Table of Contents

TABLE OF CONTENTS

LIST OF TABLES....5
LIST OF FIGURE....6
LIST OF ABBREVIATIONS....7
LIST OF ANNEXURES....9
1 INTRODUCTION....16
1.1 General....16
1.2 Screening....16
1.3 The Proponent....17
1.4 Nature and Size....17
1.5 Project Location....17
1.6 Consultant's Details....18
1.7 Purpose of Report....19
2 PROJECT DESCRIPTION....20
2.1 General....20
2.2 Screening/Type and Category of Project....20
2.3 Project Objective....20
2.4 Site Alternative....21
2.5 Project Location and Layout....21
2.6 Road Access....24
2.7 Vegetation Features....24
2.8 Project Description....24
2.8.1 Raw Material....25
2.8.2 Loose Cotton Dyeing....25
2.8.3 Dyeing of Yarn....26
2.8.4 Finishing and Final Product....27
2.8.5 Packing....28
2.9 List of Machinery....28
2.10 Supplies....28
2.10.1 Water Supply....28
2.10.2 Electricity....28
2.10.3 Manpower....28
2.10.4 Personnel Protective Equipment....28
2.11 Management Plans....29
2.11.1 Wastewater....29
2.11.2 Air Emissions....29
2.11.3 Noise....29
2.11.4 Solid Waste....30
2.12 Cost and Magnitude of Operation....30
2.13 Land Ownership....30
2.14 Government Approvals....31
2.15 Relocation and Rehabilitation Plans....31
2.16 Schedule of Implementation....31

3 DESCRIPTION OF THE ENVIRONMENT 32
3.1 Methodology 32
3.1.1 Data Collection 32
3.1.2 Social Survey 32
3.1.3 Sampling Design 32
3.1.4 Questionnaires 33
3.1.5 Data Editing and Analysis 33
3.2 Review of Legal and Administrative Framework 33
3.3 Baseline Conditions 33
3.3.1 Geography 34
3.3.2 Topography and Geology 34
3.3.3 Seismicity 34
3.3.4 Agriculture and Cropping Pattern 35
3.4 Meteorology 35
3.5 Surface Water Quality 36
3.6 Biological Environment 37
3.6.1 Flora 37
3.6.2 Fauna 37
3.6.3 Endangered Species 37
3.6.4 Archaeological Sites or Wetlands 37
3.7 Environmental Monitoring Through Laboratory 38
3.7.1 Sampling Sites 38
3.7.2 Ambient Air Quality 38
3.7.3 Noise 39
3.7.4 Water Resource 39
3.8 Socio-Economic Environment 39
3.8.1 Employment Status 39
3.8.2 Civic Amenities 40
3.8.3 Favor for the Project 40
3.8.4 Common Diseases 41
3.8.5 Community Issues 41
3.9 Quality of Life Values 41
3.9.1 Population 41
3.9.2 Religious Setup 41
3.9.3 Industrial Setup 41
3.9.4 Healthcare Facility 42
3.9.5 Educational facilities 42
3.9.6 Public Consultation 42
3.9.7 Civic Amenities 43
3.9.8 Common Diseases 43
3.9.9 Community Issues 43
3.10 Environmental Analysis 43
4 PUBLIC CONSULTATION AND PUBLIC DISCLOSURE 44

4.1 General 44
4.2 Objectives of Consultation 45
4.3 Identification of Stakeholders 45
4.3.1 Direct Stakeholders 45
4.3.2 Indirect Stakeholders 45
4.4 Public Disclosure 46
4.5 Consultation Process 46
4.6 Participants of Public Offices Contacted 47
4.7 Consultation with Beneficiaries 51
4.8 Views, Concerns and Suggestions of Various Stakeholders 51
4.9 Addressing Public Concerns 53
4.9.1 Grievances Redressed Committee 54
4.10 Results of Survey 54
4.10.1 Occupation of Respondents 54
4.10.2 Personal Income 54
4.10.3 Facilities Available 55
4.10.4 Literacy Rate 55
4.10.5 Common Diseases 56
4.10.6 Acceptance Level of the Project 56
5 IMPACT ASSESSMENT METHODOLOGY 57
5.1 Objectives 57
5.2 Methodology 57
5.2 Magnitude 58
5.2.1 Immediacy 58
5.2.2 Sustainability and Reversibility 58
5.3 Purpose of Mitigation Measure 58
5.3.1 What is the problem? 58
5.3.2 When problem will occur and when it should be addressed? 58
5.3.3 Where problem should be addressed? 59
5.3.4 How the problem should be addressed? 59
5.4 Ways of Achieving Mitigation Measures? 59
5.4.1 Changing in Planning Design 59
5.5 Impacts Associated with Project Location 60
5.6 Impact Assessment Methodology 61
5.6.1 Screening of Potential Impacts 61
5.6.2 Identification of Mitigation Measures 61
5.6.3 Evaluation of the Residual Impacts 61
5.7 Identification of Monitoring Requirements 66
6 SCREENING OF IMPACTS AND THEIR MITIGATION MEASURES 67
6.1 General 67
6.2 Objectives 67
6.3 Impact Evaluation 67
6.3.1 Methodology for Impact Evaluation 67

6.4 Impact and Mitigation Management 71
6.5 Approaches for Mitigation Measures 71
6.6 Expected Positive Impacts 72
6.6.1 Increase in Employment Opportunities 72
6.6.2 Tree Plantation 72
6.7 Adverse Impacts and Mitigation Measures 72
6.7.1 Impacts and Mitigations during Design Phase 72
6.7.2 Impacts and Mitigation during Construction Phase 76
6.7.3 Operational Phase 81
6.8 Environmental Enhancement Measures 89
7 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN 90
7.1 Objectives of Environmental Management Plan 90
7.2 Management Approach 90
7.3 Components of EMMP 91
7.4 Institutional Capacity of the Unit 91
7.4.1 Primary Responsibilities 92
7.4.2 Operation Management & Control 92
7.4.3 Supervision & Monitoring 92
7.4.4 Communications and Documentation 92
7.4.5 Meetings 92
7.4.6 Changes-Record Register 92
7.5 Summary of Impacts & Mitigation Measures 93
7.6 Environmental Training 95
7.6 Equipment Maintenance Details 96
7.7 Environmental Budget 97
8 CONCLUSION AND RECOMMENDATION 98
8.1 Recommendations 98

LIST OF TABLE

Table 1: Details of Proponent 17
Table 02: Consultant Details 18
Table 03: List of Experts 18
Table 4: List of Dyes and Chemicals to be Used 25
Table 5: List of Machinery 28
Table 6: Schedule of Implementation 31
Table 7: Average Temperature and Rate of Precipitation 35
Table 8: Sampling Sites Details 38
Table 09: Ambient Air Quality 38
Table 10: Noise Level Monitoring 39
Table 11: Water Quality Results 39
Table 12: Views of Participants of Public Sector Stakeholders 47
Table 13: Views and Concerns of Stakeholders 52
Table 14: Impact Significance Criteria 62
Table 15: Impact Matrix Checklist for Designing Phase 63
Table 16: Impact Matrix Checklist for Construction Phase 64
Table 17: Impact Matrix Checklist for Operational Phase 65
Table 18: Impact Screening Checklist 69
Table 19: Impact Evaluation Matrix 70
Table 20: Approaches for Mitigation Measures 71
Table 21: Responsibilities of Management 90
Table 22: Summary of Impacts and Mitigation Measures 94
Table 23: Training Schedule 96
Table 26: Equipment Maintenance Details 96

LIST OF FIGURE

Figure 1: Project Location..... 17
Figure 2: Google Map showing distance of Residential from Proposed Site 22
Figure 3: Map Showing Distances of Industries from Project Area 23
Figure 4: Road Access Map of Proposed Site 24
Figure 5: Seismic Zoning of Pakistan 35
Figure 6: Temperature Graph..... 36
Figure 7: Distance of Project Area from Canal..... 36
Figure 08: Employment Status of the Community 40
Figure 09: Percentage of Respondent Favored Project..... 40
Figure 10: Hospitals located in Project Area Vicinity 42
Figure 11: Consultation with EPA Field Office 48
Figure 12: Consultation with Punjab Forest Department 49
Figure 13: Consultation with Industries Department..... 49
Figure 14: Consultation with Affected Community..... 51
Figure 15: Occupation of Respondents..... 54
Figure 16: Personal Income..... 55
Figure 17: Literacy Rate of the Study Area..... 55
Figure 18: Project Acceptance Level..... 56
Figure 19: Hierarchy of Mitigations 61

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LIST OF ABBREVIATIONS

Approx.	Approximately
BOM	Board of Management
°C	Degree Celsius
dB (A)	A weighted Decibel Scale
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
Engr.	Engineer
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EPO	Environmental Protection Ordinance
GEL	Global Environmental Lab
Hons.	Honors
Km	Kilometer
Ltd.	Limited
LTI	Loss Time Injury
LWI	Loss Work Injury
m^3/h	Cubic Meter per Hour
NEQS	National Environmental Quality Standards
No.	Number
NOC	No Objection Certificate

PEPC	Pakistan Environmental Protection Council
PEPA, 1997	Pakistan Environmental Protection Act, 1997
PEPA, 2012	Pakistan Environmental Protection (Amendment) Act, 2012
PEPO	Pakistan Environmental Protection Ordinance
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipments
Pvt.	Private
SOPs	Standard Operating Procedures
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Agency

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LIST OF ANNEXURES

ANNEXURE I	PROPONENT CNIC
ANNEXURE II	PROPERTY DOCUMENT
ANNEXURE III	TERMS OF REFERENCES
ANNEXURE IV	LAYOUT MAP
ANNEXURE V	SOCIO-ECONOMIC QUESTIONNAIRES
ANNEXURE VI	ENVIRONMENTAL MONITORING REPORTS
ANNEXURE VII	LIST OF MACHINERY
ANNEXURE VIII	CYCLONES DRAWING
ANNEXURE IX	TEAM LIST
ANNEXURE X	REFERENCES
ANNEXURE XI	GLOSSARY

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Executive Summary

EXECUTIVE SUMMARY

This executive summary presents an overview of the main findings of Environmental Impact Assessment (EIA) Report for the establishment of "Cotton and Yarn Dyeing Unit" by M/s Cottonera Pvt. Limited proposed to be constructed at 24-km,Multan Road Link Amritcola Road District Lahore . The purpose of project is to establish a cotton and yarn dyeing unit to produce dyed fabric for domestic as well as industrial purpose. For this instance, Environmental Impact Assessment (EIA) Study of aforesaid project has been conducted to accord Environmental Approval from Environmental Protection Department under Punjab Environmental Protection (Amendment) Act, 2012 and IEE/EIA Regulations 2000. The process for conducting environmental assessment and the results of EIA Study are described in detail in this document.

1. Introduction

The aforesaid project fall under **Category B (9)** Schedule II i.e., ***Manufacturing and Processing of IEE and EIA Regulations, 2000.*** It requires an EIA Study. Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval/NOC. The purpose of project is to establish a "cotton and yarn dyeing unit" for the production of dyed fabric to be utilized in making of apparels and fulfill the market need.

The estimated project cost is **PKR 240 million**, the breakdown of the project cost is given in Chapter 02 of this EIA Report and the environmental budget allocated for the protection of environment is 1% of the total budget.

2. Project Description

The proponent has planned to establish a cotton and yarn dyeing unit to fulfill the need of the market. The loose cotton and yarn shall be dyed with different colors using vat and reactive dyes (list of the dyes to be used is attached herewith). Approximately 8 ton/day of dyed material (cotton and yarn) will produce. The processing of cotton and yarn involves a complete mechanism mentioned in Chapter 02 of this EIA Report.

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Salient Features of Project

Project Name	Cotton and Yarn Dyeing Unit by M/s Cotton Era
Location	24-km,Multan Road Link Amritcola Road District Lahore
Proponent Name	Muhammad Imran Malik and Mubarik Ali
Project Cost	Approx. PKR 240 Million
Total Area	16 Kanal and 11 Marlas
Consultant Name	Ecogreen Company (Pvt) Limited
Product	Dyed Cotton and Yarn
Purpose	Dyeing Unit
Product Capacity	8 tons of dyed material/day
Nature of the Area	Industrial
Solid Waste Management	Managed as per Practices of Area
Groundwater	100-1200 ft
Source of Power	LESCO (WAPDA); 01 standby generators of 450KW capacity
Period of Construction	01 Year
Site Coordinates	31°20'43.91"North and 74°08'27.31"East.

3. Site Alternative

The selected site for construction of aforesaid project is located within industrial area. The study area has developed as an industrial area and few other industries are present in project area vicinity. The selected site is ideal from the point of view of compatibility with other land uses within the area. The site is also spacious enough to accommodate the proposed facility and related infrastructure. In selected site, existing infrastructural facilities will be utilized. Due to existing infrastructure and its strategic location, the proposed site is ideal and suitable for the proposed development. Additionally, the piece of land is has been leased to proponent for 10 years. Moreover, the proponent is very concerned and conscious about the quality and equally about the environmental protection and resource conservation.

4. Major Impacts and Mitigatory Measures

Following impacts are likely to occur during constructional and operational phase of aforesaid project:

4.1 Construction Phase

Anticipated impacts associated with the construction phase include noise (machine noise and vehicular noise), air emissions from earthwork and construction machinery and vehicles, and soil

contamination due to leakage from or accidents of the construction or transportation vehicles or during on-site refueling, solid waste from construction activities, municipal water and safety of the workers and employment conflicts as the major adverse environmental impacts. Since the project is to be commenced on a reserved area and no human settlement exists within safe radius of selected site, construction related impacts are not expected to extend to the community.

Mitigation measures recommended to be incorporated into the project include running the machines and vehicles on good quality low-sulfur fuels in good working order ensuring regular maintenance, tuning and servicing, and providing them with emission control devices, such as mufflers and silencers, etc. Water suppression and covered transportation and storage of the construction materials and slow driving on unpaved roads will control dust emission. Regular testing for leakage detection will also be ensured. Solid waste of construction activities will be used for flooring, while the remaining solid waste will be managed as per practices in the area. For community safety, irrelevant persons will not be allowed inside. Safety of the workers will be ensured by developing SOPs for all jobs, training the workers to follow SOPs, discouraging any careless attitude of workers and providing the workers with, and encouraging them to use PPEs.

4.2 Operational Phase

From the aforesaid activity process wastewater will be generated at the rate of 30,000 liters/day. The wastewater will be treated by using adequate wastewater treatment. Adequate ventilation and use of dust masks by workers will be mitigation measures for dust emissions will be adopted. All the solid waste will be handled by the municipality practices of the area, so this is an insignificant issue. Machinery will be regularly serviced and tuned to mitigate noise at source, noise barriers will block noise propagation and receptors will be protected by the use of PPEs. An Emergency Response Plan will also be in place and the workers will be trained and guided about it.

Impact and Mitigtion Summary

Impact	Mitigation Measure	
	Construction Phase	**Operation Phase**
Solid Waste	• Provide solid waste handling	• Proper solid waste handling will

Generation	facilities such as waste bins and skips in all sections of the factory. • Ensure that solid waste generated is regularly disposed off appropriately. • Waste will be managed by as per municipal practices. • Non-biodegradable and recyclable matter, such as containers, wastes, used materials and waste packaging materials will be sold to local contractors for recycling or reuse purpose.	be done. • Packaging waste, cutting waste will be properly disposed off at solid waste handling area. • Cuttings of waste fabric will be re-used in other processes. • Sludge from WWTP will be handled by waste contractors and the suggested method for safe disposal.
Wastewater Generation	• No water will be disposed off into sewer lines without proper treatment. • Municipal wastewater will be handled by septic tank and disposed off into nearby drains.	• Process waste water will be managed through Wastewater Treatment Plant with a capacity of 30 m^3/hour. • The treatment system shall bring the values of untreated effluent within the limits of treated effluent discharge also to ensure this treatment as an environmental friendly method with compliance of PEQS. • WWTP of adequate technology and capacity will be installed for the treatment of wastewater.
Air Pollution	• Management needs to regularly carry out checks of all machinery and carry out regular servicing and maintenance of it in order to keep the environmental impact on account of their emissions to its minimum level. • For reducing fugitive dust, regular water sprinkling on roads will be done. • All trucks proposed to be used for transportation will be covered with tarpaulin, maintained and optimally loaded. • Moreover, the garden development and tree plantation activities of proponent during	• Air emissions will chiefly arise from boiler along with solvent vapor, odor, PM, dust and lint from floor cleaning and from the generators. • Proper ventilation plan, good housekeeping, and regular monitoring for preventive maintenance of the generators are the control measures which will check air pollution. • Air masks, helmets and safety uniforms will be provided to the workers and proper check will be made to check its compliance in the premises.

	operational phase would ensure minimal impact of fugitive dust emissions. • Generators will be provided with proper enclosure, tuning and maintenance to control emissions.	
Noise & Vibration	• Proper encasement of noise generating sources will be done to keep the noise levels within limits. • Generator will be provided with acoustic enclosures and silencers in the exhaust. It will be housed in a closed building which will considerably reduce the noise. In case of maintenance, the persons working near the generator building will be provided with ear muffs. • A thick greenbelt will be developed all around the plant which will be acting as noise barrier. • The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows. • The use of complete or partial enclosures. • Attenuation by use of sound absorbents on walls and fixed or suspended ceilings	• Noise from the generator will be mitigated by enclosing them in sound proof rooms and planting trees. • Workers will be protected by providing them with PPEs (ear muffs, ear plugs, etc.). • Safety issue will be managed by developing and updating from time to time, the SOPs for all work activities, training the workers to follow them, not tolerating any careless attitude of the employees during work. • Regular inspection to ensure no unsafe act or condition prevails at work site and lastly, by providing the workers with necessary PPEs (safety helmets, dust masks, safety shoes, ear plugs, special suiting for various jobs and areas, etc.) and encouraging the workers to use them

5. Proposed Monitoring

During construction, ambient air quality for dust level in particular, vehicle and equipment exhaust, noise level, solid waste management and soil contamination, and community and workers' safety (visual) need to be monitored on regular basis. During operation, ambient air quality for dust level in particular, noise level, solid waste management and soil contamination, and community & workers safety need to be monitored on quarterly basis. Monitoring Plan has been included in **Chapter 05.**

6. Conclusion

The environmental impact assessment study contains description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study. While the objectives of this study have been to describe the project and its environmental impact, it also identifies adverse environmental factors associated with the project. Appropriate mitigation measures as explained in the environmental study should reduce, if not eliminate, these impacts so that these are within acceptable limits. It is further concluded that all potential environmental concerns associated with the project have been adequately addressed, and no further study is required in this context. The objective of preparation of an environmental study is to identify how the environment is impacted and to suggest mitigating measures to reduce if not totally eliminate adverse effects of a project. It is accordingly recommended that Environmental Approval for the project should be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponents of the project.

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Chapter 1

Introduction

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1 INTRODUCTION

1.1 General

For any development project to be initiated in Punjab, it is mandatory to accord Environmental Approval from EPA Punjab under Section-12 of the Punjab Environmental Protection (Amendment) Act, 2012 by filing an IEE or EIA before EPA Punjab, as may be defined in Review of IEE/EIA Regulations, 2000 or recommended by EPA Punjab. This Report represents the Environmental Impact Assessment (EIA) Study for the establishment of "Cotton and Yarn Dyeing Unit" by M/s Cottonera Pvt Limited. For this purpose the proponent engaged environmental consultants; M/s Ecogreen Company (Pvt) Limited to conduct EIA Study for the construction of aforesaid project. The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the construction and operation phase of project and to find out appropriate measures for their mitigation, to either eliminate those impacts or to bring them to acceptable level and formulation of Environmental Management Plan (EMP) for implementation of the project in environment friendly manner.

This EIA Report is prepared by critical examining environmental factors which might be affected due to construction and operation of project. The purpose of this study is to analyze impacts associated with the construction and commencement of aforesaid project. This report provides the basis for a determination of degree of environmental impacts of project. This EIA Report provides relevant information, as required under the officially approved format, to help the decision makers i.e. EPA Punjab before issuing for the Environmental Approval.

1.2 Screening

As per directions of Punjab Environmental Protection Act 2012, IEE and EIA Regulations, 2000 the establishment of "Cotton and Yarn Dyeing Unit" falls under **Category B (9);** ***Manufacturing and Processing (Synthetic resins, plastic and man-made fibers, paper and paper board, paper pulping, plastic products, textile (except apparel), printing & publishing, paints & dyes, oils, fats and vegetable ghee projects, with total cost more than Rs. 10 million) mentioned under Schedule II.*** It requires an EIA Study. Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval/NOC.

1.3 The Proponent

The details of proponent of aforesaid project are given below:

Table 1: Details of Proponent

Sr#	Details of Proponent	
1	Name	Mr. Muhammad Imran Malik
2	Designation	Director
3	Contact No.	0345-2499999
4	Company	M/s Cottonera Pvt. Limited

1.4 Nature and Size

The aforesaid project under study is titled as "Establishment of Cotton and Yarn Dyeing Unit" by M/s Cottonera Pvt. Limited. The production capacity of aforesaid project is 8 tons/day of dyed material. The total area of aforesaid project is 16 kanals and 11 marlas.

1.5 Project Location

This project is to be located at 24-km, Multan Road-link-Amratcola, Mouza Mohlanwal District Lahore. The coordinates of site are; 31°20'43.91"North and 74°08'27.31"East. The location of the aforesaid project is:



Figure 1: Project Location

1.6 Consultant's Details

The proponent has engaged M/s Ecogreen Company (Pvt) Limited to conduct the EIA Study for the establishment of aforesaid project in accordance with Punjab-EPA guidelines. For this purpose, Ecogreen Company has engaged the group of professionals which comprises of environmental specialists, environmental engineers and chemical engineer. The details of the consultants are given below:

Table 02: Consultant Details

Sr#	Consultant Details	
1	Consultant	Ecogreen Company (Pvt) Limited
2	Address	1st, 2nd and 3rd Floor, Plot#02, mini commercial area, near Gate#01, Canal View Housing Society, Lahore
3	Contact No.	042-37171189
Focal Person		
1	Name	Miss Leenah Maqbool
2	Designation	Asst. Manager Operations
3	Contact No.	+92-320-0800112

To prepare EIA Report of the respective project the company engaged the following experts. The details of the experts are given below in Table 03:

Table 03: List of Experts

Sr. #	Name	Qualification
Team Leader		
1	Ms. Leenah Maqbool	M.Phil. Environmental Sciences
Environmental Scientist		
2	Ms. Ambreen Lateef	Ph.D. Environmental Sciences
3	Ms. Foqia Khalid	Ph.D. Environmental Sciences (Scholar)
4	Mrs. Marium Ijaz	M.Phil. Environmental Sciences
5	Mr. Adnan Naeem	MS Env. Science & M.Sc. Analytical Chemistry
6	Ms. Zahra Anwar	M.Phil. Environmental Sciences
7	Mr. Shahid Kamran	M.Phil. Environmental Sciences
8	Mr. Danial Zaib	BS Environmental Sciences
Environmental Engineers		
9	Engr. Tanveer Ahmed	M.Sc. Environmental Engineering
10	Engr. Bilal Khan	B.Sc. Environmental Engineering
11	Engr, Usman Waqas	B.Sc. Environmental Engineering
12	Engr. M. Usman	B.Sc. Environmental Engineering

1.7 Purpose of Report

The main objectives of this EIA Study were:

- To determine and record the state of the environment of the project area to establish a baseline in order to assess the suitability of the project in the proposed area.
- To identify pre-construction/design, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in the cost effective manner.
- To present mitigation and monitoring plan for smooth implementation of the suggested mitigation measures and supervises their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an EIA Report for submission to the EPA, Punjab for Environmental Approval (NOC).

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Chapter 2

Project Description

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2 PROJECT DESCRIPTION

2.1 General

This section covers the project comprehensively. It holds salient features including; location, project site layout, objectives, process employed, site alternatives, cost and magnitude of operation and various phases.

2.2 Screening/Type and Category of Project

For the prediction and mitigation of impacts of development at an early stage, it is pre-requisite under the environmental laws to undertake Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Study as the case may be. Based on its nature, size and related impacts, the project under consideration has been categorized for EIA Study as stated in Regulation 03 of Statutory Notification (S.R.O 339(1)/2001). As per the statutory notification of Review of IEE and EIA Regulations, 2000 made under Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2012), states;

"No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be or where the project is likely to cause an adverse environmental effects an Environmental Impact Assessment (EIA) and has obtained from the Government Agency approval in respect thereof."

The aforesaid project i.e., "Dyeing Unit" falls under **Category B (9); *Manufacturing and Processing (Synthetic resins, plastic and man-made fibers, paper and paper board, paper pulping, plastic products, textile (except apparel), printing & publishing, paints & dyes, oils, fats and vegetable ghee projects, with total cost more than Rs. 10 million) mentioned under Schedule II.*** Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval/NOC.

2.3 Project Objective

The objective of aforesaid project i.e., establishment of cotton and yarn dyeing unit is to go for forward integration and manufacture high quality products with good market potential. The project will encompass modern state-of-the-art facility with the objective of producing superior quality products. The project will have following advantages:

- The project will provide additional income and gainful employment to local people.
- It will help to produce superior quality products for end consumers.
- The proposed project is itself value addition project.
- Socio-economic up-lift of the proponent
- Creation of new job opportunities and promoting income prospects for those engaged in the allied activities associated with operation of project is considered as indirect objectives of the project.

2.4 Site Alternative

The selected site for proposed project is located at commercial cum industrial area. The area is developed as an industrial and few of the industries are in operation. The proposed project site is ideal from the point of view of compatibility with other land uses within the area. The site is also spacious enough to accommodate the proposed facility and its infrastructure. After the proposed project existing infrastructural facilities will be utilized. Due to existing infrastructure and its strategic location, it is our considered view that the proposed site is ideal and suitable for the proposed development. Moreover, the proponent is very concerned and conscious about the quality and equally about the environmental protection and resource conservation.

2.5 Project Location and Layout

The site under consideration for the establishment of "Cotton and Yarn Dyeing Unit" by M/s Cottonera Pvt Limited is located at 24-km, Multan Road Link Amratcola Road, Mouza Mohlanwal, District Lahore. The coordinates of site are; 31°20'43.91"North and 74°08'27.31"East. The location of aforesaid project is given below and the layout of aforesaid project is attached herewith as **Annex-VI**.

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Figure 2: Google Map showing distance of Residential from Proposed Site

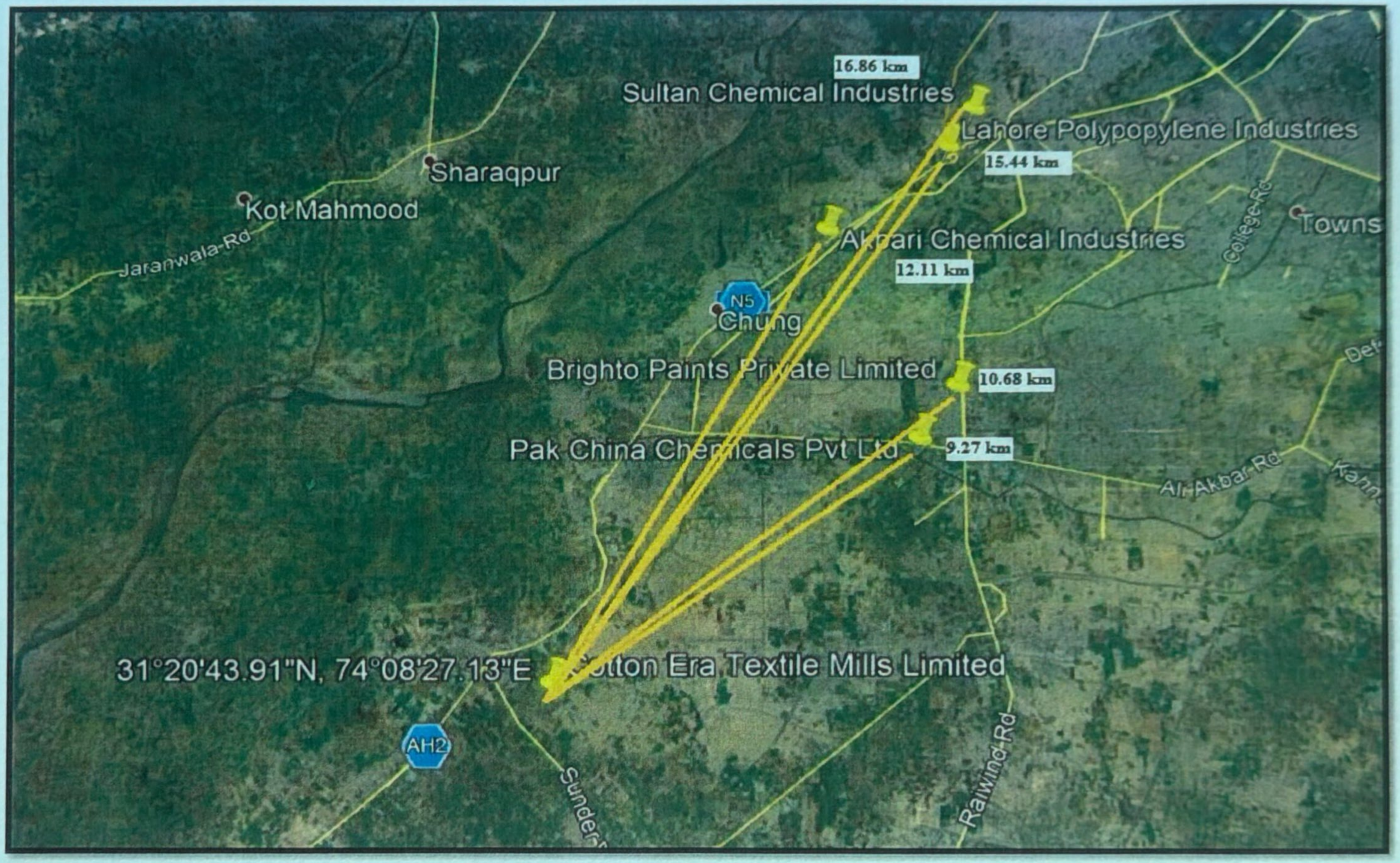


Figure 3: Map Showing Distances of Industries from Project Area

2.6 Road Access

The site is accessible through Multan Road (N5), Canal Bank Road and Sundar Road. The road access map of project is attached below:

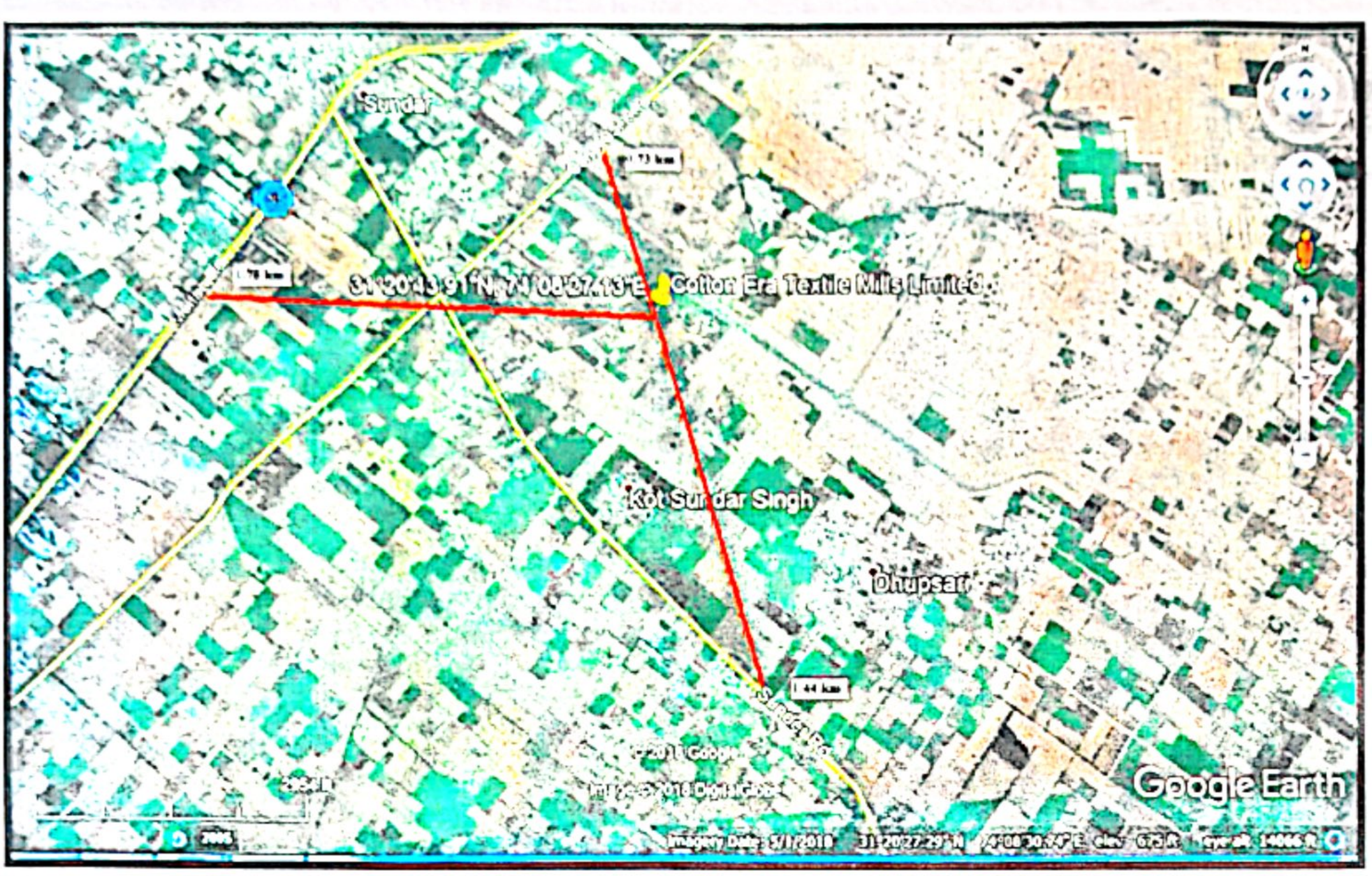


Figure 4: Road Access Map of Proposed Site

2.7 Vegetation Features

Agricultural crops, bushes and wild grasses are present in the nearby surroundings of project area. During operation phase, green belts will be developed and it will serve as a useful buffer to contain the menace of pollution from different sources. As a control measure of atmospheric pollution, as a barriers noise generated within the premises it is recommended to develop green belt.

2.8 Project Description

The proponent has planned to establish a cotton and yarn dyeing unit to fulfill the need of market. The loose cotton and yarn will be dyed in different color using vat and reactive dyes according to the client demand. The product capacity will be 8 tons of dyed material per day. The processing of fabric involves a complete mechanism mentioned in this EIA Report.

Dyeing process for different textile material could be different but its basic idea is same for all. For all types of dyeing pre-treatment is must for removing unwanted material from textile materials. Pre-treatment styles differ for the shade of dyed material. Shade may be light or deep. Also, these

pre-treatment depends on buyer's requirements. After, pre-treatment textile materials are ready for dyeing and after dyeing treatment is necessary to get the final finished products. The list of the dyes to be used is given below:

Table 4: List of Dyes and Chemicals to be Used

CHEMICALS	DYES
ALKAPOL RGN.L (wetting Agent)	Syn G.Yellow 2GR
Exoline 4000wel (wash.off)	Synzol G.Yellow 4GR
Kollasol CDA (Leveler)	Corfix Yellow MERP
Sarabid MIP (Leveler)	SYN L-Yellow 4GL
Sarabid VAT (Leveler)	Sin L-Yellow BF4GL
Exolubu NC	Syn U-Yellow DS
Alkaquest 540 (Sequester)	Syn Red 6BN
Lustraffin AS (Softner)	Corfix Red ME4BP
Rocofil AWU (Softner)	Syn Red GD
Tubingal RSK (Softner)	Syn U.Red DS
Alkafix FK.600 (Fixer)	Syn U.Wine DS
SINAR WHITE DHX	Sin Black VBB
ALKABID LDR (LEVELER)	Syn U.Black R
Acetex plus	SYN U.Black DR
Hydrogen (DESCON)	SYN U.Black G
Alka Gal Konz (Stabilizer)	Corfix Black GDNNX
	Sinar Black HSN
	Syn Brilient Blue R
	Sin Blue RA
	Syn Blue KBR
	SIN BLUE HSR
	CORAZOL BLUE RN
	Syn Turq 266%
	Syn Turq 165%
	SINAR Turq VG 165%
	Syn Orange RR
	Sinar Orange BF2R
	Syn Navy Blue KBF
	Sin Navy BLUE RHC
	Sin Navy BLUE SKBF
	Syn U.Navy DS
	Syn U.Navy DSR

2.8.1 Raw Material

Following raw material to be used for the production of 8 tons of dyed material per day:

- Loose Cotton
- Yarn
- Dyes
- Chemicals

2.8.2 Loose Cotton Dyeing

The process employed for the dyeing of the loose cotton:

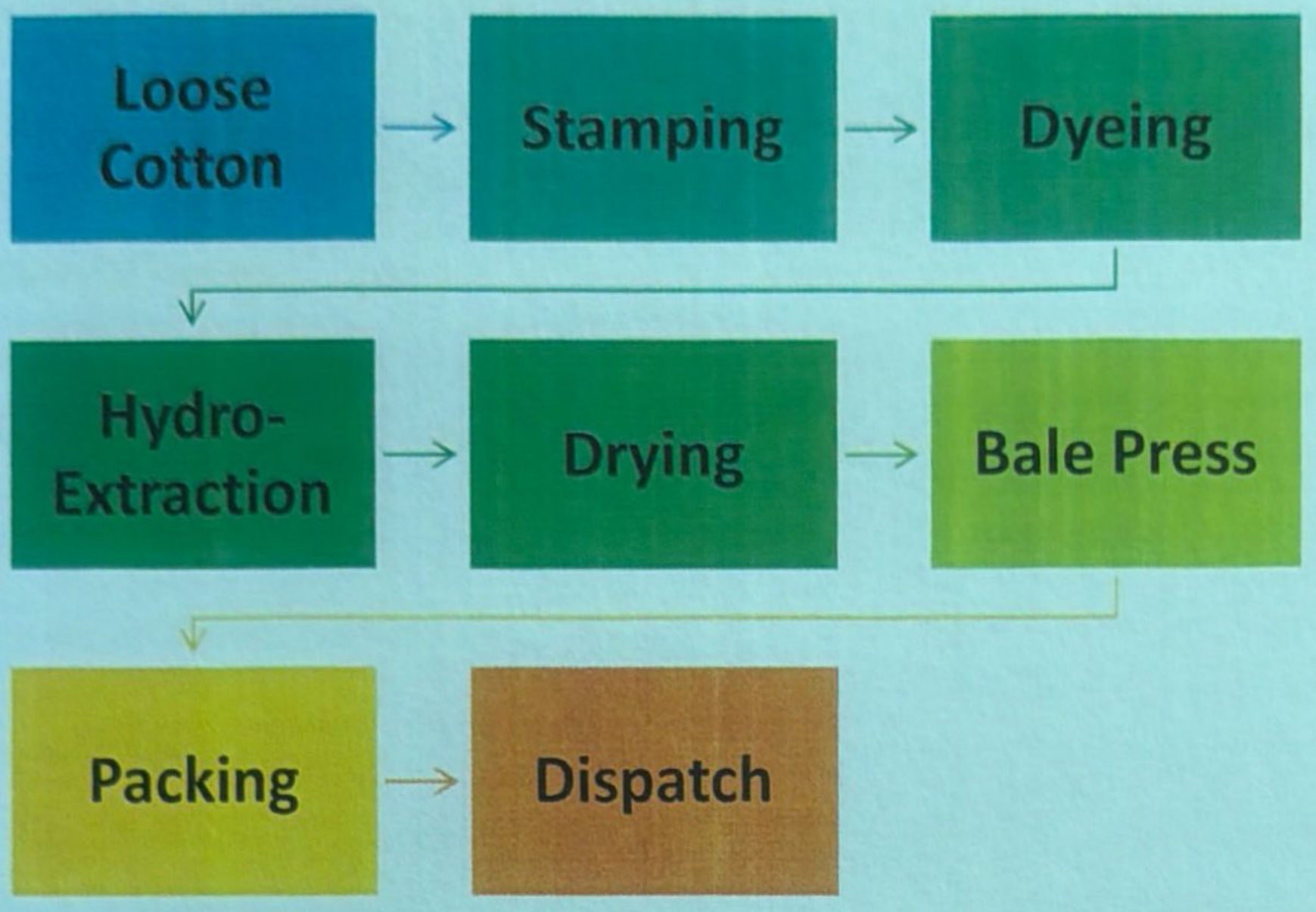


Figure 5: Cotton Dyeing Process

a. Stamping

The first step in dyeing loose cotton is stamping. It includes

b. Dyeing

For the dyeing of the loose cotton batch dying process will be employed. In this process dyes and chemicals in the required amount will be feed, this process will be carried out for 8 hours.

c. Hydro-Extraction

After dyeing, hydro-extraction process will be carried by employed. In this process cotton will be dried by using mechanical process. In this process energy will be saved.

d. Drying

Drying will be done through steam generated from boiler.

e. Bale Pressing

After drying the loose cotton will be pressed into bales for transportation.

2.8.3 Dyeing of Yarn

In process of yarn dyeing following steps will be employed:

a. Soft Winding

In yarn dyeing process; soft winding section is the first section. In this section yarn is transferred from paper cone to plastic tube or spring tube for facilities the dyeing process. It is one type of re-winding process.

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b. Dyeing

For the dyeing of yarn, batch dyeing process will be employed. In this process the yarn after soft winding is feed into batch dyeing machine for 8 hours.

c. Hydro-Extraction

After dyeing, hydro-extraction process will be carried by employed. In this process cotton will be dried by using mechanical process. In this process energy will be saved.

d. Drying

Drying will be done through steam generated from boiler.

e. Re-winding

This is the last step of yarn dyeing process. In this section dyed and dried yarn is re-wind on the plastic cones/tubes from spring cones. After, this section the yarn is ready for dispatched.

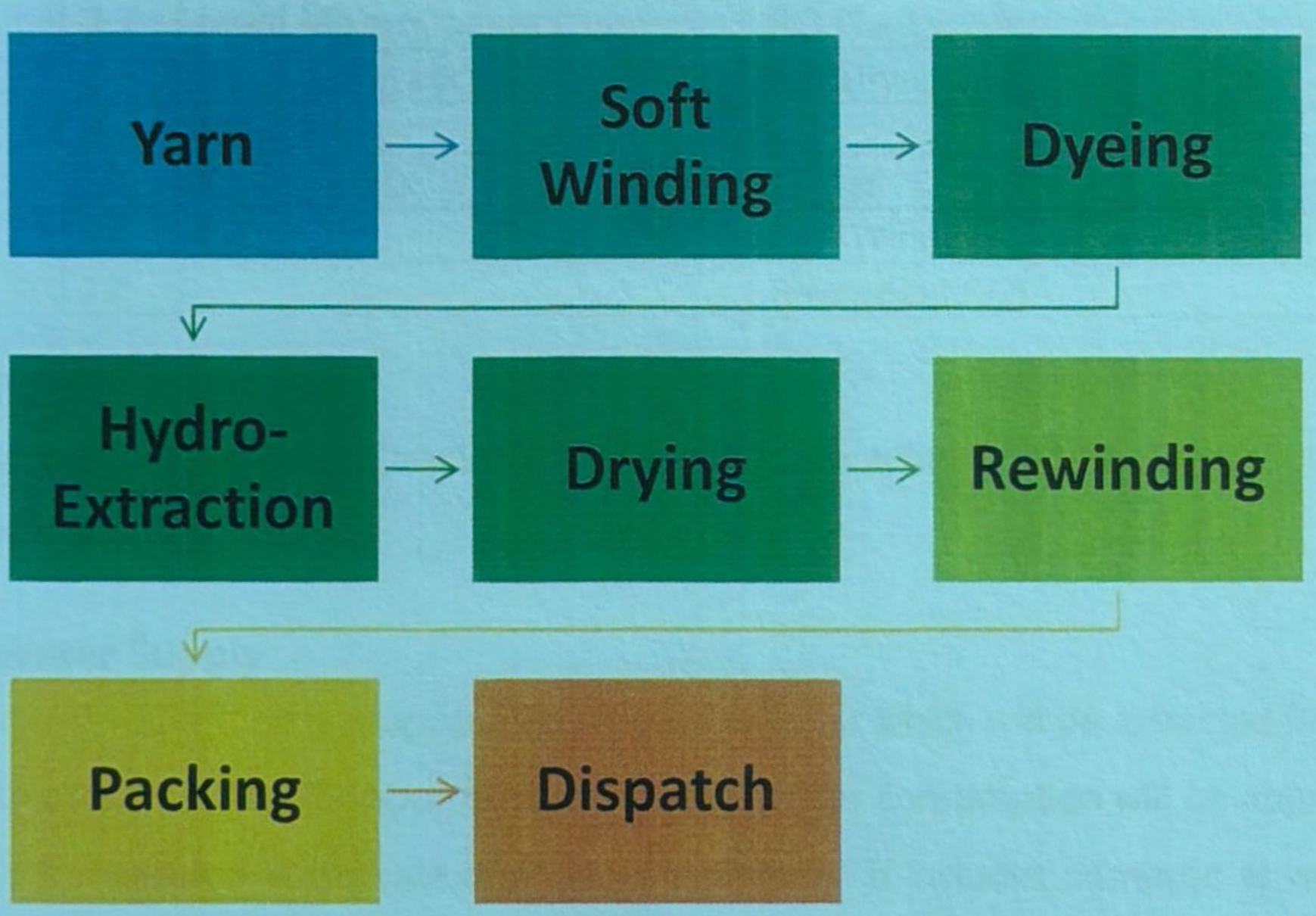


Figure 6: Yarn Dyeing Process

2.8.4 Finishing and Final Product

In order to impart the required functional properties to raw cotton and yarn, it is customary to subject the material to different types of physical and chemical treatments for example, stamping/winding for cotton or yarn. The production capacity of aforesaid project will be 8 tons of dyed material per day.

2.8.5 Packing

Final product will be packed and will be ready to be shipped in market to fulfill the market demand.

2.9 List of Machinery

Following machines will be used for the processing of greige cloth (staple/viscose):

Table 5: List of Machinery

	Loose Cotton	Yarn Dyeing
1	Stamping Press	Boiler
2	Dyeing Machine (02)	Crane
3	Wet Opener	Stamp Pressing
4	Hydro-extractor	Dyeing Machines (04)
5	Breaker/Feeder	Compressors (02)
6	Drum Dryer	Hydro-extractor (03)
7	Multi Mixer/Opener	RO Plant
8	Inspection Latice	R.F. Dryer
9	Condenser	Lift
10	Bailing Press	Chiller
11	Crane	Soft Winding
12		Rewinding (02)

2.10 Supplies

Following supplies will be required/utilized for the manufacturing of the production of 8 tons of dyed material per day:

2.10.1 Water Supply

The source of water for the proposed site is ground water which will be extracted from ground at the depth of 300-350 ft. The approximate domestic water consumption will be approximately 5.5 m^3/day it is measured at the rate of 45 liters/capita/day. It includes domestic as well as process water consumption.

2.10.2 Electricity

LESCO (WAPDA) will be the main source of the power. However, one (01) generator will be on standby mode having capacity of 450KW (Doosan Infracore Co).

2.10.3 Manpower

There will be approximately 20-25 workers during construction phase and 120-125 workers will be hired during operational phase.

2.10.4 Personnel Protective Equipment

Following Personnel Protective Equipment will be provided to the workers for their safety:

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2.14 Government Approvals

Proponent will apply in concerned government departments for approval after obtaining Environmental Approval from EPA.

2.15 Relocation and Rehabilitation Plans

There exists no human settlement within a safe radius of the selected project site to be displaced owing to the commencement of the Project. No structure of any significance stands at the site to be relocated or dismantled.

2.16 Schedule of Implementation

The proponent intended to complete the construction in a period of a year.

Table 6: Schedule of Implementation

Sr. #	Activities	6 Months			6 Months		
		2M	2M	2M	2M	2M	2M
1	Detailed Designing						
2	Mobilization of Contractors						
3	Preparation of site						
4	Civil Works						
6	Installation of facilities						

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- Protective Gaggles
- Protective leather/rubber shoes
- Gloves-leather, canvas, rubber and plastic
- Gas masks
- Protective shields
- Helmets
- Overcoats

2.11 Management Plans

For the management of the wastewater and air emissions following measures will be adopted:

2.11.1 Wastewater

The wastewater (process and domestic) will be generated at the rate of 30m^3/hour. Approximately, 25m^3/hour of the wastewater will be generated from the dyeing process. This generated wastewater will be treated through proper WWTP plant of adequate capacity.

2.11.2 Air Emissions

No air emission is likely to be released during operation of aforesaid project; except the dust or PM to be produced during floor cleaning and other such operations, which also will not be posing any environmental threat (will not breach the safe standards). Wet suppression will be done to control dust emissions. Generator will be kept in proper enclosure.

The only source of air emissions is from boiler as coal will be used for the generation of steam. It is equipped with multi-tube cyclones, cyclone and wet-scrubbers to control the air emissions efficiently.

2.11.3 Noise

All the machinery will be installed and operated in a closed hall and from operation of machinery; generator noise will not be a problem for the residents in nearby area. Further, administration of unit it will take the precautionary measures to avoid the noise emissions. There is no possibility of noise pollution from aforesaid activity. Installation activities will however add great to the noise, but that noise will be temporary and will be mitigated by measures as stated in **Chapter-04**.

Further, trees will be planted within the facility which will act as noise absorbers and workers will used as PPEs whenever and wherever might be necessary.

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2.11.4 Solid Waste

Waste generated during construction would include mostly construction material (mainly steel and wood), empty cement bags, excavated earth and general packaging waste. Waste will be stored within the facility until transfer to the ultimate waste disposal site. Estimated solid waste generated during operational phase will comprise of dust and sticks, empty packages and domestic solid waste. The quantity of domestic solid waste will be generated at the rate of 20-30 kg/day and it will be handled as per practices of area.

However, from the process activity solid waste will consist of packing material of dyes and chemicals which will be handled by adopting standard practices.

2.12 Cost and Magnitude of Operation

The estimated initial capital cost of aforesaid project is PKR 240 million. Purchase of raw material, operation and maintenance of production machinery are the costly activities involved in the operation phase of said project. Equipment safety will be assured if these operations are carefully managed. No separate fund allocation is required for the maintenance. However, budget will be allocated for purchase and maintenance of standardized PPEs for workers, for waste management and environmental enhancement. Despite these costs, this project was found to be financially feasible in the feasibility report. Magnitude of operations includes:

- Applying and getting all necessary approvals and contracts
- Construction of aforesaid facility
- Installation of machinery
- Installation of firefighting equipment
- Marking of emergency exits and assembly points
- Tree plantation and landscaping

The allocated environmental budget is **PKR 2.4 million** approx. The allocated environmental budget will be spent on planting trees, mitigation measures adopted, environmental monitoring and installation of pollution abatement devices. The proponent will plant indigenous and ornamental plants to increase the aesthetic value of the area. Thus, the project is also a source of employment for locals and would help in economic development activities of area.

2.13 Land Ownership

The proponent of aforesaid project is under the process of purchasing land. The contract agreement between both parties is attached herewith which clearly shows that the site selected for the Project lies under the owner's ownership without any dispute.

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Chapter 3

Environmental and Social Baseline Conditions

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3 DESCRIPTION OF THE ENVIRONMENT

This chapter provides baseline data (physical, biological and socio-economic parameters) related to the project and study area. The information has been compiled by using primary and secondary data resources. This chapter also refers to the theoretical analysis of the methodology adopted for collection of primary and secondary baseline data. The underlying principles and practices adopted in this regard are also discussed.

3.1 Methodology

The methodology employed to collect the baseline data and information regarding the social structure and various related parameters as discussed in sub-sections below:

3.1.1 Data Collection

The primary data was collected by visiting the project area and its nearby communities. The secondary data regarding physical parameters (topography, geology, seismology, and climate) was obtained by visiting relevant various government departments and their official websites. The biological parameters such as flora and fauna were studied by preparing a floristic list based on visual observation and fauna was studied by using opportunities approach. The species were recorded with reference to their existence in the project area. Information on wildlife fauna specie (mammals, amphibians, reptiles, birds, etc.) in the assessment area was compiled based on opportunistic observation, gathering the existing information and consultation with local experts, community members, government and Non-Government Organizations (NGOs). The socio-economic aspects were studied and analyzed by conducting socio-economic surveys.

3.1.2 Social Survey

The purpose of social survey was to record the socio-economic conditions of people residing in the study area and to assess the expected project impacts on their life, subsistence systems and socio-cultural values. Prior to conducting the field surveys, the following steps were taken:

- Clear boundaries of the project area were identified
- The sampling procedure in order to draw a representative sample size of the target population and households were designed
- The tools for data collection i.e. questionnaires to access the socio-economic status of the area were developed

3.1.3 Sampling Design

Social baseline data of the persons residing in the study area has been estimated and collected through random sampling by using pre-developed questionnaires.

3.1.4 Questionnaires

In order to test the validity and reliability of the proposed questionnaires, they were reviewed to assess whether questions needed to be clarified, changed or re-sequenced and then a final editing of questionnaires was conducted prior to their application in the project area. The sample of socio-economic questionnaires used is attached as **Annex-V** of this EIA Report.

3.1.5 Data Editing and Analysis

The filled questionnaires and recorded information were compiled by the same field investigators who were involved in the data collection. This was done immediately after completing the field investigations and the data sets were processed accordingly. Analysis of the data and preparation of conclusions in the minimum possible time was done using statistical techniques of data analysis.

3.2 Review of Legal and Administrative Framework

The objective of reviewing legal and administrative framework is to obtain information on all legislation pertaining project development. The socio-environment team of Ecogreen Company (Pvt) Limited reviewed the environmental policies, national, international and provincial laws and guidelines relevant to the development of aforesaid project which helped in systematic identification of impacts.

3.3 Baseline Conditions

Baseline conditions refer to the existing physical, environmental and socio-economic status of project and study area. On the basis of baseline information, the project interventions are assessed and mitigation measures are proposed accordingly. The baseline information also helps to indicate the specific issues to be monitored during construction and operational phases of project development. The baseline data (physical, biological and socio-economic parameters) related to project and study area is described in sub-sections below. Information provided is based on primary and secondary data collected by site visits, desk studies and consultation with locals respectively. This section gives the overview of the topology, geology, seismology and meteorological conditions whereas, it gives detailed information about following; surface water, ground water (if present in the project area vicinity) and air quality of project area. The detail of each parameter is discussed in sub-sections below:

The physical environment consists of existing land form and land use at the project site including geology, pedology, hydrology, meteorology and climatology. The pre-project condition (i.e. baseline) of these components of the physical environment is described in detail. To identify the

potential impacts on the physical, biological and socio-economic environment that is likely to arise from the project activities.

3.3.1 Geography

The geography of Lahore comprises the various features relating to the land and climate of Lahore, Pakistan. Lying between 31°15′–31°45′ North and 74°01′–74°39′ East. Lahore is bounded on north and west by the Sheikhupura District, on the east by Wagah and on the south by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of **1014 km²** and is still growing.

3.3.2 Topography and Geology

The topography of project area is flat. The general height of the area is approximately **220 meters** above the Mean Sea Level (MSL). The Lahore district is divided into two parts. The low lying alluvial soil is along the River Ravi and the upland in the east. Upland is a plain slope from north-east to south-west. The lowlands are generally inundated during the monsoon season by Ravi River, flowing in the west of district along its boundary with district Sheikhupura.

The proposed location for establishment of cotton and yarn dyeing unit is 24-km, Multan Road link Amirtcola Road, Lahore. The coordinates of the site are; 31°20'43.91"North and 74°08'27.13"East.

3.3.3 Seismicity

According to seismic zoning of Pakistan, the project area lies in minor to moderate damage prone area. Distant earthquakes may cause damage to structures with fundamental period greater than 1.0 second, corresponds to intensity V and VI of the M.M scale" (National Disaster Management Authority). The seismic zoning of Pakistan is given below in **Figure 10** below:

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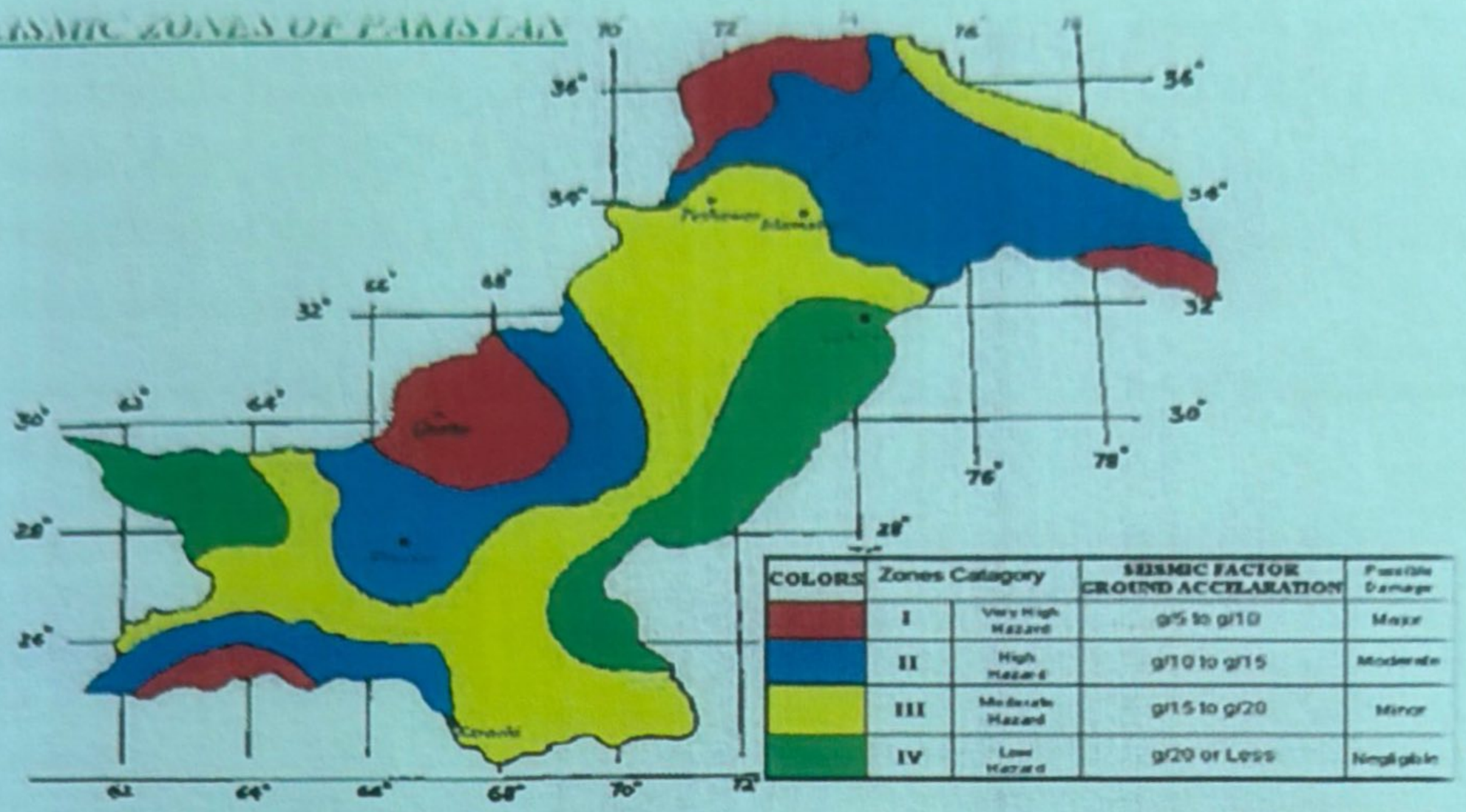


Figure 7: Seismic Zoning of Pakistan

3.3.4 Agriculture and Cropping Pattern

In district Lahore, crops that are cropped during various seasons includes; wheat, sugarcane, cotton and rice which together account for more than 75% of the value of total crop output. Due to the aforesaid project establishment no damage to the agriculture is being envisaged.

3.4 Meteorology

Lahore features a five-season semi-arid climate (Köppen climate classification *BSh*) with five seasons: foggy winter (15 Nov–15 Feb) with few western disturbances causing rain; pleasant spring (16 Feb–15 April); summer (15 April – June) with dust, rain storms and heat wave periods; rainy monsoon (July – 16 September) and dry autumn (16 September –14 November).

Table 7: Average Temperature and Rate of Precipitation[1]

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	12.3	15.4	20.6	26.5	31.1	33.9	31.5	30.7	29.7	25.5	18.9	13.7
Min. Temperature (°C)	5.3	8.4	13.6	18.8	23.4	27.3	26.9	26.3	24.3	18	10.7	6
Max. Temperature (°C)	19.3	22.4	27.7	34.2	38.9	40.6	36.2	35.1	35.1	33	27.1	21.4
Avg. Temperature (°F)	54.1	59.7	69.1	79.7	88.0	93.0	88.7	87.3	85.5	77.9	66.0	56.7
Min. Temperature (°F)	41.5	47.1	56.5	65.8	74.1	81.1	80.4	79.3	75.7	64.4	51.3	42.8
Max. Temperature (°F)	66.7	72.3	81.9	93.6	102.0	105.1	97.2	95.2	95.2	91.4	80.8	70.6
Precipitation / Rainfall (mm)	24	24	37	17	20	36	189	159	73	12	4	12

[1] *Source: https://en.climate-data.org/location/33/*

The hottest month is June, where average highs routinely exceed **40**°C (104.0 °F). The wettest month is July, with heavy rainfalls and evening thunderstorms with the possibility of cloudbursts. The coolest month is January with dense fog. The city's highest maximum temperature was **48.3°C (118.9 °F)** recorded on May 30, 1944 and **48°C (118°F)** was recorded on June 9, 2007. The lowest temperature recorded in Lahore is **–1°C**, recorded on 13 January 1967[2].

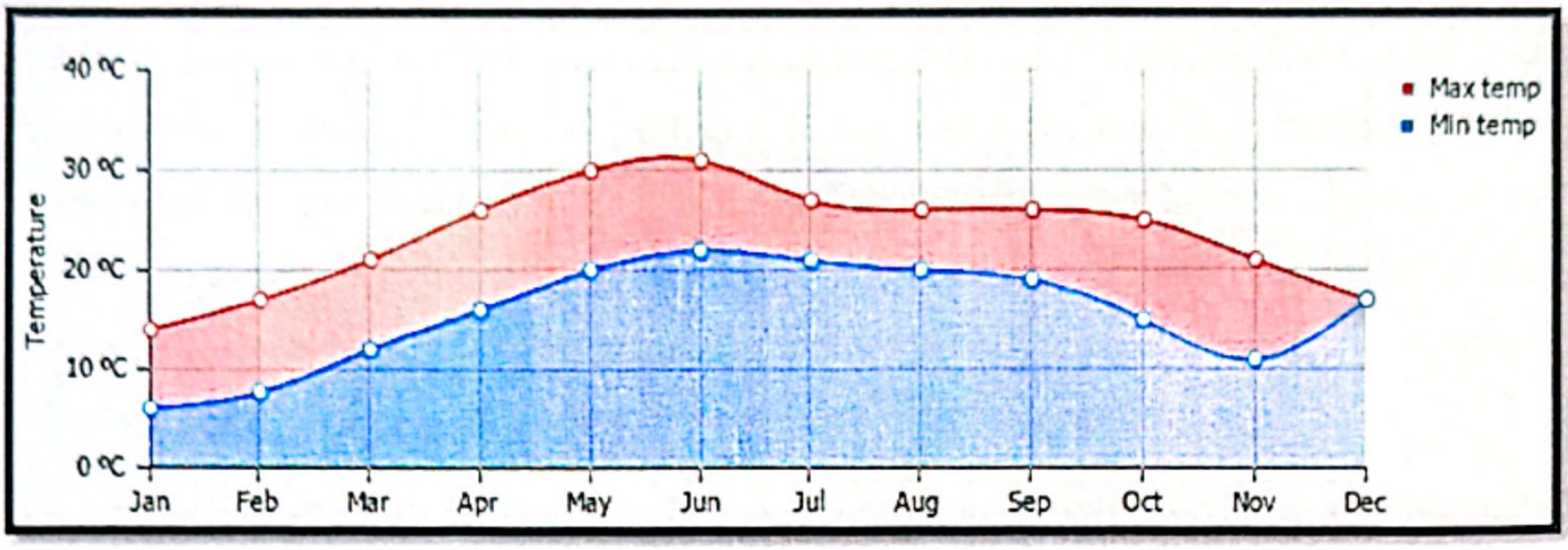


Figure 8: Temperature Graph

3.5 Surface Water Quality

Surface water body/canal is located at the distance of **742m** from project area. No impact is being envisaged due aforesaid project development.

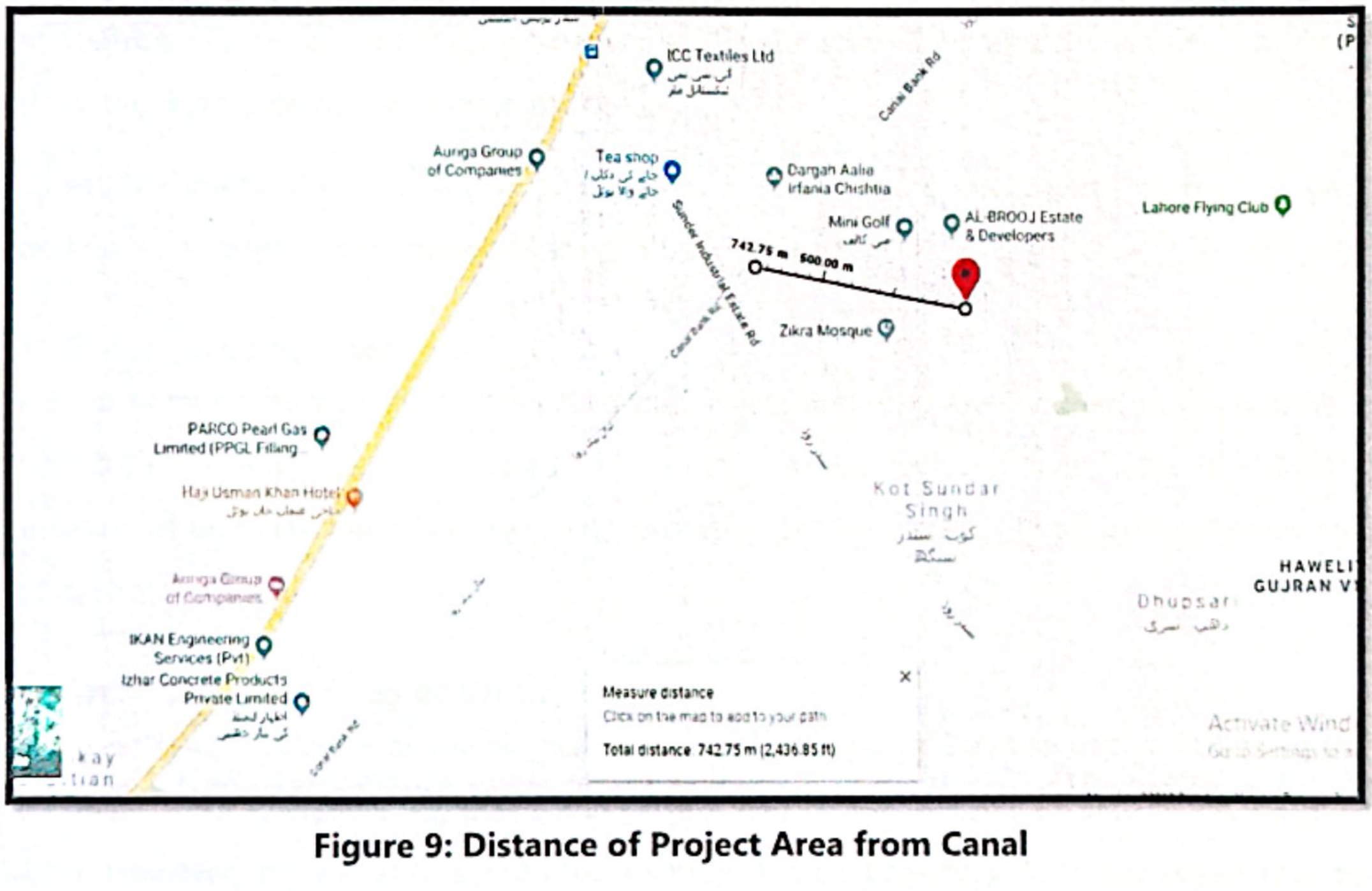


Figure 9: Distance of Project Area from Canal

[2] https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,lahore,Pakistan

3.6 Biological Environment

The biological environment consists of flora and fauna present in study as well as project area.

The detail of each parameter is given below.

3.6.1 Flora

Lahore, the city of gardens is heart of Pakistan. A large variety of the trees, shrubs and herbs are present in the City. Few of the species are listed as endangered or threatened. The site selected for the installation of aforesaid is present within industrial area so no impact on the local flora is being envisaged. However, a variety of trees, herbs and shrubs are present in the study area which are ornamental as well as native it includes; Amaltas, Safeeda, Kikar, Jasmin, Toot, etc. After the completion of aforesaid project; native and ornamental trees will be planted in the designated green areas.

3.6.2 Fauna

The fauna consists of mammals, birds, reptiles and amphibians. Currently, the project area is located in industrial zone having very few species of the fauna such as; Jungle Cat (*Felis chaus*), House Shrew (*Suncus marinus*) and Soft Furred Rat (*Millardia mettada*). Reptiles mainly includes; Snakes and Lizard. Only amphibian reported in the project area is frog. The Birds species includes; House Sparrow (*Passer domesticus*), House Crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) are the most common sighted in the area.

Due to establishment of aforesaid unit no negative impact is being envisaged that could impact the local fauna because it is being established in built-up area.

3.6.3 Endangered Species

There is no floral or faunal species inhabiting the project area that are included in the Red Data Book of IUCN. The population of birds is reported to be reduced over time due to the conversation of open land into built up areas, excessive pesticide sprays in agricultural crops and loss of habitat.

3.6.4 Archaeological Sites or Wetlands

There are no known sites of archaeological or cultural importance located within 5.0 km of the project area. The only water body present in project area vicinity is canal located at the distance of 742m. However, no wetland is reported in project area proximity. It is envisaged that no adverse impact from project activity will occur which will cause damage to the surface water body or any archaeologically important feature.

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3.7 Environmental Monitoring Through Laboratory

M/s Global Environmental Laboratory (GEL) was engaged to carry out environmental monitoring of ambient air quality, ground water quality, noise level and particulate matter concentration in the project area. Laboratory analysis reports of ambient air quality, ambient noise and surface water analysis results are annexed at **Annex-VI** of this EIA Report and the detail information related to the testing results is given below:

3.7.1 Sampling Sites

The sampling was carried out at the project site which is identified to collect samples of water, noise and air for testing according to the testing guidelines of Punjab-EPA. It also defines number of samples and the site from where samples were collected.

Table 8: Sampling Sites Details

Sr#	Particulars	Details
1	Number of Samples	03 (Three)
2	Parameters of Monitoring	Ambient Noise, Ambient Air and Ground Water Quality
3	Sampling Sites	01 (One)

3.7.2 Ambient Air Quality

The project area lies in industrial area therefore the atmosphere is relatively polluted. The cause of the visual pollution is particulate matter, NOx, SOx, dust and smoke being generated from vehicular movement and from the chimneys of other industries. The key pollutants likely to be found at proposed project locations are; Carbon Monoxide (CO), Oxides of Nitrogen (NOx), Sulfur Dioxide (SO_x) and Particulate Matter (PM). In order to determine the air quality of the area, Laboratory had the requisite air sampling device and expertise for collection of samples. Ambient air quality of the project area was monitored within the project area and results of the monitoring are given below:

Table 09: Ambient Air Quality

Source	CO	SO_2	NO_2	SPM	PM_{10}	$PM_{2.5}$	O_3
Units	mg/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
PEQS	10	120	80	500	150	35	130
Project Area	0.2	5.22	41.3	78	47	10	18

The results of the ambient air quality monitoring showed that all the parameters are within the PEQS limits.

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3.7.3 Noise

Noise level of the project area was monitored at project site using digital sound level meter and results of the monitoring are given below in **Table 14** and attached at **Annex-VI** of this EIA Report:

Table 10: Noise Level Monitoring

Sr#	Source	Units	PEQS	Conc.
1	Project Area	db (A)	75	46.2

3.7.4 Water Resource

Ground water is the principal source of municipal water supply in Lahore. The City's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area. Ground water samples were collected from proposed project site. Water samples were tested for physio-chemical parameters (Temperature, pH, TDS, EC, Colour, Odour, and Taste). The ground water was being used in the study area for domestic purposes. To check the quality of the water in the area ground water was collected and analysed by EPA Certified Laboratory; GEL. The detail of the water quality of the project area is given below:

Table 11: Water Quality Results

Sr#	Parameters	Units	WHO Guidelines	Concentrations
1	pH value	----	6.5-8.5	7.76
2	TDS	mg/l	1000	188.0
3	Taste	----	Not Objectionable	Not Objectionable
4	Odor	TON	Not Objectionable	Not Objectionable
5	Chloride	mg/l	250.0	7.0
6	Color	Ptcu	15.0	0.0
7	Total Hardness	mg/l	500	88.0
8	Total Alkalinity	mg/l	----	74.0

The results of the groundwater analysis showed that all the parameters were within the limits prescribed in WHO guidelines.

3.8 Socio-Economic Environment

The project site is adjacent to the industries such as; PARCO Pearl Gas Limited, Auriga Group of Companies, ICC Textile Limited, Pacific Pharmaceuticals Limited, etc. The site is accessible through metaled road network such as; Sundar Industrial Estate Road and Canal Bank Road which connects the site to the other parts of the city. The socio-economic survey was conducted within these areas and the social profile is being discussed hereunder:

3.8.1 Employment Status

The respondents were asked about their employment status. According to the socio-economy majority of the respondents were employed. It is being envisaged that around **90%** of the

respondents were working in various private and government sectors. Around **44%** of respondents were found employed in private sector, **38%** of responded were running their own business at small scale such as; shops, selling various essential goods, working as labors, etc. Only **10%** respondents according to the socio-economic survey were un-employed. Only **08%** of respondent were working as government employees. This reflects that overall maximum community is employed in settlements near the project area.

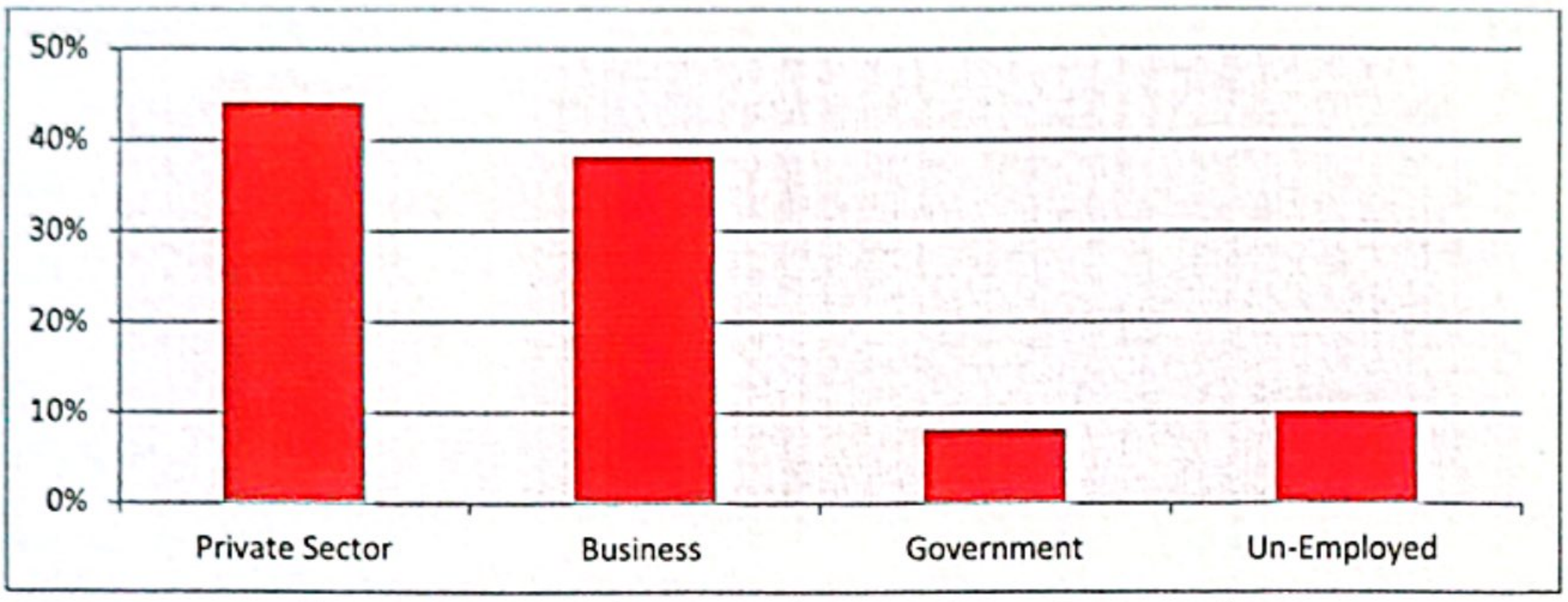


Figure 010: Employment Status of the Community

3.8.2 Civic Amenities

Respondents were inquired about the civic amenities within their area. Almost **100%** respondents had electricity supply, water supply services, sewerage collection system, gas and local & private transport facilities.

3.8.3 Favor for the Project

Respondents were inquired about their views regarding the proposed project. Almost **85%** respondents were in favor of the proposed project whereas **15%** of respondents of showed no concern for the establishment aforesaid project.

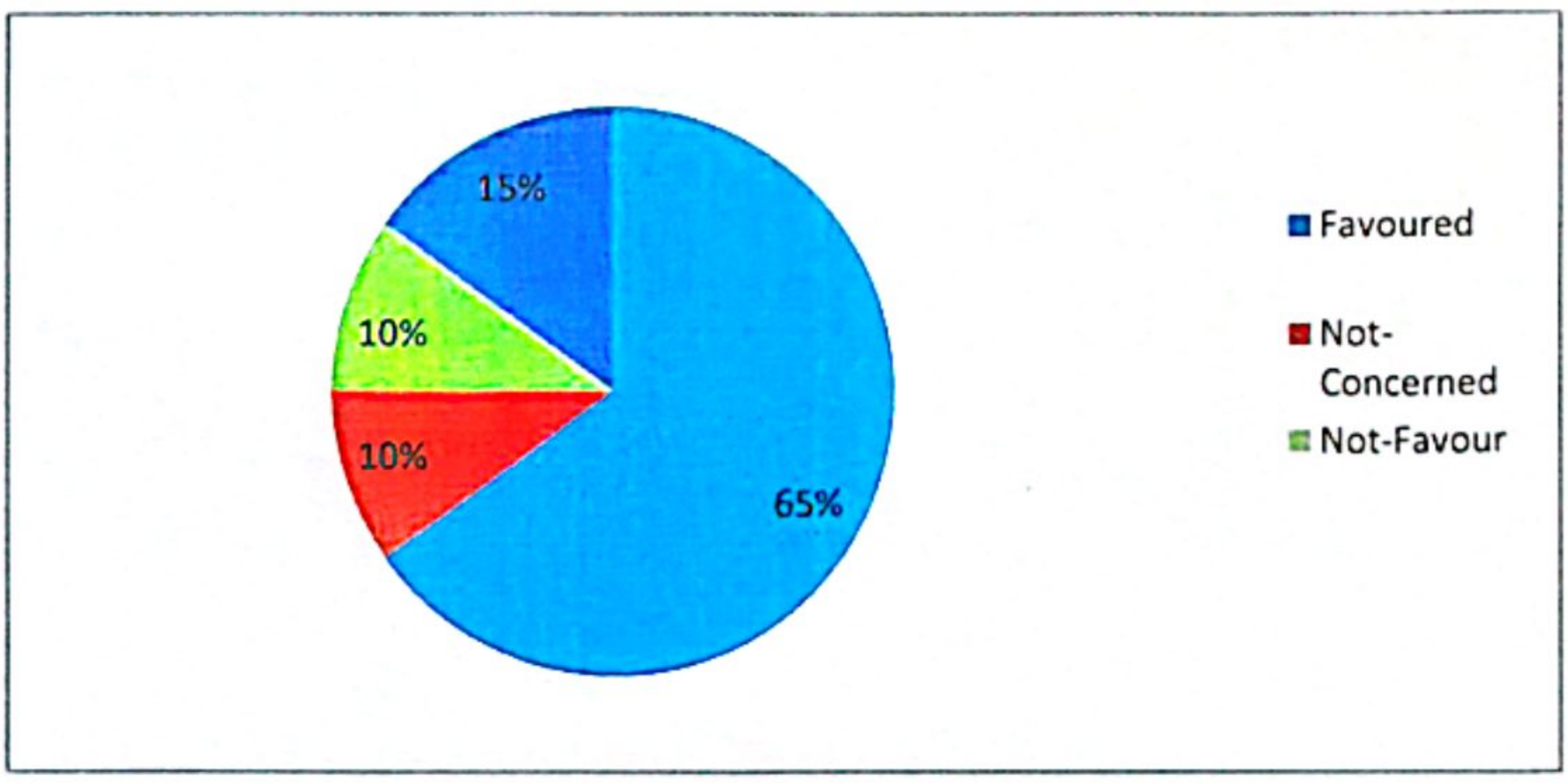


Figure 11: Percentage of Respondent Favored Project

3.8.4 Common Diseases

Respondents were asked about the common diseases prevailing within their area. The majority of respondents suffered from diarrhea and cough; whereas less number of individuals was suffering from diabetes and hepatitis. The most prevailing disease was diabetes followed by cough, skin problem and allergy.

3.8.5 Community Issues

Community was asked about the burning issues they are facing. The majority of respondents complained about the improper and inefficient supply of safe drinking water and few of respondents were interested in the expansion of the market for the selling of their goods.

3.9 Quality of Life Values

Most of the respondents had the basic facilities of life such as; health and education facilities as well as basic amenities such as electricity, gas, water supply and transportation to sustain life. Most of the respondents were working with the various private sector companies. Primary & Secondary Schools, College and Universities are present in the vicinity of project area. People of the nearby residents enjoy basis amenities of life.

3.9.1 Population

The results of the 2017 Census determined the population to be at 11,126,285 with an annual growth rate of 4.07% since 1998. Gender-wise, 52.35% of the population is male, while 47.64% is female and transgender make only 0.01% of the population. Lahore is a young city with over 40% of its inhabitants below the age of 15. The average life expectancy is less than 60 years of age. Another statistic is that less than 40% of the population of the city is literate.

3.9.2 Religious Setup

The city has a Muslim majority and Christian minority population. There is also a small but longstanding Zoroastrian community. Additionally, Lahore contains some of Sikhism's holiest sites and is a major Sikh pilgrimage site.

3.9.3 Industrial Setup

A major industrial agglomeration with about 9,000 industrial units, Lahore has shifted in recent decades from manufacturing to service industries. Some **42%** of its work force is employed in finance, banking, real estate, community, cultural and social services. The city is Pakistan's largest software & hardware producing center and hosts a growing computer-assembly industry. The city has always been a center for publications where **80%** of Pakistan's books are published and it remains the foremost center of literary, educational and cultural activity in Pakistan.

The Lahore Expo Centre is one of the biggest projects in the history of the city and was inaugurated on 22 May 2010. Defense Raya Golf Resort, also under construction, will be Pakistan's and Asia's largest golf course. The project is the result of a partnership between DHA Lahore and BRDB Malaysia. The rapid development of large projects such as these in the city is expected to boost the economy of the country. Ferozepur Road of the Central business districts of Lahore contains high-rises and skyscrapers including Kayre International Hotel and Arfa Software Technology Park.

3.9.4 Healthcare Facility

Lahore has many government and private hospitals to address and maintain the health standard.

Following healthcare facilities are available in project area vicinity:

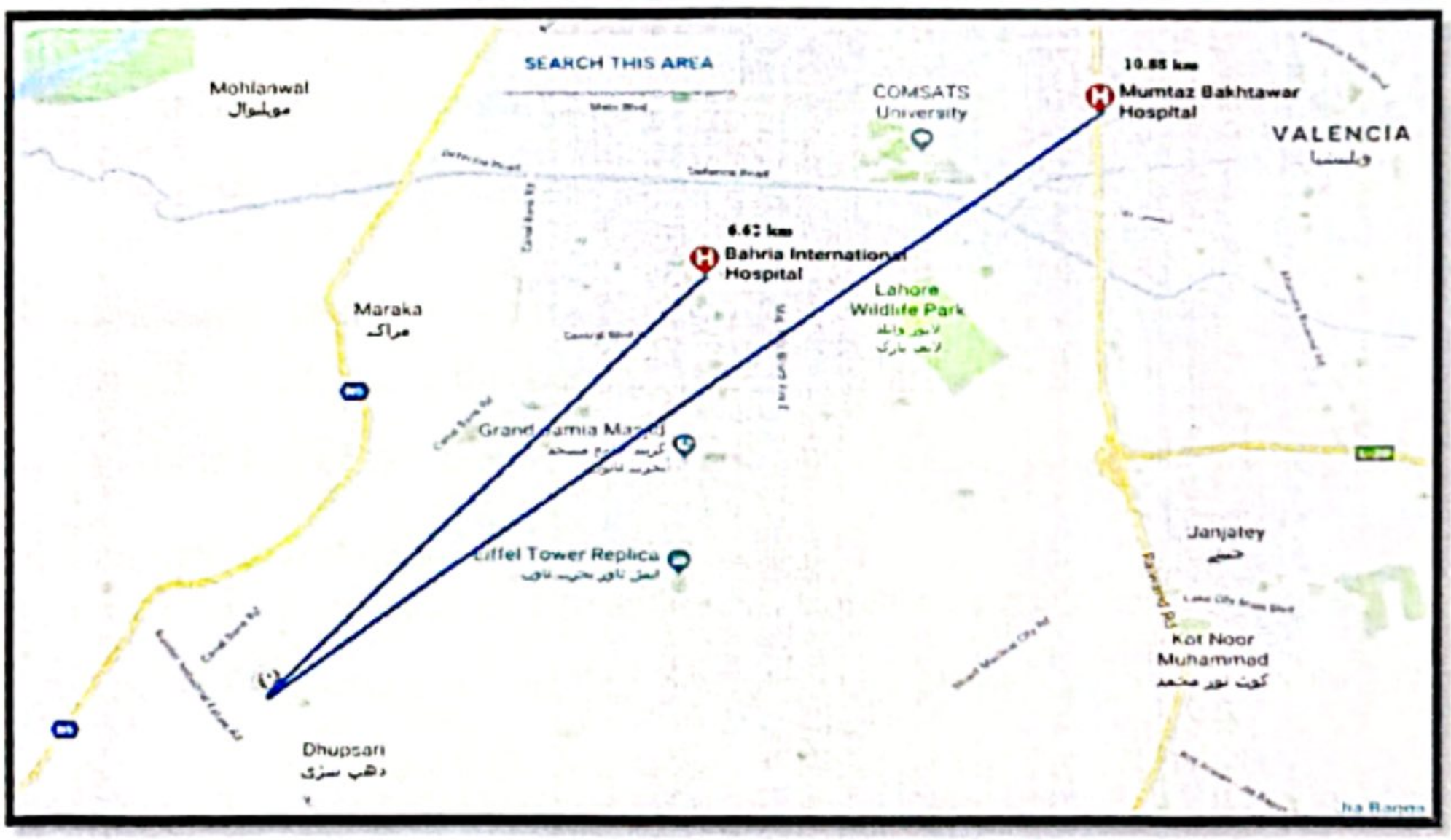


Figure 12: Hospitals located in Project Area Vicinity

3.9.5 Educational facilities

Lahore is known as Pakistan's educational capital with more colleges and universities than any other city in Pakistan. Lahore is Pakistan's largest producer of professionals in the fields of science, technology, law, IT, engineering, medicine, nuclear sciences, pharmacology, telecommunication, biotechnology and microelectronics, nanotechnology and the only future hyper high-tech center of Pakistan. Most of the reputable universities are public, but in recent years there has also been an upsurge in the number of private universities. The literacy rate of Lahore is **74%.** Lahore hosts some of Pakistan's oldest and best educational institutes.

3.9.6 Public Consultation

To study the socio-economic status of the area stakeholders of the various residential area and commercial areas were consulted. In addition, Government Officials were consulted to know their

views regarding the commencement of aforesaid project. The list of the Government Officials and the local stakeholders consulted for the commencement of the aforesaid project is discussed in **Chapter 04** in detail.

3.9.7 Civic Amenities

Respondents were inquired about the civic amenities available in the respective areas during socio-economic survey of study area. Most of the respondents had the basic amenities to sustain life such as; electricity, water supply services, sewerage collection system, gas and transport facilities. Adequate educational and healthcare facilities were also present in the area.

3.9.8 Common Diseases

Respondents were asked about the common diseases prevailing within their area. Majority of the respondents suffered from diarrhea, cough, diabetes and hypertension. Hepatitis also prevailed in the few communities.

3.9.9 Community Issues

Community was asked about the burning issues they are facing. Majority of the respondents complained about lack of safe drinking water and lack of the job opportunities.

3.10 Environmental Analysis

Environmental parameters such as; ambient noise, ambient air quality and ground water qualities are discussed in the Sections above. The environmental analysis report issued by EPA certified laboratory Global Environmental Lab is attached at **Annex-VI** of this EIA Report.

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Chapter 4

Public Consultation and Disclosure

4 PUBLIC CONSULTATION AND PUBLIC DISCLOSURE

Public consultation refers to the process by which the concerns of various stakeholders and local community who have a plausible stake in the environmental management & associated impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. According to the IEE and EIA Review Regulations, 2000 public consultation is mandatory for any socio-environmental study for the commencement of any project.

4.1 General

Impact assessment survey and public consultation sessions held with different stakeholder groups that may be impacted by the proposed project commencement were carried out. The consultation process was carried out in accordance with the guidelines laid by Punjab-EPA. The objectives of this process were to:

- Share information with stakeholders on proposed project establishment.
- Access the impacts on the physical, biological and socio-economic environment.
- Understand stakeholder concerns regarding various aspects of the project commencement.
- Note valuable suggestions of local stakeholders to improve the proposed project design.
- Understand the perceptions, assessment of social impacts and concerns of the affected people/communities of the project area.
- Find out the awareness level and situation of acceptability to identify any issues for the implementation of the proposed project.
- Invite people to express their views about the positive/negative impacts on their lifestyles and environment.
- Disclose information about contact offices/officers for any complaints/queries.

It is envisaged, there will be no social impact being foreseen due to the commencement of aforesaid project at aforesaid location, the nearest community is located at 0.69 km aerial distance (Kot Sundar Singh) from the project area. This EIA Report includes all the comments, which were taken into account during the social survey and preparing the definitive development concept for the installation and operation of proposed project. Public consultation performas is attached as **Annex-V.**

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4.2 Objectives of Consultation

Public consultation plays a vital role in studying the impacts of aforesaid project on stakeholders in successful implementation and execution of project. It provides an opportunity to exchange knowledge with the beneficiaries and affected parties. Referring particularly to a project related to environmental assessment, involvement of the public is all the more essential, as it leads to better and more acceptable decision-making. The overall objective of consultation with stakeholders is to help verify the environmental and social issues, besides technical ones, that have been presumed to arise and to identify those which are not known or are specific to project. In fact, discourse with many who have thoroughly observed the site conditions in the pre-development phase, goes a long way in updating the knowledge and understanding.

4.3 Identification of Stakeholders

All the people who are directly or indirectly affected or concerned with the project are stakeholder. Besides the living population of the surrounding areas, some other stakeholders were identified and contacted which are enlisted below. They are the key players including; residential community, labors present in the study area in the vicinity of the proposed unit, public and government offices, schools, university, hospitals, hotels, international agencies and the NGOs. Not only published material, brief or other literature were obtained on request, but also noted their views and the concerns, in an official capacity as well as on the personal basis. Project Affected Persons (PAPs); include the settled families, either property owners or the tenants, businessmen (big, shopkeepers, vendors, etc.) and employees of the commercial entities. PAPs are of two types, for instance:

4.3.1 Direct Stakeholders

As, no disturbance in the local community is being foreseen due to the installation of cotton and yarn dyeing unit by M/s Cottonera Pvt Limited, the minimum distance between the community and the project area is **0.69 km** (Kot Sundar Singh). No property loss is being envisaged due to the establishment of aforesaid project as plant will be installed at adequate distance from the residential and other sensitive receptors.

4.3.2 Indirect Stakeholders

Indirect impact will occur on those who are living or doing business within a Project Area of Influence (AOI). In the case of aforesaid project, the citizens of Lahore will get opportunities of being employed. So, in the early development stages and during the operational phase the people will be benefited. Indirect respondents include;

- Government agencies responsible to deal and supervised the project related activities.

- Government Agencies directly, indirectly or widely involved in the execution and monitoring of aforesaid project.
- Government departments such as; Field Office Environment (Lahore), Irrigation Department, Industries Department (Poonch House) and Forest Department had been consulted and considered as indirect stakeholders.
- Workers of political, cultural, religious or social scientific bodies, directly or indirectly related to the project.

4.4 Public Disclosure

Public disclosure is the outcome of all such activities where the public is involved at least in the information sharing process. This is an integral part of the process. So, before the proponent applies for NOC to the Punjab-EPA, this disclosure will be distributed properly among all stakeholders. It is the responsibility of the proponent and the consultants to display a public disclosure document in prominent places where community has easy access.

4.5 Consultation Process

Information disclosure, public consultation and discussion regarding the various aspects of project with the people of area are necessary. This process is intensified during the EIA Studies and separate rounds of public consultations were held with local community and various government departments as listed below. Surveys were carried out in order to investigate physical, biological and socio-economic resources falling within the immediate AOI of the project. Primary data collection included:

- Data collection regarding the socio-economic condition of study area.
- Pre-testing of socioeconomic survey tools in the field.
- To consult the locals for collection of information on biological environment.

Various meetings with the stakeholders were held the following objectives:

- Share information with stakeholders on the proposed project and expected impacts on community in the vicinity of the project.
- Understand stakeholders' concerns regarding various aspects of the project, including the existing condition of the upgrading requirements, and the likely impact of construction and operation activities.
- Provide an opportunity to the public to influence the project design in a positive manner.
- Obtain local and traditional knowledge, before decision making.
- Increase public confidence about the proponent, reviewers and decision makers.

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- Reduce conflict through the early identification of controversial issues and work through them to find acceptable solutions.
- Dissemination of information through discussions, education and liaison.
- Documentation of information narrated by the stakeholders and mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their address in the EIA and eliciting their comments and feedback.
- Create a sense of ownership of the proposal in the mind of the stakeholders.

4.6 Participants of Public Offices Contacted

Following officers of government departments were consulted by the socio-environmental team of the consultants and concerned details about the project were noted down through personal interviews, group meetings, etc., in their offices, for instance, see Table 11 below.

Table 12: Views of Participants of Public Sector Stakeholders

S#	Participant	CNIC/Designation	Concerns/Remarks
Environmental Protection Department			
1	Misbah-ul-Haq Khan Lodhi	35202-2385202-1 0300-9438318	Following comments are summarized for the implementation of aforesaid project: • In-house WWTP should be designed and installed. • Air emissions control measures should be adopted (if any). • Proper landscape and tree plantation plan should be developed. • Solid waste should be managed properly.
Forest Department			
2	Rana Zahid Ali Khan	DFO Planning	Following recommendation were suggested by the forest department: • Lack of collaboration within the departments such as; environment, planning, industries, forest, etc. is the main cause of deforestation. • CSR cells should be established. • Payback the cost of loss to environment • 10 trees should be planted for the removal of 01 tree to compensate the loss. • Natives trees such as; Sheesham, kikar, popular, Neem, Dherak,

			Amaltas and Alostonia should be planted extensively.
Industries Department			
3	Farhan Ahmed	0332-4681862 AD Planning	Following measures should be adopted while designing the proposed project: • Industries Department regulates establishment of industrial units according to Industrial location policy 2002 which states, "Services Industry (In Schedule B of that policy) can be established in positive areas specialized by Government. • The social concern should be addressed accordingly, if any. • It will help in obtaining the foreign investment.

HSE= Health, Safety and Environment

Pictorial view of the consultation:



Figure 13: Consultation with EPA Field Office

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Figure 14: Consultation with Punjab Forest Department

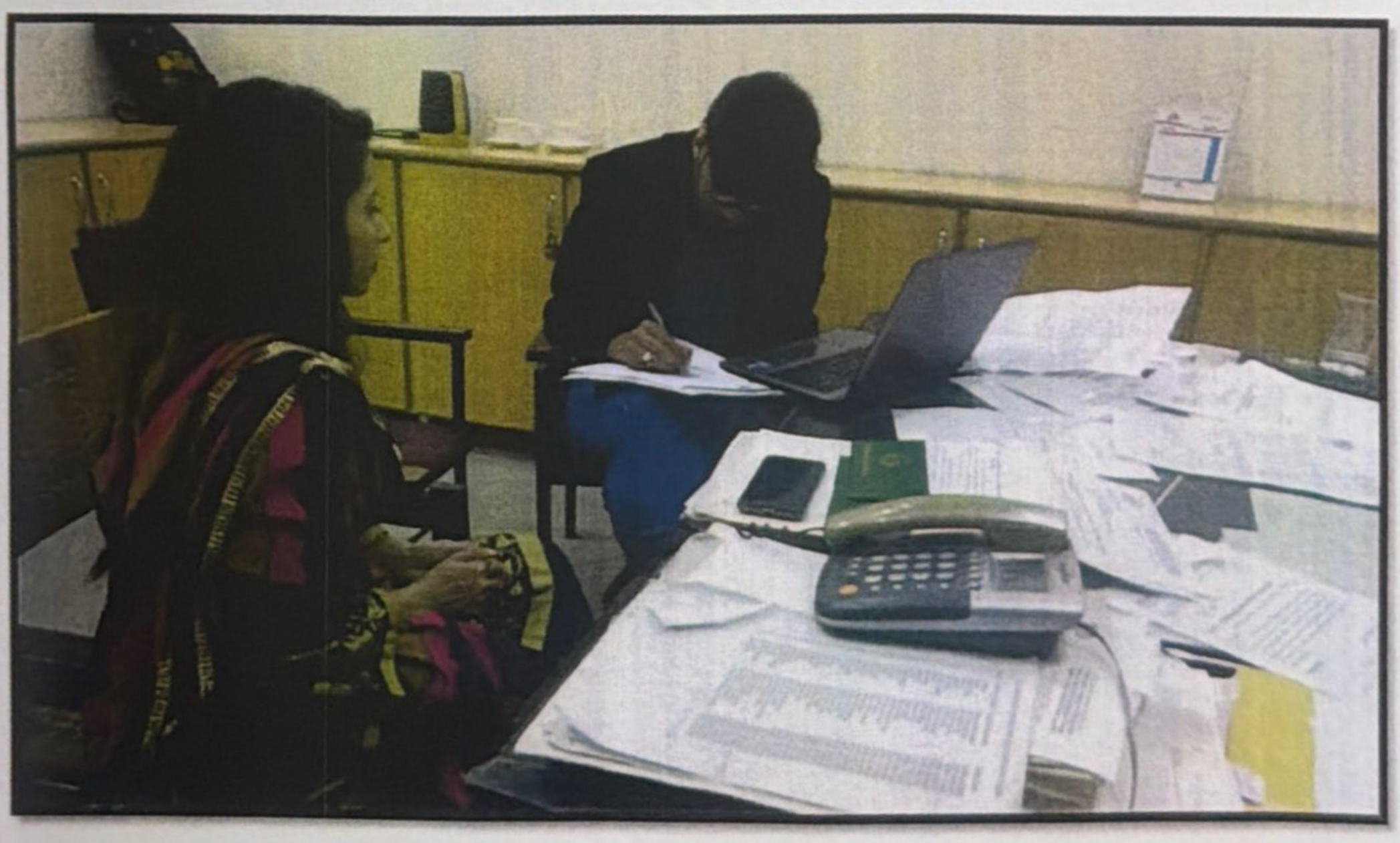
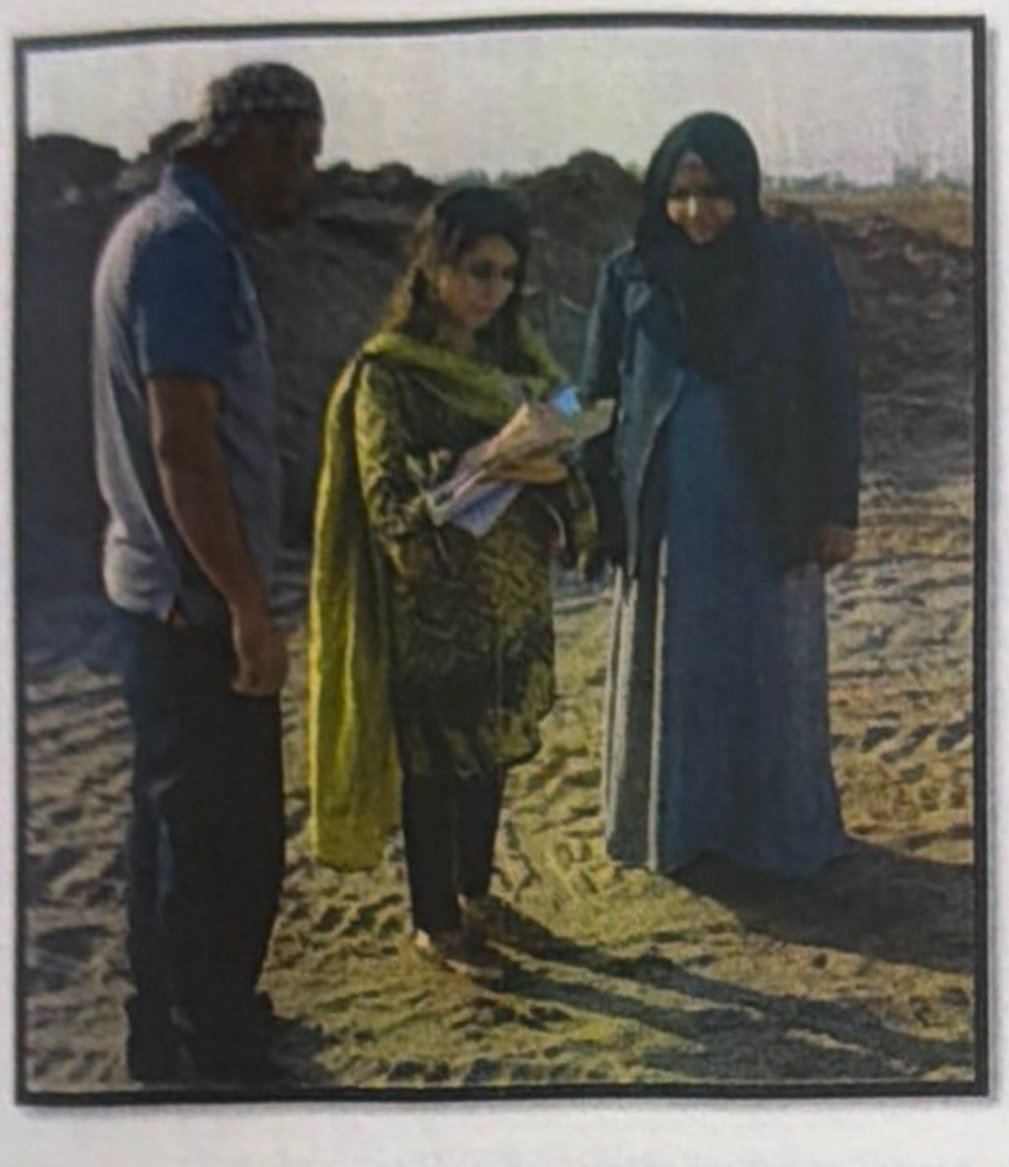
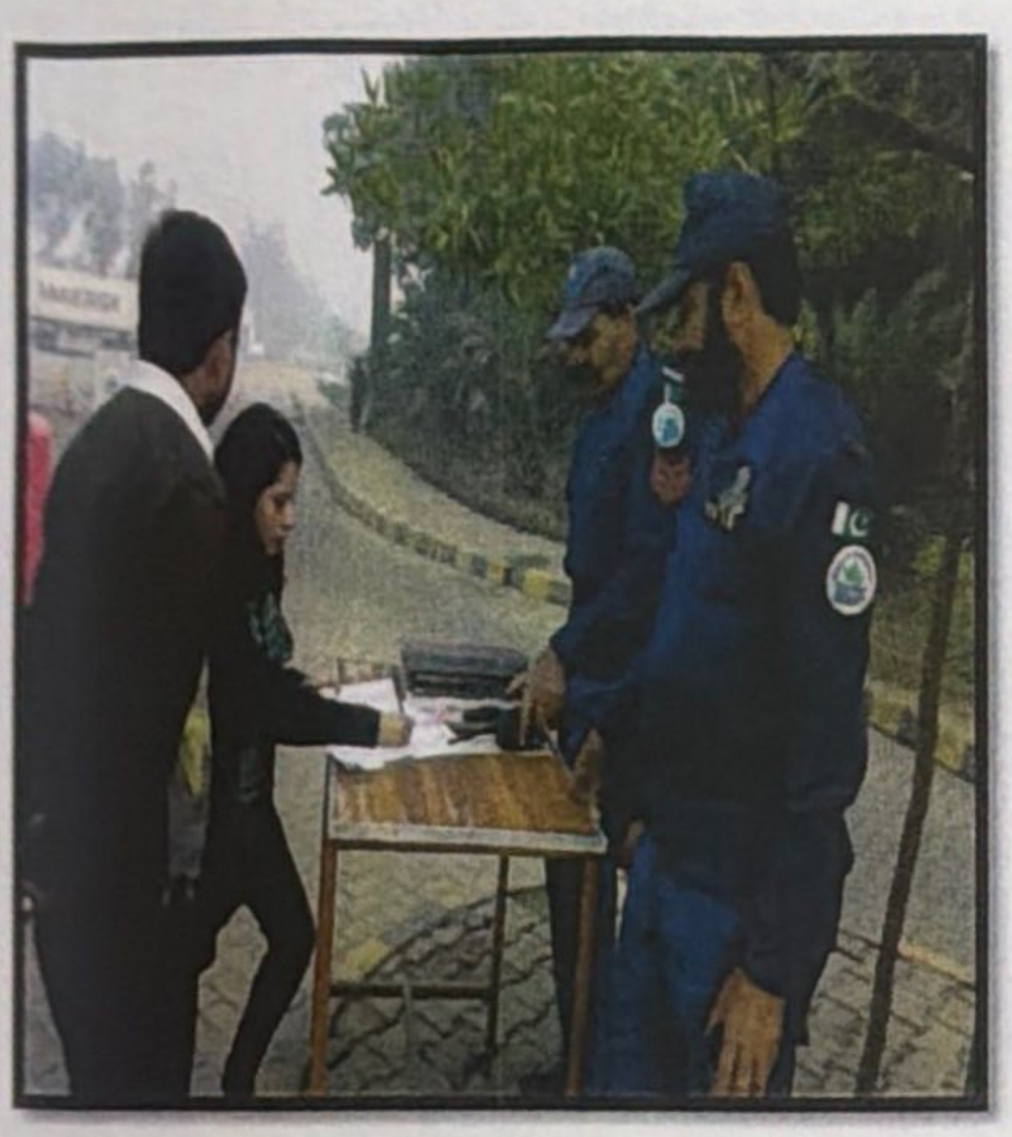
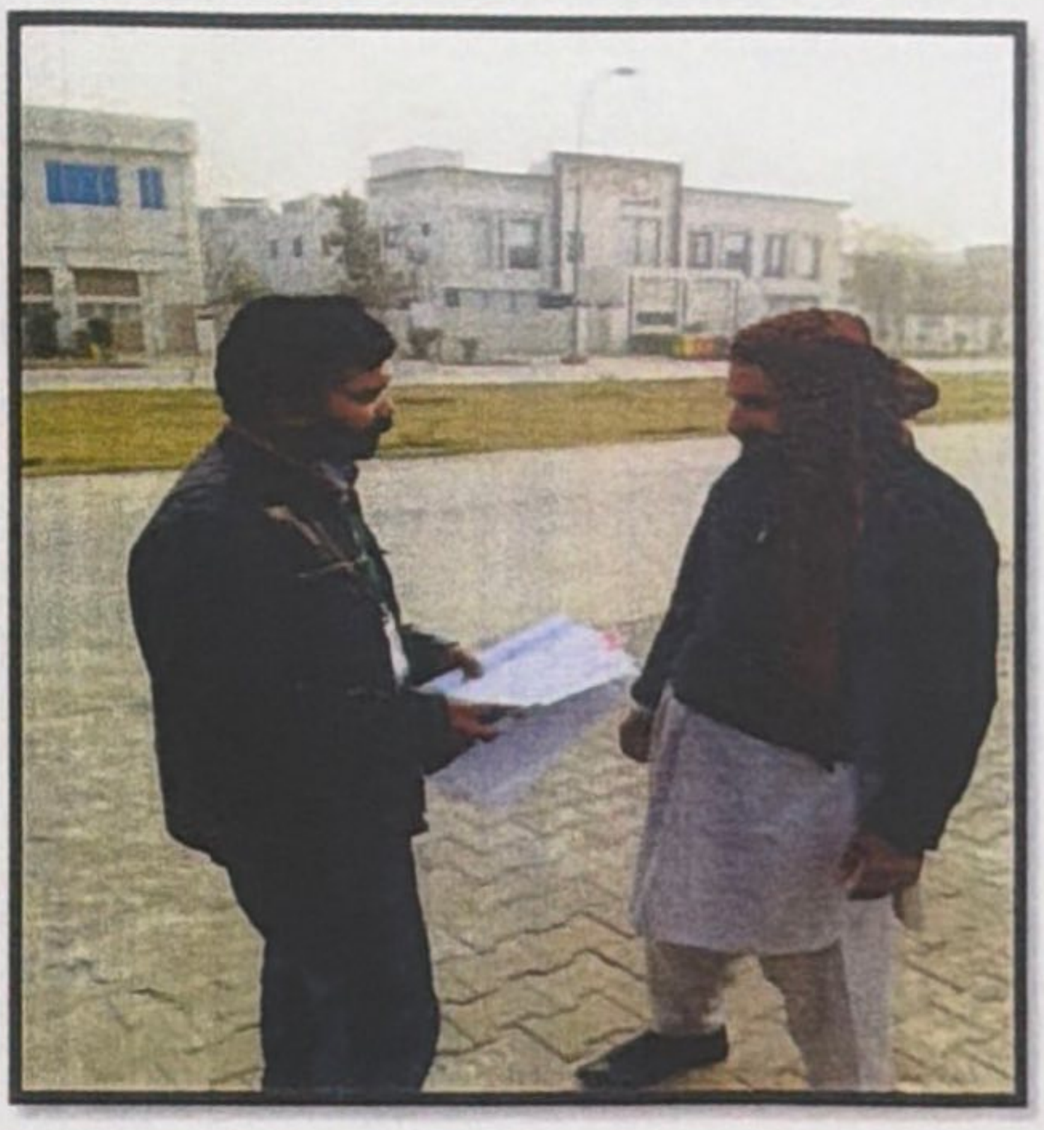


Figure 15: Consultation with Industries Department











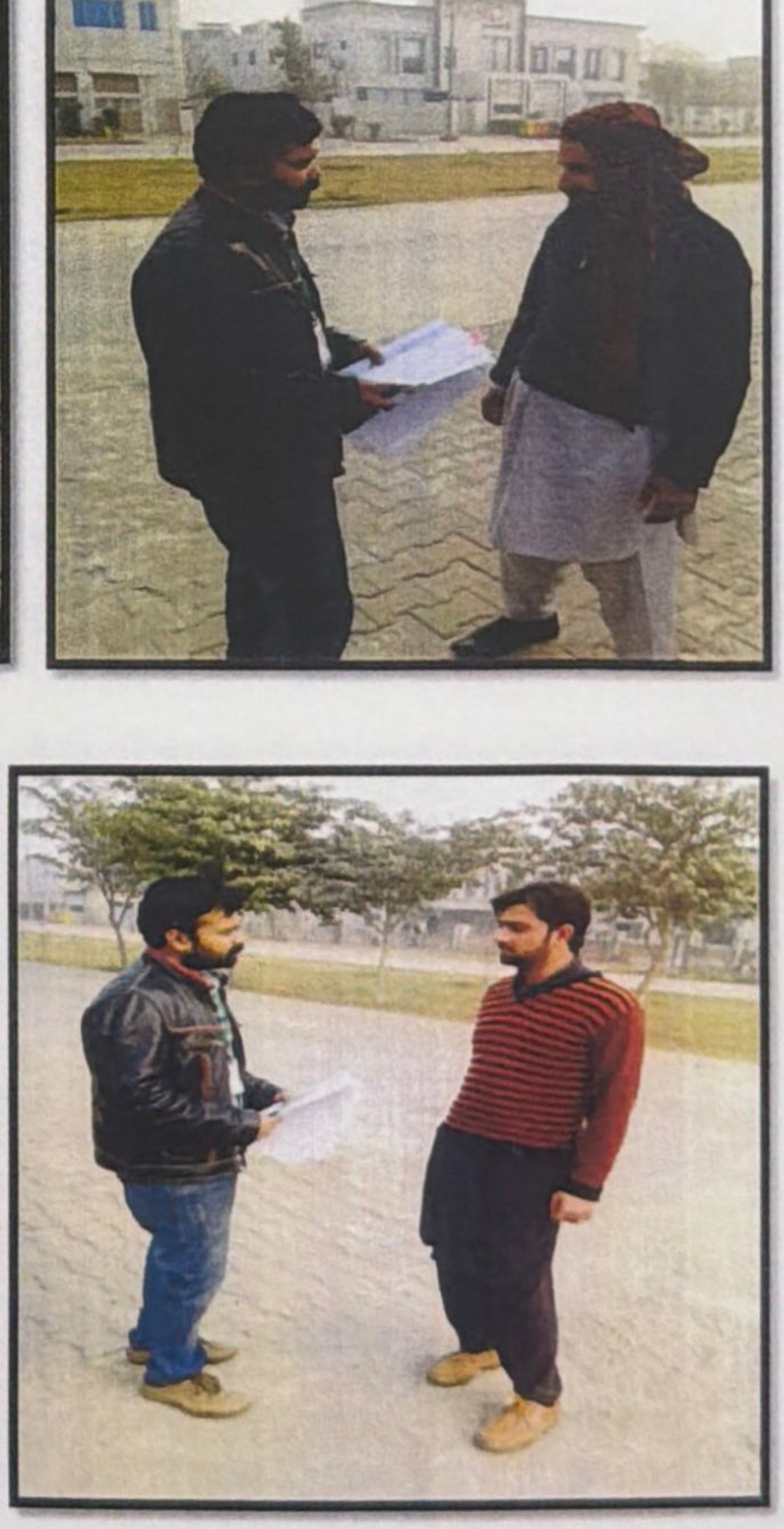




Figure 16: Consultation with Affected Community

4.7 Consultation with Beneficiaries

In addition, to the use of direct methods to evince the response of the various stakeholders in targeted population residing in study area was ascertained by conducting a sample survey, through specially formatted questionnaires (attached in the **Annex-V** of this EIA Report). Questions posed to the public were related to creation of possible impacts, adverse impacts and beneficial impacts, including; employment opportunities, income generation activities, change in living standards and provision of the basic amenity.

Personal views of the respondents on the establishment of cotton and yarn dyeing unit by M/s Cottonera Pvt Limited, possible disturbance to the residents near the AOI and infringement of their privacy were also recorded. The various rounds of public meetings and consultations were arranged in project and study area. The objectives of consultation with the affected persons are given in the table below:

- Disclose the proponent plan for the construction of the proposed facility.
- To share information on the design and specifications of project works.
- To analyze the expected impact on the socio-economic environment.
- To understand their concerns regarding various aspects of project commencement.

4.8 Views, Concerns and Suggestions of Various Stakeholders

The major socio-economic concerns and problems of the affected persons of various communities have been given in tabulated form below **(Table 13)** along with their main concerns and remarks. Community showed a lot of concerns; a few are being mentioned here:

- Removal of shrubs and trees should be avoided to the extent possible in the case of clearance green zones should be established within the facility.
- Indigenous tress around the facility should be planted to control air pollution and as the compensation of removed trees.
- The project will become the source of income for local to earn their livelihood easily and honorably, so locals should be preferred.
- The area will inhabit and will be used for the beneficial purposes.
- For the solid waste management and waste disposal, proper disposal techniques should be adopted.
- Water spraying/sprinkling should be done on the regular basis during construction phase to avoid dust emissions.
- Employment opportunities will be generated and locals should be hired on the priority basis.
- The air pollution is one of the major impact from which Punjab is being affected at the large scale. So, ambient air quality should be monitored regularly and air pollution expected to generate from the operation should be mitigated beforehand.
- Good relations with the local communities will be promoted by encouraging Contractor to provide opportunities for skilled and unskilled employment to the locals as well as on-job training.
- Noise generated activities should be carried out during day hours.

The views and the concerns of the local communities, direct and indirect stakeholders has been complied and are presented in the tabular form below:

Table 13: Views and Concerns of Stakeholders

Sr#	Respondents	CNIC/Contact Nos.	Concerns
1	Shah Sawar	35404-77842715-7	During the survey in the study area following concerns of the local community were noted: • Air pollution should be controlled effectively such as emissions generated from power generating activities. • Dyes should be stored and handled properly only authorized persons should be allowed near the chemical storage area. • Locals should be preferred for the job opportunities. • Wastewater should be treated prior to
2	M. Shabbir	35404-4177869-9	
3	M. Bilal	35401-8748974-1	
4	Ashfaq Ashraf	33100-5586905-9	
5	Akbar Ali	35404-3552529-5	
6	Shah Rukh	35404-13377181-7	
7	Akbar Ali	34101-6996979-5	
8	Asghar Ali	35502-0115975-3	
9	Azhar Hussain	35404-1583563-7	
10	Ali Faiyz	35404-9639820-1	
11	Mirza Babar Iqbal	35404-9761924-1	
12	Wasaif	35404-7748809-3	

13	Muhammad Usman	35404-2339547-3
14	Azhar Javed	0348-7530319
15	Muhammad Boota	35404-0369950-3
16	Asif Iqbal	35404-1606331-7
17	Azhar Ali	35501-0320261-5
18	Ajaz Ahmed	33100-6629033-3
19	Hasseb-ur-Rehman	33103-0407065-7
20	Hafiz M. Naseem	35201-8203359-3
21	M. Hassan	33100-7069780-7 0308-8301104
22	Hajhat Ali	35403-1152260-1
23	Iftikhar Ashraf	33100-0960726-9
24	Jalal Raiz	35404-0851938-1
25	M. Tayyab	33102-94494070-1
26	M. Qasim	33103-5708449-5
27	M. Imran Ali	33100-3718960-1
28	M. Asif	33102-4405857-9
29	M. Bilal	33102-6879266-9
30	M. Jameel	35404-6472528-5
31	Mehran Ali	33102-0749901-7
32	Mehmood Ahmed	35404-5098871-1
33	M. Hussain	35404-9874025-7
34	Tahir Mahmood	35404-4675969-3
35	Naseer Masshi	35404-8149454-3
36	Shahbaz	35502-0145928-7
37	Saif-ur-Rehman	0321-6616660
38	Sakhawat Ali	31203-8256953-1
39	Usman Haider	36602-3574677-3
40	Uzair Hassan	35404-5501547-7
41	Waqar Ahmed	33102-20354307
42	Zunair Hassan	33103-8161080-1
43	Zeeshan Liaqat	0308-3225030

final disposal in nearby drain.

- Solid waste should be managed effectively by adopting the standard practices of the area.
- Cleanliness of the area should be ensured.
- An effective EMMP should be designed and enforced with true spirit.
- Health of the workers should be ensured.
- Planation should be carried out at extensive scale.
- Construction activity should be carried out during day hours.
- Noisy activities should be confined.
- Workers should be hired from local community.
- Proper disposal of solid waste should be practiced.
- Indigenous tress around the facility should be planted to control air pollution.
- Safeeda can be planted in the project area as the area in known to be affected by the logging and salinity.
- Removal of shrubs and bushes should be avoided to the extent possible.

4.9 Addressing Public Concerns

The best mechanism of effective communication between the community and the proponent is the by the nomination of the Company Representative and all the issues/concerns of the community must be recorded for future reference. This representative may be the member of the Grievances Redressed Committee (GRC).

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4.9.1 Grievances Redressed Committee

Grievances Redressed Committee (GRC) will be formulated by the proponent to address the concerns of the locals during the construction as well as during operational phase. The main role of the GRC will be to resolve the issues of the community associated with aforesaid project, if any.

4.10 Results of Survey

Following are the results of the survey with the local stakeholders:

4.10.1 Occupation of Respondents

Majority of the respondents (**33%**) belongs to the labor class, **20%** associated with their own business, **13%** were daily wagers, **13%** of respondents were associated with agriculture, **07%** were shopkeepers and remaining **07%** were the private employees. During survey, efforts were made to interact with local stakeholders representing all walks of life. The detailed graphic representation of occupational status is given below:

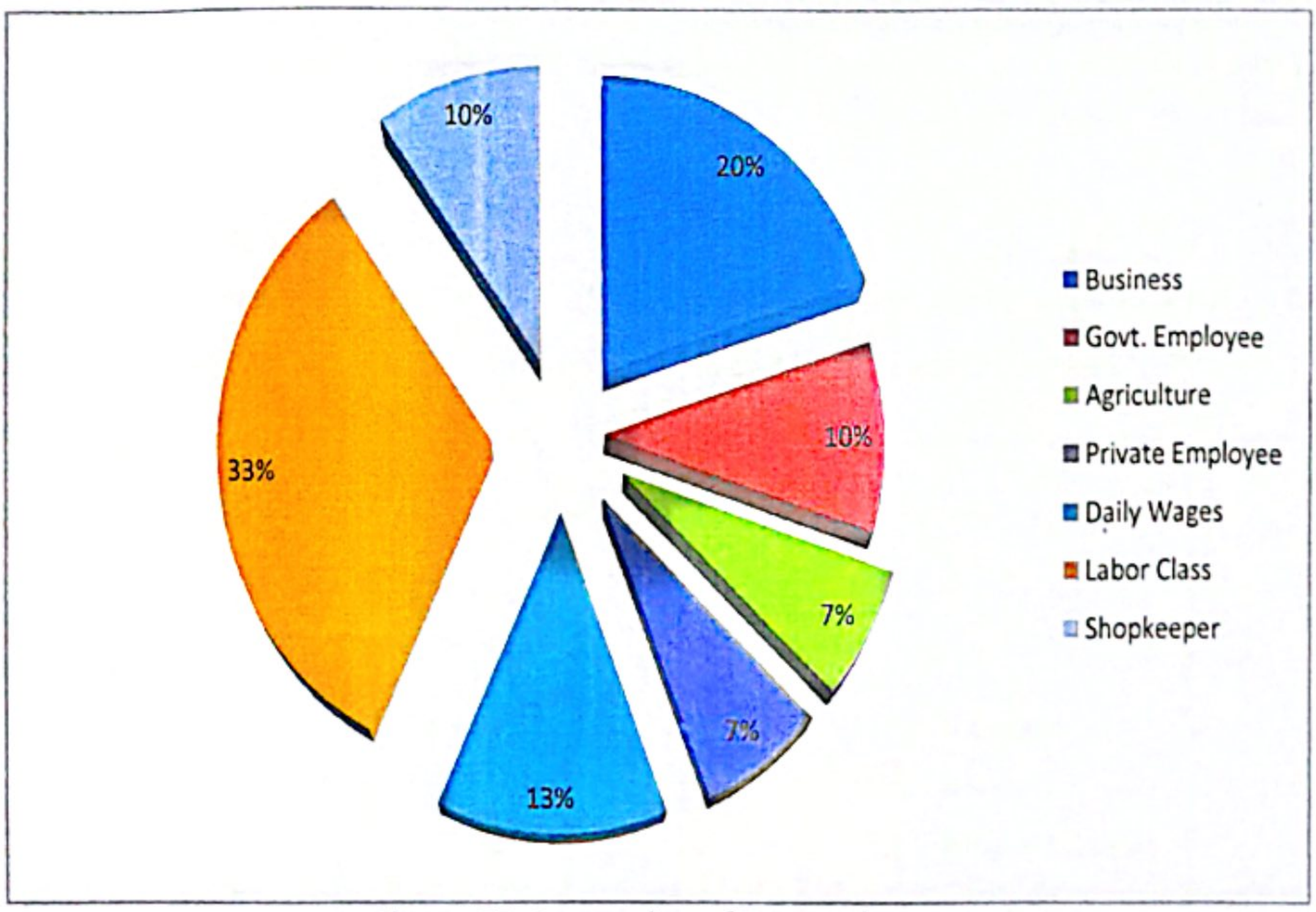


Figure 17: Occupation of Respondents

4.10.2 Personal Income

Based on the sample survey results, as the figure shows that **05%** of the respondents were earning less than 20,000 rupees, **24%** of respondents fall within the income range of 20,000-25,000, **41%** respondents earn 30,001-40,000 while only **16%** of the respondents earn within the range of 40,001-45,000 and **14%** of respondents were earning more than 45,000 rupees.

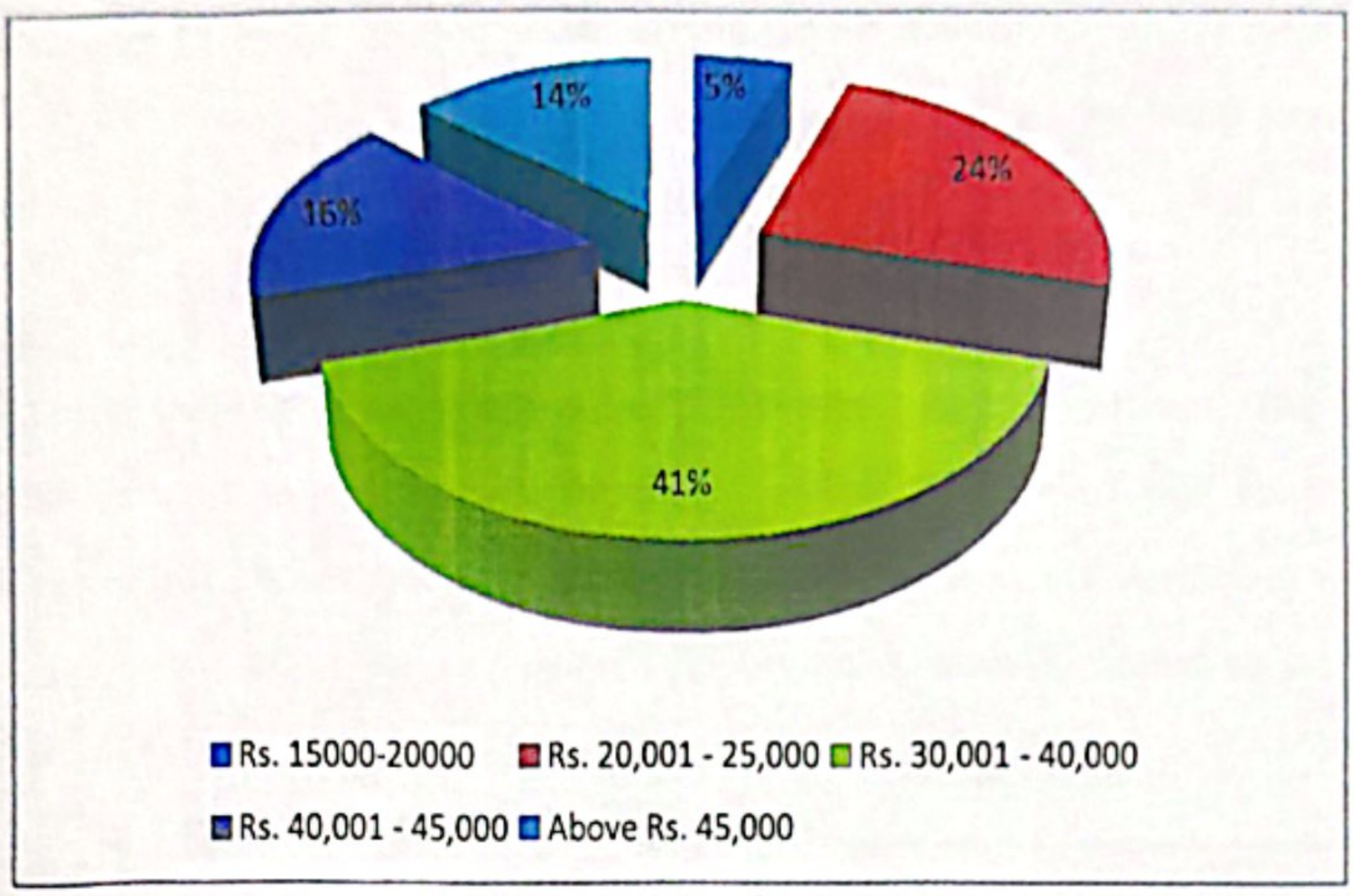


Figure 18: Personal Income

4.10.3 Facilities Available

Basic facilities available in the study area are depicted here. It shows that electricity, tele-communication, gas supply water supply, sewerage system and every other routine facility is available in study area.

4.10.4 Literacy Rate

From survey results, it was found that **23%** of the studied population was illiterate, **29%** was up to primary level and **48%** of the respondents had studied up to higher education level.

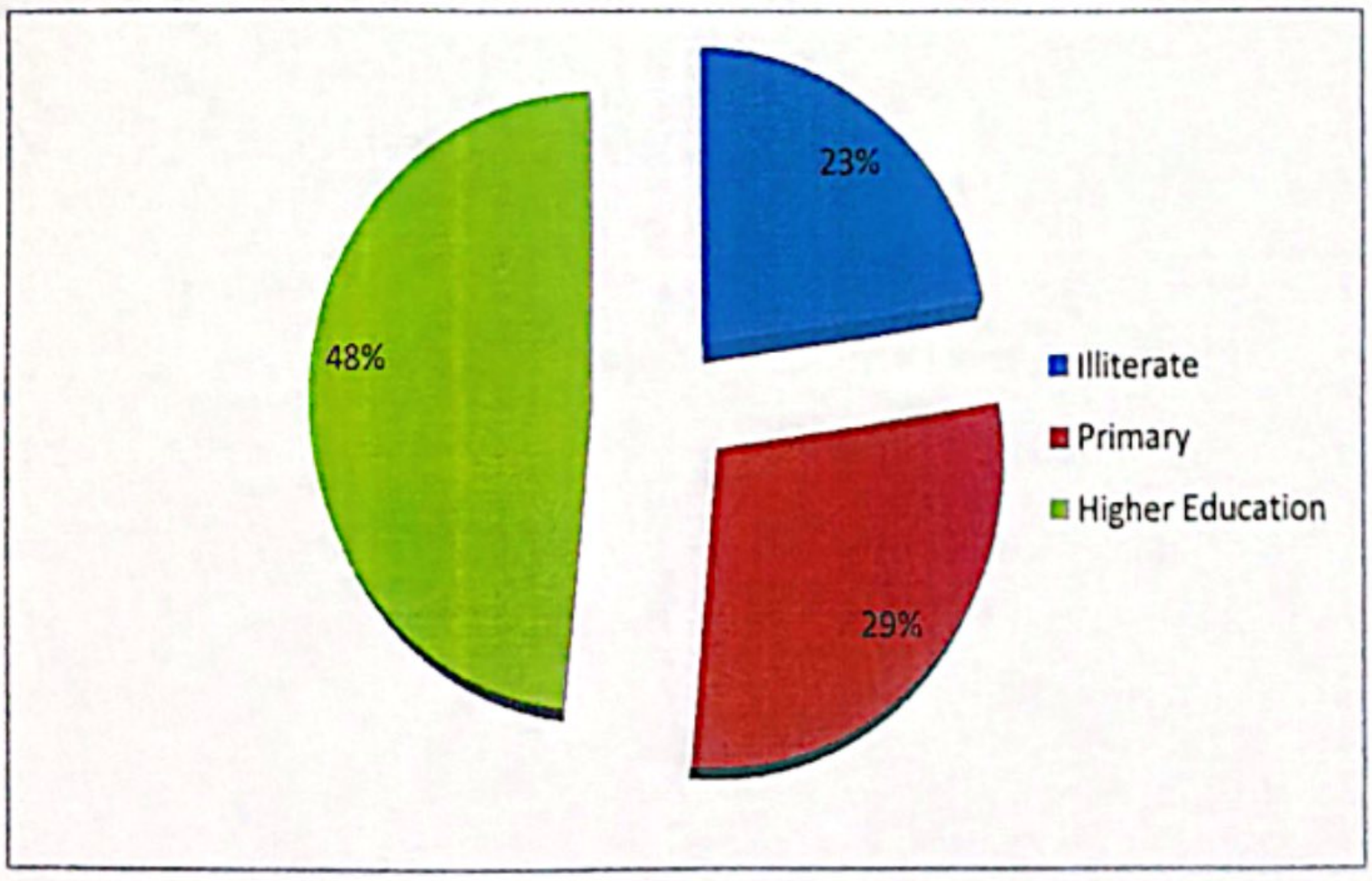


Figure 19: Literacy Rate of the Study Area

4.10.5 Common Diseases

According to the survey of local community, the common diseases recorded were; Diabetes, Fever, Hepatitis, Hypertension, stomach problems, Malaria, Typhoid, Nephritis and Diarrhea[3].

4.10.6 Acceptance Level of the Project

The opinions of the respondents were noted during the public consultation. The majority of respondents **(89%)** of were in favor of aforesaid project. They expect that establishment of aforesaid project will also increase the economic value of local assets. According to them the proposed project will boost the employment opportunities, mobility access to resources and social amenities.

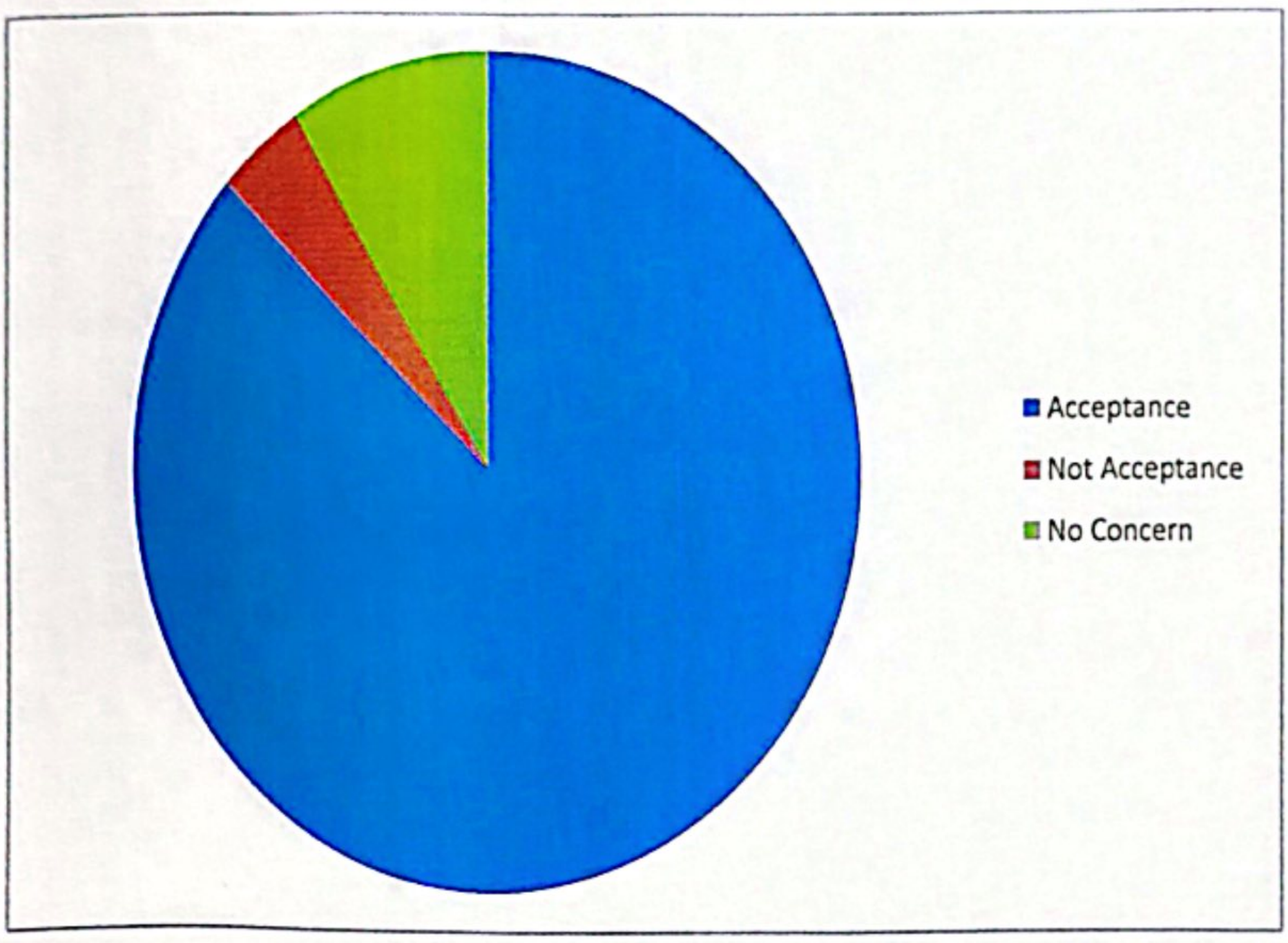


Figure 20: Project Acceptance Level

[3]Source: Climate Change Working Papers No. 9, 2015.

Chapter 5

Impact Assessment Methodology

5 IMPACT ASSESSMENT METHODOLOGY

This section discusses the potential environmental impact for the establishment cotton and yarn dyeing unit by M/s Cottonera Pvt Limited. The impacts may include; soil contamination, water resources damage, biological resources disturbance and socio-economic impacts and, where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in this Section is based on potential impacts on overall environmental receptors within the project area.

5.1 Objectives

The objective of screening is identification of the adverse as well as beneficial impacts and then mitigating the effect of adverse impacts up to acceptable limits or within PEQS. Following are the objectives of screening out all significant environmental and social impacts:

- To find different alternatives and ways of carrying out the project activities, this may cause adverse environmental and social impacts on the surroundings.
- To enhance the Environmental and Social benefits of project.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept within acceptable limits.

In the sub-sections below the impacts assessment methodology for the establishment of cotton and yarn dyeing unit by M/s Cottonera Pvt Limited proposed to be installed at 24-km, Multan Road link Amritcola Road, Lahore has been defined. It includes the magnitude, the extent of the impact and the nature of the anticipated impact that is likely to be occurred from aforesaid project activity.

5.2 Methodology

This Section discusses the project's potential environmental impact of establishment of dyeing unit. The adverse impact may occur on; the area's geomorphology, soil, water resources, air resource, biological resources and socio-economic condition and where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in the sub-sections below is based on potential impacts on overall environmental receptors within the project area. Impacts are evaluated on the basis of magnitude, immediacy and sustainability. Evaluation criteria are as follows:

5.2 Magnitude

The magnitude of the impacts associated with the establishment of aforesaid project includes; the type of impact project commencement will cause to its immediate environment and social structure. It could be direct, indirect and cumulative.

5.2.1 Immediacy

Immediacy of the impact focus on the following parameters:

- Temporal Extent (during construction and operation)
- Spatial Extent (local or widespread)

5.2.2 Sustainability and Reversibility

Sustainability and reversibility of the impact focused on the following parameters:

- Implementation of mitigations (Fully/Partially)
- Monitoring (Fully/Partially)

5.3 Purpose of Mitigation Measure

The basic purpose of mitigation measures is to reduce the impacts for establishment of dyeing unit on the socio-environment up to maximum possible extent. The mitigation measures are suggested based on the following parameters:

5.3.1 What is the problem?

The aforesaid project is installation of cotton and yarn dyeing unit. By the commencement of aforesaid project the ever-increasing market demand of dyed loose cotton and yarn will be fulfilled. The study area is commercial in nature and located at adequate distance from various sensitive receptors. In addition, to the noise and fugitive dust emissions anticipated to be generated during the construction phase solid waste management and disposal issues may arise along with wastewater disposal issues. The major impact associated with the operation of aforesaid plant includes; the management of the solid waste generated, wastewater generated from dyeing, raw-material storage and health & safety issues.

5.3.2 When problem will occur and when it should be addressed?

The impacts from the installation of cotton and yarn dyeing unit will occur during the construction and operational phase due to the civil work involved and the people residing in the project area. These issues included; noise generation, fugitive dust emissions, solid waste management, wastewater disposal, top-soil removal, health and safety issues and change in the

geographic features of area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

5.3.3 Where problem should be addressed?

The problem will be generated from site development and operation of said unit. So, it should be addressed on source i.e. at site within the same time-frame.

5.3.4 How the problem should be addressed?

Proper mitigations measures will be provided according to the nature of the impacts/problems. For example, against dust emissions sprinkling of water may be done on regular basis, for solid waste proper solid waste management and disposal practices may be adopted and to manage liquid waste proper treatment may be made before discharging into the receiving body.

5.4 Ways of Achieving Mitigation Measures?

Following ways will be adopted to reduce the impacts of the installation of dyeing unit:

5.4.1 Changing in Planning Design

For the production of dyed loose cotton and yarn at aforesaid location, the raw-material will be purchased from local market. Raw-material will include; dyes (vat and reactive dyes), chemicals yarn and loose cotton. The vendor will be chose on the basis of competitive market price. The site selected for establishment of proposed unit is located on 24-km Multan Road, Lahore.

There is no endangered and threatened species has been reported in the project & study area. Moreover, there is not any human settlement or infra-structure present on-site that will be dislocated or dismantled due to the construction of aforesaid project. Hence, there is no need to change the location of project. For the dyeing of loose cotton and yarn, state of the art technology has been adopted. This technology is adopted because of the following reasons:

- For the conservation of energy, hydro-extraction process will be employed. In this process 20-25% of water removed through mechanical process instead of using steam.
- For dyeing process; vat and reactive dyes will be used. Reactive dyes are organic in nature and form strong covalent bond with fabric.
- Vat dye is water soluble, easy and stable to use.
- To treat the generated wastewater, proper WWTP will be design and it will be treated properly before final disposal.
- The proposed project design will follow the principle of sustainable development.
- Improved Management and Monitoring Practices

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The anticipated impacts had been reduced significantly by adopting better management activities, as it will be carried out for betterment of the society. While environmental monitoring will be conducted on the regular basis to keep the sources of the air pollution, wastewater generation, noise and public nuisances in-check. Following practices that need to be adopted to reduce the impact significantly:

a. Compensation in Money Terms

Due to the establishment of dyeing unit at the proposed location, vegetation will be removed from site during site clearance. No Impact on the geography/landscape of area will be envisaged due to the installation of aforesaid project. However, there is no protected or environmentally sensitive area present within 3.0 km vicinity of project that could be impacted. Hence, no compensation in the monetary terms will be required. However, for the removal of one tree from the project area, 3-5 trees will be planted as the compensation.

b. Replacement/Relocation/Rehabilitation

The proposed project is being installed at 24-km, Multan Road Link Amritcola Road, Lahore and no sensitive area, human population or preserved natural resource is present which could be impacted due to the commencement of aforesaid project as it is located in commercial area. No replacement, relocation and rehabilitation will required for the commencement of the aforesaid project.

5.5 Impacts Associated with Project Location

The proponent has selected the site owing to the following reasons:

- The site is undisputed and owned by the Client (Copy of contract to made a fresh purchase of land is attached herewith as **Annex-II**).
- There is no community or human settlement present on-site or in the project proximity that could be impacted due to the commencement of aforesaid project.
- There is no fauna or flora belonging to an endangered species present on-site.
- The site has accessible through road network i.e., Multan Road, Canal Bank Road and Sundar Industrial Estate Road.
- There is no ecologically sensitive or declared protected area like; Reserved Forest, Fish Hatcheries, Wildlife or Game Reserves. Moreover, there is no socio-cultural significant structure (historical or archaeological site or religious structures; Masjid, temples, etc.) located within 2.0 km of the selected site that could be impacted.

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- It can be concluded in view of these reasons that the selected site is best suited for the project and will not pose any adverse impact or threat on any component of the environment.

5.6 Impact Assessment Methodology

The impact assessment methodology for the installation of loose cotton and yarn dyeing unit is given below:

5.6.1 Screening of Potential Impacts

Based on site visit, observation, brain storming, provided information and social interviews, significant impacts were anticipated and evaluated. Then qualitative and quantitative (where possible) assessment of these anticipated impacts is to be carried out.

5.6.2 Identification of Mitigation Measures

After anticipation and screening of significant impacts, certain mitigation measures are to be provided in order to enhance benefits of aforesaid project and reducing the adverse environmental and social impacts. These measures can be classified as:

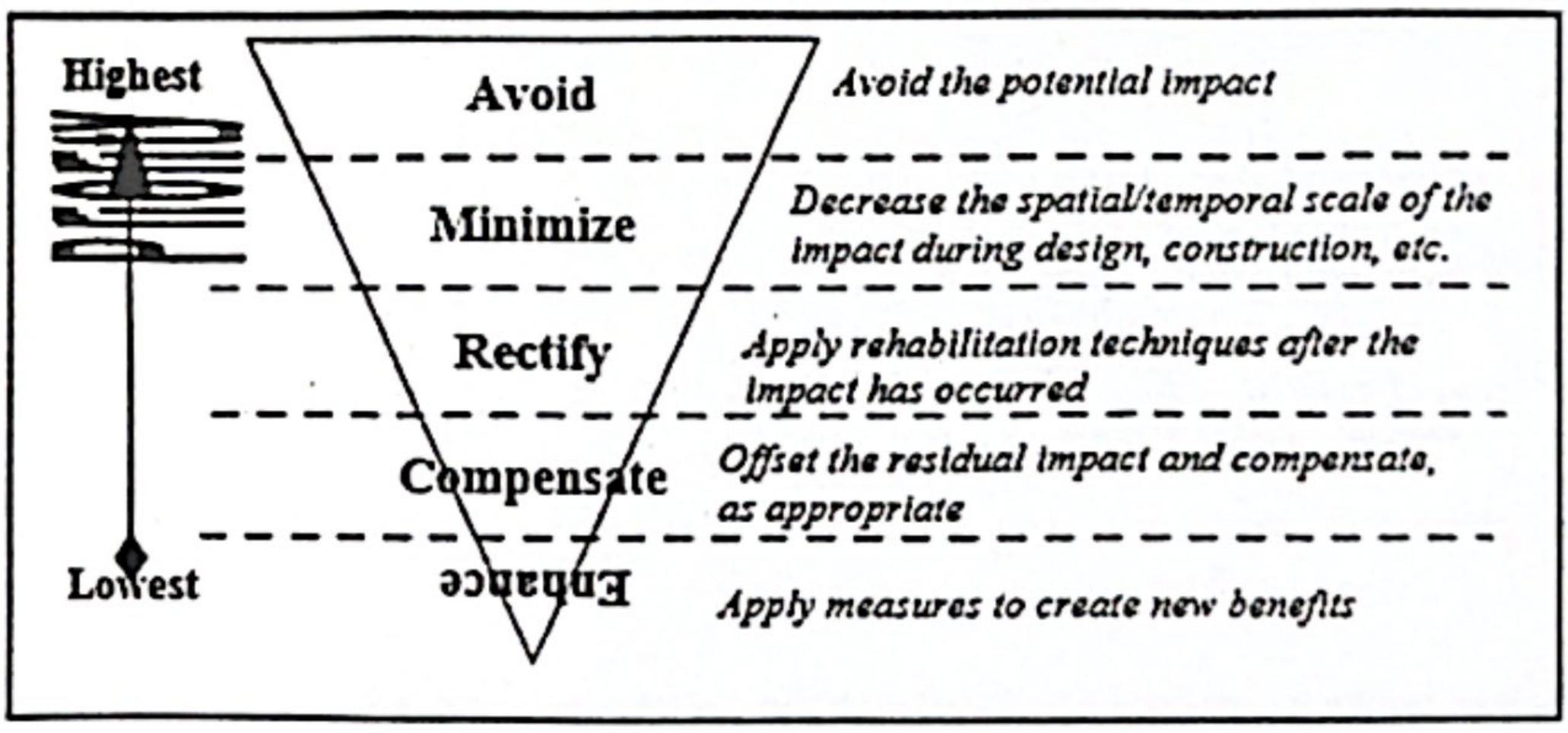


Figure 21: Hierarchy of Mitigations

5.6.3 Evaluation of the Residual Impacts

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of abovementioned project but sometimes, it may fail in bringing them within the acceptable limits. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied.

It can be concluded in view of these reasons that the selected site is best suited for the project and the technology adopted for the production of passenger vehicles. The said project will not

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pose any adverse impact or threat on any component of the environment. The impact assessment criteria are given below along with their impacts:

Table 14: Impact Significance Criteria

Impact	Criteria
No Impact	When the proposed activity will have no impact
Long Term	When the impact is of high intensity with high spread and high duration or of high intensity with medium spread and medium duration
Moderate Term	When the impact is of moderate intensity with high spread and high duration or of high intensity with low/ moderate spread and low duration
Short Term	When the impact is of low intensity but with moderate spread and moderate duration or of moderate intensity
Insignificant	When the impact is of low intensity, low spread and low duration
Adverse	When the impact is of large intensity, spread easily and long-term
Beneficial	When the impacts are positive and improve the environmental conditions

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Table 15: Impact Matrix Checklist for Designing Phase

Environmental Sensitivities	Intensity of Impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	National	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Topography													
Land Acquisitions													
Seismicity													
Biological Parameters													
Land Environment													
Flora													
Fauna													
Social Parameters													
Local Economy													
Social Impacts													

Table 16: Impact Matrix Checklist for Construction Phase

Environmental Sensitivities	Intensity of Impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	Moderate	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Air Quality													
Noise													
Water Quality													
Biological Parameters													
Land Environment													
Flora													
Fauna													
Physical Parameters													
Local Economy													
Social Impacts													
Health & Safety													

Table 17: Impact Matrix Checklist for Operational Phase

Environmental Sensitivities	Intensity of Impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	Moderate	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Noise													
Water Quality													
Biological Parameters													
Land Environment													
Flora													
Fauna													
Physical Parameters													
Local Economy													
Social Impacts													
Health & Safety													

5.7 Identification of Monitoring Requirements

The last step in the assessment process is the identification of minimum monitoring requirements. The scope and frequency of monitoring depends on the residual impacts. The purpose of monitoring is to confirm that the impact is within the prescribed limits and to provide timely information if acceptable limits are being breached.

Chapter 6

Screening of Environmental Impacts and Mitigation Measures

6 SCREENING OF IMPACTS AND THEIR MITIGATION MEASURES

6.1 General

This Chapter identifies the potential impacts (positive and adverse) on the physical, biological and socio-economic environment of project area due to the establishment of cotton and yarn dyeing unit. It also identifies measures that will help to mitigate the adverse environmental and social impacts as well as it will enhance positive impacts of said project. Impacts are assessed by analyzing their magnitude and sensitivity, which is a legal requirement as discussed in Chapter 05 of this EIA Report.

6.2 Objectives

Objectives of screening all possible impacts and then providing their mitigation measures are:

- To find different alternatives and ways of doing the project activities.
- To enhance the environmental and social benefits of proposal.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept in acceptable limits

6.3 Impact Evaluation

Impact screening checklist and project impact evaluation matrix have been developed **(Table 18 and 19)** to evaluate the potential impacts for establishment of dyeing unit on the basis of set procedures as given in the environmental guidelines by Punjab EPA.

6.3.1 Methodology for Impact Evaluation

These tools have been used to identify the significance and magnitude of the impact as well as the nature, reversibility and extent:

- An Impact Screening Checklist
- Project Impact Evaluation Matrix

Following is given a brief description of assessment tools:

a) Impact Screening Checklist

The impact screening checklist is developed to screen out potentially insignificant environmental and social impacts from potentially significant adverse environmental and social impacts during planning & designing, construction and operational phases of the project. The objective of impact screening process is to assess the significance of issues related to the air, water, noise, soil,

transportation, civil work, communication, the hazards and external constraints. The beneficial and adverse impacts of project during planning & designing, construction and operational phases are identified based on their duration, location, frequency, extent, significance and reversibility. The impact of each activity on various environmental parameters is given below:

Table 18: Impact Screening Checklist

Sr#	Environmental Component	Impact Characteristics												
		Duration		Location		Frequency		Extent		Significance			Reversibility	
		Long	Short	Direct	Indirect	Cont.	Intermittent	Wide	Local	Large	Moderate	Minor	Rev.	Irrev.
Beneficial Impacts														
1	Employment Opportunity	◙		◙		◙			◙		◙		◙	
2	Export of finished goods	◙		◙		◙			◙		◙		◙	
3	Appreciation in Land Value	◙			◙	◙			◙			◙		◙
4	Tree Plantation	◙		◙		◙			◙		◙		◙	
Adverse Impacts														
1	Air Pollution		•	•			•		•			•	•	
2	Wastewater		•	•		•			•			•		•
3	Solid Waste and By-Products	•		•		•			•		•			•
4	Health and Safety		•		•		•		•			•		•
5	Chemical Hazards	•		•		•			•		•			•
6	Physical Hazards		•	•			•		•			•		•
7	Security Risks		•		•		•		•		•		•	

b) Project Impact Evaluation Matrix

The project *Impact Evaluation Matrix* was developed by placing different environmental parameters that are likely to be affected by said project actions, grouped into categories i.e., physical, ecological, socio-economic environment and hazards. For assessment of associated impact risk assessment methodology was used. Moreover, the risk assessment was done on the basis of project phases (planning & designing, construction and operation). A project *Impact Evaluation Matrix* is attached as **Table 19** below:

Table 19: Impact Evaluation Matrix

Environmental Parameters	Impact Assessment during Different Phases	
	Construction	Operational
Planning and Designing		
i. Location	+2p	+2p
ii. Design	+1p	+1p
A: : Physical		
1. Land Resources		
i. Soil Erosion and Contamination	-2t	-2p
ii. Transportation	-1t	-1t
iii. Solid Waste and By-Products	-2t	-2p
iv. Land Use	NA	NA
2. Air Resources		
i. Noise Pollution	-1t	-1t
ii. Air Pollution	-1t	-1t
iii. Dust Emissions	-1t	NA
3. Water Resources		
i. Ground Water	-1p	-2p
ii. Surface Water	0	NA
iii. Wastewater	-1p	-2p
B : Ecological		
Flora		
i. Tree Cutting	-1p	+1p
Fauna		
ii. Terrestrial Fauna	NA	NA
C: Socio-Economic		
i. Employment Opportunities	+1t	+3p
ii. Land Value Appreciation	+1t	+2t
iii. Economic Uplift of Study Area	+1p	+3p
D: Hazards		
i. Physical Hazards	-1t	-1p

ii. Chemical Hazards	0	-1p
iii. Health and Safety	-1t	-1p
Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible		

6.4 Impact and Mitigation Management

Purpose of mitigation is to evade, reduce or balance the expected antagonistic effects in suitable way and to integrate these for devising environmental management strategy or plan. At every stage of project, mitigation plan for all the adverse impacts should be predicted to find out the best alternative. The objectives of mitigation are to:

- Invent of best substitution, better alternatives and ways to reduce the adverse environmental and social impacts in immediate surroundings.
- To improve the environmental and societal payback of project.
- To prevaricate, remedy/reduce and pro-vocative impacts.
- To certify that remaining negative influences are kept within permissible limits.

In this part of EIA Report a number of complications may occur which will include; cleanliness, environmental health & safety, societal & environmental managing, inspection, industrial vulnerability, tools & apparatuses, etc. During operational activities, influx of workers and impacts of operational activities have been deeply elaborated.

6.5 Approaches for Mitigation Measures

Following approaches may be used to mitigate the impacts of the project:

Table 20: Approaches for Mitigation Measures

Avoid: Change of route or site details, to avoid damage important ecological or archaeological features.
Replace: Regenerate similar habitat of equivalent ecological value in different location.
Reduce: Filters, cyclones, noise barriers, dust, enclosures, visual screening, wildlife corridors and changed time of activities to reduce the impact.
Restore: Site restoration at the end of the operational activities.
Compensate: Relocation of displaced communities, facilities for the affected communities, financial compensation for the affected individuals, etc.

6.6 Expected Positive Impacts

Following are the expected outcome for installation of cotton and yarn dyeing unit by M/s Cottonera Pvt Limited at above said location:

6.6.1 Increase in Employment Opportunities

Due to installation of aforesaid project, the employment opportunity will be slightly enhanced. During construction phase, 20-25 workers will be hired from local community include; skilled and un-skilled workers. During operational phase, approximately 110-120 persons will be required. It will include hiring of technical and non-technical staff. Locals will also have the opportunity to diversify their income by being employed. Hence, there will be an increased employment opportunity for the local people which will have a positive impact on the socio-economic status of the area.

6.6.2 Tree Plantation

At the end of construction phase, 03-05 times of removed trees will be planted in the designated green areas, this will enhance the aesthetic beauty of area.

6.7 Adverse Impacts and Mitigation Measures

This section identifies the potentially significant and in-significant adverse environmental and social impacts anticipated during the planning & designing, construction and operation phases for establishment of aforesaid unit. Appropriate mitigation and management measures, where applicable, have also been suggested to reduce the severity of anticipated impact up to the extent possible.

6.7.1 Impacts and Mitigations during Design Phase

During planning and designing phase most of the associated impacts will be associated with the selection of appropriate location and design that would have minimal impact on the environment and society. It will include:

i. Impacts of Location

The nearest residential community (Kot Sundar Singh) is located at the distance of **0.69 km**. There is no human settlement, heritage building, social structure, grassland or preserved area in the project vicinity that could be damaged, dislocated or dismantled due to the project activity

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in proposed area. Hence, the impact of location is considered to be in-significant as the project site is away from the surface water body (Canal=742m), residential area (Kot Sundar Singh at 0.69 km) and no protected area is reported in 5.0 km vicinity of the project.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

Following mitigation measures will be adopted to reduce the impact of proposed project location on sensitive receptors:

- The project is located at adequate distance from the various sensitive receptors.
- The site is accessible through metaled road network; Canal Bank Road, Multan Road and Sundar Industrial Estate Road.
- The selected site is located in commercial area and due to establishment of aforesaid project no change in the land use of area is being envisaged.
- The site is owned by the proponent and no dispute is associated.
- No emissions will be released from the operation of aforesaid project.
- The aforesaid project is located in the area having proper sewer and solid waste management system.
- The wastewater will be treated prior to its disposal in the nearby drains.
- The generated solid waste will be collected by Contractor and it will be disposed off through the standard practices of area.

It is envisaged that no mitigation measures will required as aforesaid project will not have any adverse impacts on its surroundings due to significant distances from sensitive receptors

ii. Designing

The design phase of aforesaid project optimized the use of best available technology in order to prevent or minimize potentially significant environmental impacts associated with the project as well as to ensure high level business and environmental performances. In pre-construction/ design phase, a management system was provided at design level for the reduction of impacts. Design of aforesaid project will adhere to all standards, technical and legal requirements in

order to avoid adverse impacts on the socio-environment and human health. Efficient infrastructure will be developed. Procurement of construction materials from approved dealers will be ensured. The technology adopted for the manufacturing of dyed cotton and yarn will be state of the art technology. This process is employed because of the following reasons:

- Procurement of construction materials from approved dealers.
- For the protection of workers PPEs (masks) will be provided during construction and operational phase.
- In aforesaid project, hydro-extraction process will be employed for the removal of water. In this process 20-25% of the water will be removed by using mechanical process.
- Reactive and vat dyes will be used for dyeing. Reactive dye is organic in nature. They are water soluble, stable and easy to use.
- The proposed emergency system will be semi-automatic and it will control through computerized systems which will be connected with smoke alarms.
- In this process almost 98% of raw-material will be converted into the final good.
- Through the selected system high quality of goods will be produced.
- The generated wastewater will be treated through WWTP.
- The Proponent intends to reduce the environmental and social issues up to practically possible safe limit. The Client had adopted SOPs for Emergency Reponses Plan, Fire Fighting Plan and Disaster Management Plan which are explained in sub-sections below.
- Planning principles and design considerations have been reviewed and incorporated into the site planning process to the extent possible. The concepts considered in the design of the proposed project are:
- No additional land acquisition.
- Substantial reduction of environmental degradation in project area.
- Augmentation in adequacy of sanitation conditions at the user end enhancing the efficiency of existing infrastructure.

Nature of Impact

The nature of the proposed impact will be direct, low, short-term and hence in-significant.

Mitigation

No additional mitigation measure will be required as state of art technology is being adopted for the dyeing of cotton and yarn such as vat and reactive dyes. For the treatment of the generated wastewater proper wastewater treatment plant will be installed. This generated wastewater will be given primary and secondary treatment before final disposal in nearby drains.

iii. Land Use

The project area is being constructed in an open land. There is no settlement, surface water body, grassland or preserved area in proximity of project area that could be damaged or dismantled due to establishment of abovementioned unit. Due to the establishment of said unit no change in the land use of area is being envisaged and all the basic amenities as well as facilities will be extended to construct new infra-structure and facility at site.

Nature of Impact

The nature of impact will be in-direct, low, short-term and hence in-significant.

Mitigation

The aforesaid unit will be installed at adequate distance from the sensitive receptors. Hence, no impact is being envisaged on land use change of the area. However, vegetation removed from site will be compensated. Following mitigations measures will be adopted to reduce the land use impact:

- Unnecessary up-rooting and disturbance to native vegetation should be avoided up to the extent possible.
- The designated green area will be vegetated and native vegetation present on-site will be preserved as far as practically possible.

iv. Tree Cutting

It is envisaged that trees have been removed from the site during the site clearance. The ecology of the area will have impact but at minor scale.

Nature of Impact

The nature of impact will be direct, low, short-term and hence insignificant.

Mitigation

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Following mitigation measures will be adopted:

- Avoid un-necessary disturbance and removal of trees.
- The designated green area will be vegetated and native vegetation present on-site will be preserved.
- During construction phase trees removed from the site during site clearance causing soil exposure will be re-vegetated quickly and compensatory plantation (3-5 trees for each one removed) will be carried out as soon as possible.
- Native and fast growing trees will be planted in the designated green areas.
- Biodiversity at the site will be maintained by transplanting or culturing endangered or threatened plants such as; Sheesham which is under-attack in Asia will be planted at site.
- 3-5 times of the removed trees will be planted in the designated green zones.

v. Impact on Topography

The area of said plant has flat terrain. It is predominantly covered with fine to medium grained clay loam as top soil with underlying compacted dense sand. During the construction phase, leveling would be required. Apart from the localized construction impacts confined to the plant site, no significant long term adverse impact on topography is envisaged.

Nature of Impact

The nature of impact will be direct, low, short-term and hence insignificant.

Mitigation

No mitigation measure will be required as no impact on the topography of area is being envisaged.

6.7.2 Impacts and Mitigation during Construction Phase

Project construction phase is of 01 year whose activities will surely show effects on land environment, water, air, noise level, soil quality, socio-economic trend of area, etc. This activity will have a positive impact in case of socio-economic culture for the people. They will have a chance for local employment, fabrication, brick masonry, painting and machinery erection works. Along with that tree plantation will be one of the activities. As local workers are involved in construction phase, impact at site will be negligible.

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The construction phase of aforesaid project will include activities associated with the site leveling, construction of civil structures, architectural works and building services. The construction phase would bring in immediate but short term changes on various components of environment near the project site. This section explains how aforesaid project will affect different environmental aspects and its mitigation measures to manage the impact. The impacts during construction phase will be temporary and localized. Even though, the measures proposed to minimize such impacts.

i. Soil Contamination

During constructional activities the chances of soil erosion and contamination may be increased. Soil erosion from construction activities will deteriorate the soil quality. There are low chances of land contamination due to release/spill of lubricants, oil and other materials during the construction period. Erosion may also result from movement of heavy vehicle such as; bulldozers, excavators, trucks and pick-ups. The impact will be short term, localized and can be controlled through immediate appropriate management and mitigation measures. This impact is considered negative of minor magnitude. Hence, the impact is in-significant.

Nature of Impact

The nature of proposed impact will be direct, medium, short-term and hence significant.

Mitigations

Following mitigation measures will be adopted to protect the soil from erosion and contamination:

- During construction phase trees removed from the site during site clearance causing soil exposure will be re-vegetated quickly and compensatory plantation (3-5 trees for each one removed) will be carried out as soon as possible.
- Native and fast growing trees will be planted in the designated green areas.
- Spill prevention and response plan for storage, usage and transfer of fuel should be prepared (if used on site) and implemented.
- Workers should be trained on spill prevention and response plan.
- Maintenance and washing of vehicles as well as equipment will be carried out at designated areas within the facility.

- Any hard surface or tarpaulin should be spread on area to prevent soil contamination.
- Regular inspections should be carried out to detect leakages in construction vehicles and equipment.
- Machinery involved should be maintained properly to avoid leakages.
- The proponent will be required to instruct and train their workforce in storage and handling of materials that can potentially cause soil contamination.
- Solid waste generated during construction will be properly and safely disposed of as per practices of area.

ii. Impact on Air Environment

The main source of air emission during the construction phase is dust. It will be generated due to movement of equipment at the site and during site leveling, earthwork, foundation work and other constructional activities. Dust emissions are expected to result in increased particulate matter thus affecting base line air quality, primarily in working area for a short duration.

Nature of Impact

The nature of proposed impact will be direct, medium, short-term and hence significant.

Mitigations

Following mitigation measures will be adopted:

- In order to reduce concentration of suspended dust particles, transport roads will be sprinkled with water on the regular basis.
- Construction activities causing dust should not be carried out on excessively windy days.
- Construction workers will be provided with masks for protection against the inhalation of dust and they should be trained for its use.
- Vehicle speed should be controlled within the limit.
- Emission of exhaust gases from vehicles used for construction should be controlled.

iii. Impact on Water Environment

The construction activities will be associated with mechanical fabrication, assembly and erection.

These associated activities do not consume large quantities of water. Portable sanitation facility shall be provided by contractors for disposal of sanitary sewage generated by the work force. There shall be no disposal of construction waste outlet. The overall impact on water

environment during construction phase due to the proposed project is considered short-term and in-significant.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigations

Following mitigation measures will be adopted:

- Water conservation techniques should be adopted to conserve freshwater.
- Labor should be trained to conserve the water.

iv. Impact on Flora & Fauna

Project site is vegetated by grass and seasonal agricultural crops. Since, no native flora removal is involved; therefore no effect due to the project implementation is being envisaged. There will be no effect on fauna of the area, animals will not be allowed at project execution area. Proper fencing will be done during construction period to protect any damage to fauna (if any). New plants will be grown if wild grass or some trees will be removed.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigations

Following mitigation measures will be adopted:

- After the completion of construction phase, tree will be planted in the designated green areas.
- For the management of landscape, local and native trees will be planted.
- Trees will be planted along the project area boundary.
- Unnecessary up-rooting of the trees and plants must be avoided.

v. Impact on Noise Environment

The noise produced during construction phase may not have significant impact on the existing ambient noise levels. The activities like; construction of foundation, infrastructure and plant are considered as the main source of noise generation. The major construction work will be carried out during the daytime. The construction equipment may generate high noise which can affect

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the personnel operating the machines. Use of proper personnel protective equipment will mitigate any adverse impact of noise on the working population. Noise from the site is expected to be reduced significantly before reaching nearby habitation.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigations

Following mitigation measures will be adopted:

- Selection of up to date and well maintained plant or equipment with reduced noise levels ensured by suitable in built damping techniques or with appropriate muffling devices.
- Confining noisy work to normal working hours in the day, wherever possible.
- Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in its use.
- Restricting construction vehicle movements during night time.
- Use of low noise machinery, or machinery with noise shielding and absorption are the mitigation measures suggested for said project.

vi. Socioeconomic Impacts

In project area, no significant changes are envisaged in traditional life style and occupation of local people residing in the nearby communities as it is being established at adequate distance from various sensitive receptors. The local people are rather benefited due to the provision of job opportunities. No impact is envisaged due to influx of workers as local will be preferred and hired for working. Social issues may arise which will cause minor negative impact on the social life style of people. Moreover, health and safety related issues may arise during the construction activities. These impacts are in-significant can be further reduced significantly by adopting best management practices.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

Following mitigation measures will be adopted to reduce the socio-economic impact on the community:

- Good relations with local communities will be promoted by encouraging Contractor to provide opportunities for skilled and un-skilled employment to the locals as well as on-job training.
- In the case of not hiring the locals, Contractor will restrict his permanent staff to mix with the locals to avoid any social problems.
- The contractor should prefer hiring local labor from adjacent community; Kot Sundar Singh, Dhupsari, Sundar, Chimbran wali Jhuggi, etc.
- The contractor will keep the copy of National Identity Card (CNIC) of his employees and will warn the workers not to involve in any anti-social activities otherwise they may face dire consequences.
- At the time of hiring the Contractor has to ensure that workers should be of good repute.
- First aid kits having all the necessary first aid stuff will be available at site.
- Routine medical check-ups of all the field staff including unskilled labor needs to be conducted by qualified physician and surgeon.
- Training of workers should be carried out for operating various constructional machinery, safety procedures should be adopted, environmental awareness should be carried out, equip all workers with safety boots, helmets, gloves, protective masks and monitoring of their proper and sustained usage will be carried out. In case of accidents, contractor will provide free medical treatment to the community.
- The Contractor will be responsible for sensitivity towards the local customs and traditions.

6.7.3 Operational Phase

This section delineates the potential impacts during operation phase of the project and the mitigation measures to counteract these impacts. The summary of the impacts and possible mitigation measures are as follows:

i. Impact on Ecology

Currently, the site is being use for agricultural activities and after the completion of construction phase different native and ornamental plants species will be planted in designated green spaces and along boundary of project site. This will improve the overall aesthetic beauty of the area and it will have a significant impact on the overall ecology, aesthetic and landscape of the area.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

This impact is considered to be positive, long-term and significant. Hence, it doesn't require any mitigation measure.

ii. Impact on Air Environment

Air emissions will be generated from the production of steam. For the production of steam coal based boiler will be used. This would be the source of air emissions that would deteriorate the project area air quality. Moreover, dust will be generated due to the frequent movement of vehicles carrying the raw-material and finished goods. During operational phase, suspended particulate matter and gaseous emissions will be the main pollutant.

Due to increased vehicular movement increase in NOx, SO_x, VOC and CO concentrations will be observed at the project site. As most of the construction equipment will be mobile, the emissions are likely to be fugitive and not concentrated on a single source or place. As the impacts will be localized in nature, the areas outside the proposed project boundary are not likely to face any significant adverse impacts with respect to ambient air quality

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

Following mitigation measures will be adopted:

- Multi-tube cyclones, cyclone and wet scrubber will be installed on coal based boiler to control air emissions.
- Instead of using local coal, imported coal having low sulfur contents will be used.

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- Generator from low NOx and SOx series will be purchased and they will be installed in confined spaces.
- Vehicles used for transportation of raw material as well as finished product and the utility vehicles will be regularly serviced and maintained in order to keep the environmental impact on account of their exhaust emissions to its minimum level.
- Native tree would be planted along the boundary of project area to keep environment healthy. 3-5 trees will be planted for the removal of one tree.

iii. Noise Environment

Noise, an unwanted sound, affects human being. Excessive exposure to noise produces varying degree of damage to hearing system. It leads to headache, fatigue, etc. Continuous exposure of increased level of noise will have an adverse impact on the health of workers as well as the people residing in surrounding area.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

In general the following methods will be adopted to control the noise pollution from the proposed units;

- Residential area is at safe distance from selected site.
- Proper encasement of noise generating sources will be done to control the noise levels within limits.
- A thick greenbelt will be developed all around the plant which will be acting as noise barrier.
- The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows.
- The use of complete or partial enclosures as and if required.
- Attenuation by use of sound absorbents on walls and fixed or suspended ceilings
- Introduction of control and monitoring rooms having good sound insulation properties.

- The use of mufflers, sound attenuation and acoustic louvers in air flow paths, taking particular care to direct inlet and discharge an opening away from critical areas wherever possible, so as to take advantage of direct effects.
- All the workers will be provided with ear plugs. All the transporters will be vised to carry out regular maintenance of their vehicles

iv. Solid Waste Management

The key solid wastes and by-products expected from project activity will be non-biodegradable and recyclable matter, such as containers, waste papers, and use materials, waste packaging materials, cones, will be sold to local contractors for recycling or reuse purpose. Domestic waste will be handled as per practices of area.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigations should be adopted to manage generated solid waste:

- The recyclable and reusable waste will be sold to the contractor which will include; paper, plastic and non-ferrous material.
- Waste bins will be placed in the facility at the strategic position for the collection of solid waste.
- The installed bins will be covered in order to reduce the chances of the disease vector production.
- Record of all waste generated during the project activity should be maintained on the regular basis. Quantity of the waste disposed, recycled or reuse will be logged on a waste tracking register.
- Regular training will be given to the workers dealing with the waste management it will include identification, segregation and management of waste.
- The sludge removed from WWTP will be sold to the certified contractor for the management of the generated solid waste.

v. Water Environment

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Wastewater will be generated at rate of approximately at the rate of 30 m^3/hour. The process wastewater will be consisting of 20-25% of dyes. This generated wastewater may impact the quality of water, if not treated. Moreover, the use of chemicals during process may pose threat and cause water pollution. In addition to the use of chemicals, its spillage may deteriorate water quality.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigations should be adopted to manage generated wastewater:

- The domestic wastewater will be treated through septic tank prior to disposing off in nearby drain.
- For the treatment of wastewater; WWTP of adequate capacity and technology will be installed.
- Water conservation activities will be adopted for the preservation of water.
- RO reject will be reused after primary treatment for various horticultural activities on-site.
- Water conserving methods will be applied by placing taps and toilets.
- All faults will be monitored and fixed.
- Freshwater conservation techniques should be adopted to ensure sustainable development such as; wastewater recycling plant.
- Monitoring of effluents shall be carried out as per requirement of Self-Monitoring and Reporting Tools (SMART) to ensure compliance with the PEQS.
- It will be ensured that no solid waste will be entered in the wastewater stream.
- Freshwater conservation techniques should be adopted to ensure sustainable development such as; wastewater recycling plant
- Monitoring of effluents shall be carried out as per requirement of Self-Monitoring and Reporting Tools (SMART) to ensure compliance with the PEQS

vi. Health & Safety

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Improper handling of chemicals, dyes and raw-material may cause various health issues such as inhaling, injection, etc. It can cause allergy reaction and many other issues. To ensure the safety of workers these impacts need to be managed effectively.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigations should be adopted to improve the health and safety:

- Regular inspection and maintenance of the plant will be carried out to eliminate the risk and associated hazards of any unfortunate incident.
- Workers will be trained on the regular basis regarding personal safety and disaster management.
- Operators operating the plant should be fully trained and equipped.
- Training regarding HSE should be given on the regular basis.
- Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc.
- It should be strictly enforced to wear PPEs while working.
- Incidents should be reported directly to the concerned authority.
- Spillage prevention plan should be adopted and it should be implemented effectively
- Floor surfaces shall be maintained and cleaned on regular basis.
- Floor should be kept clean and free of oil spills, other slippery fluids or materials and obstructions.
- The effective use of hearing-protection devices shall be ensured.
- Protective measures and emergency rescue procedures should be followed strictly.
- Only authorized persons shall be allowed in the processing and chemical storage areas.
- Unloading of the raw-material and loads of the final products should be controlled, supervised, slow and smooth.

vii. Chemical Hazards

Direct exposure to dyes may occur during the handling of chemicals related to dyeing of loose cotton and yarn. Avoid unnecessary chemical exposure to the workers who are working in the

process area or related to the process. A long term and direct chemical exposure may impact the health of workers and the risk of the spillage may increase.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigations

Following mitigation measures will be adopted:

- Personal Protective Equipment (PPEs) should be given to workers including; protection and impermeable clothing for use during processing and handling chemicals, gloves, mask, safety boots, goggles, etc.
- Proper plan for the movement of the raw-materials (including dyes & chemicals) should be planned.
- Only authorized persons should be allowed for the handling of the chemicals.
- Wearing of the PPEs should be regulated strictly by the concerned authority.
- Chemical spillage will be avoided by developing proper SOPs for the handling of the chemicals.
- Chemicals and final products will be stored properly and all precautionary measures will be adopted to eliminate all the hazards and risks associated with the handling and storage of material.

viii. Security Risks

A large number of workers will be hired including; skilled and un-skilled laborers. The increase in the number of the individuals residing in the area, may lead to an increase in crime and violence in surrounding areas. The nature of the impact is considered to be low as the locals will be preferred for hiring.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation Measures

Following mitigation measures will be adopted:

- Proper security will be provided to the workers working in the premises of proposed project.
- Before hiring any worker and his criminal record may be checked.

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- CNIC of all the workers will be kept by the proponent.
- Strict law will be enforced to control the crime at site.
- Security to the workers should be provided.

ix. Emergency Response

Emergency response preparedness committee will be formulated consisted of heads of all the departments. Emergency response leader will be the head of the team assisted by safety team and safety supervisors. Emergency response leader along with his team will ensure that in the case of emergency, team is prepared for fire-fighting and the first aid kits will be provided which may include; blankets, hot water bottles, stretchers, benches, sterilized dressing, snake bite kit, cotton and iodine (2% alcohol).

Incidents and accidents may take place unexpectedly during project operations no matter how effective, strong and efficient the mitigation measures for all adverse impacts; especially the safety issues may be adopted. These may include; accident and natural disasters.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigation measure will be adopted:

- Site in-charge should be responsible to ensure that fire-fighting plan has been implemented with true spirit.
- Safety team will be responsible to monitor the activities and to act on the approved firefighting plan in the case of fire.
- Designated area fire marshals will be responsible to monitor their respective their respective areas and act on firefighting plan in case of fire.
- Workers should be given adequate training of handling machinery.
- Emergency call service must be made available.
- The drills to check the response of the workers against any emergency situation will be carried out on the regular basis.
- Safety and hazards signs will be displayed with the facility to avoid any unfortunate incident.
- Only authorized persons will be allowed for the handling of the chemicals.

5.6.7 Socioeconomic Impact

It is envisaged that the adverse impacts associated with the development of the proposed project includes; local community will be disturbed due to increase in the traffic load (i.e., vehicles carrying raw material and final products), wastewater management, soil pollution, etc. The intensity of the aforesaid project will be quite low. The commencement of the aforesaid project will have a beneficial impact on the surrounding community such as; increase in employment opportunity, increase in the wages of the local area employees, increase in revenue generation, provision of social welfare funds of the employees and appreciation of land value. The aforesaid impact is considered to be positive and will have a direct, medium, long-term and significant impact.

Mitigation Measure

No mitigation measures will be required.

6.8 Environmental Enhancement Measures

Proposed project will be result in following benefits:

- Direct and indirect employment opportunities,
- Gains in the local and national economy,
- Industrial development in region
- Business spin-offs in the factory area,

Tree plantation along boundary of project will act as environmental enhancement measure. Trees including shatoot, Jaman, Moor Pankh, Fish paam, Trysenia, etc. will be grown on all open spaces and along boundary of project. **Environmental Budget: 2.4 million PKR**

Chapter 7

Environmental Management and Monitoring Plan

7 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

This EIA Report provides the Environmental Management Plan (EMP) of implementation of aforesaid project to keep it environmental as well as social impacts in check by suggesting monitoring of the certain parameters moreover, to ensure the compliance of established EMP. As per the environmental legislation in Pakistan, the EMP for operations phase, along with other documents, is to be submitted to the Environmental Protection Agency to obtain confirmation for compliance and Environmental Approval for project operation. Even after implementation of the suggested mitigation measures, the impact may remain significant, and require monitoring. This section also underlines the monitoring framework for operation phase to check compliance of the EMP and to take timely actions for correction in case any accidence of significant criteria, requirements or goals is found.

7.1 Objectives of Environmental Management Plan

The primary objectives of the EMP are to:

- Facilitate the implementation of mitigation measures identified in EIA Report.
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

7.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

Table 21: Responsibilities of Management

Sr.#	Managers	Responsibilities
1.	**Contract Manager**	• Ensure EMP development. • Maintenance of EMP • Environmental issues identification within pre construction phase. • Communication of EMP with other employees.
2.	**Contractor**	• Ensuring that the control measures identified from environmental surveys are implemented as they are

	relevant to their work/visit. • Ensuring that the project management team is notified of any non-conformance of control measures or environmental incident where the environment has been put at risk.
Site Manager	• Ensure site material and chemicals are safe • Controlled access arrangement to avoid hazards • Emergency egress arrangements to avoid dangerous situation. • Provide first aid facilities.
Site HSE Advisor	• Ensure work is carried out in safe manner • Ensure good standards of workmanship • Health and safety advisor to complete the site waste management plan to be followed. • Ensure EMP implementation • Daily checks • Weekly checks • Consultation with workers
Site Environment Advisor	• According to legislation and consent develop EMP • Ensure application of EMP • Carry out site inspection
Public Contact Officer	• First point of contact for members of the public • Arrange and manage public forums • Maintain relation with stakeholders • Door to door surveys as appropriate • Coordination with work

7.3 Components of EMMP

Components of EMP are as follows

- Management plan
- Monitoring Plan
- Communication and documentation
- Institutional capacity
- Environmental training

7.4 Institutional Capacity of the Unit

The organizational structure for the Environment Management Plan is outlined below:

7.4.1 Primary Responsibilities

The primary responsibility for implementing EMP within the company lies with the owner of M/s Cottonera Pvt Limited for dyeing loose cotton and yarn.

7.4.2 Operation Management & Control

Conducting the operational activities in environmentally sound manner will be the responsibility of the concerned Manager; for which he will be trained.

7.4.3 Supervision & Monitoring

Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

7.4.4 Communications and Documentation

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

7.4.5 Meetings

Two kinds of environmental meetings will take place during the project:

- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meeting will be to present the EMP to project staff and discuss its implementation and to discuss any event of environmental significance that has happened in the under-discussion industry or a similar industrial unit to investigate its route causes and develop its solutions. The purpose of the weekly meetings will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

7.4.6 Changes-Record Register

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

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7.5 Summary of Impacts & Mitigation Measures

Following is the summary of the impacts & mitigation measures adopted;

Table 22: Summary of Impacts and Mitigation Measures

Impact	Mitigation Measure	
	Construction Phase	Operation Phase
Solid Waste Generation	• Provide solid waste handling facilities such as; waste bins and skips in all sections of the factory. • Ensure that solid waste generated is regularly disposed off appropriately. • Waste will be managed by as per municipal practices. • Non-biodegradable and recyclable matter, such as containers, wastes, used materials, waste packaging materials, will be sold to local contractors for recycling or reuse purpose.	• Proper solid waste handling will be done. • Packaging waste, cutting waste will be properly disposed off at solid waste handling area. • Cuttings of Waste fabric will be reused in other processes. • Sludge from WWTP will be handled by waste contractors and the suggested method for safe disposal is incineration.
Wastewater Generation	• No water will be disposed off into sewer lines without proper treatment. • Municipal wastewater will be handled by Septic tank and disposed off into the drain.	• Process waste water will be managed through Wastewater Treatment Plant with a capacity of 30 m^3/hour. • The treatment system shall bring the values of untreated effluent within the limits of treated effluent discharge also to ensure this treatment as an environmental friendly method with compliance of PEQs. • WWTP of adequate technology and capacity will be installed.
Air Pollution	• Management needs to regularly carry out checks of all machinery and carry out regular servicing and maintenance of it in order to keep the environmental impact on account of their emissions to its minimum level. • For reducing fugitive dust, regular water sprinkling on roads will be done. • All trucks proposed to be used for transportation will be covered with tarpaulin, maintained and	• Air emissions will chiefly arise from boiler along with solvent vapor, odor, PM, dust and lint from floor cleaning and from the generators. • Proper ventilation plan, good housekeeping, and regular monitoring for preventive maintenance of the generators are the control measures which will check air pollution. • Air masks, helmets and safety uniforms will be provided to the

	optimally loaded. • Moreover, the garden development and tree plantation activities of proponent during operational phase would ensure minimal impact of fugitive dust emissions. • Generators will be provided with proper enclosure, tuning and maintenance to control emissions.	workers and proper check will be made to check its compliance in the premises.
Noise & Vibration	• Proper encasement of noise generating sources will be done to keep the noise levels within limits. • Generator will be provided with acoustic enclosures and silencers in the exhaust. It will be housed in a closed building which will considerably reduce the noise. In case of maintenance, the persons working near the generator building will be provided with ear muffs. • A thick greenbelt will be developed all around the plant which will be acting as noise barrier. • The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows. • The use of complete or partial enclosures. • Attenuation by use of sound absorbents on walls and fixed or suspended ceilings.	• Noise from the generator will be mitigated by enclosing them in sound proof rooms and planting trees. • Workers will be protected by providing them with PPEs (ear muffs, ear plugs, etc.). • Safety issue will be managed by developing and updating from time to time, the SOPs for all work activities, training the workers to follow them, not tolerating any careless attitude of the employees during work. • Regular inspection to ensure no unsafe act or condition prevails at work site and lastly, by providing the workers with necessary PPEs (safety helmets, dust masks, safety shoes, ear plugs, special suiting for various jobs and areas, etc.) and encouraging the workers to use them.

7.6 Environmental Training

Training is an integral part of a preventive strategy. Environmental and disaster management training will be required to ensure proper implementation of effective environmental management and monitoring plan; and disaster management plan. However, training could be organized by proponent involving relevant staff. As a trainer, competent Consultant can be outsourced. Important training under the spectrum needs to include:

- Training on fire fighting and safety management;
- Training on environmental safeguards and compliance;
- Staff training on environmental monitoring and reporting;
- Training on occupational health and safety measure.

Table 23: Training Schedule

Target Audience	Trainers	Contents	Schedule
Selected Management Staff	Subject Expert	Key finding of mitigation measure	After every five months
All Personnel	HSE Officer	Mitigation measures especially firefighting, safety, health and environment (emissions & discharges) etc.	Monthly
Technical Staff	HSE Officer	Waste disposal, vehicle movement restriction and other mitigation measures	After every three month
Other Staff	HSE Officer	Waste disposal, resource conservation and other mitigation workers	Monthly

7.6 Equipment Maintenance Details

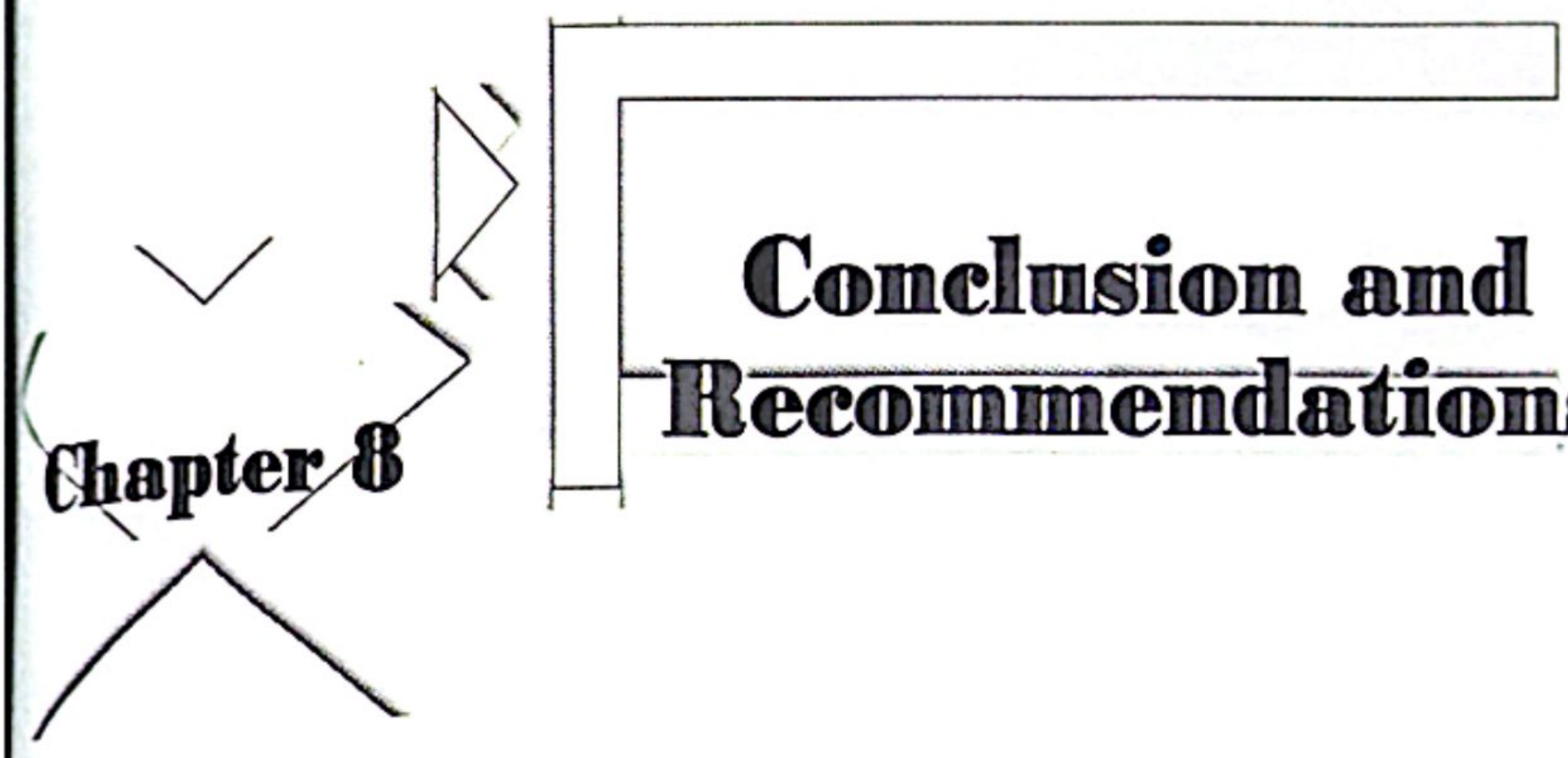
PPEs and other required machinery of latest technology with high efficiency will be purchased by the Proponent. Maintenance of Equipment will be done twice year for the smooth operation and maximum production.

Table 24: Equipment Maintenance Details

Task	Weekly	Monthly	Semi-Annually	Annually
Visual Inspection	✓			
Testing and Inspection		✓		
Check for Leakage		✓		
Recharging				✓
Fire Mains and Nozzles		✓		
Containers/Cylinders			✓	
Control and Section Valves			✓	

1.7 Environmental Budget

The environmental budget consists of the cost of plantation, monitoring (air, wastewater and noise), air pollution abatement devices and maintenance of fire-fighting equipment the monitoring of the impacts associated with the proposed project construction and operation will be carried out as and when required. The environmental budget for the proposed project will be approx. **PKR 2.4 Million.**



Chapter 8

Conclusion and Recommendations

8 CONCLUSION AND RECOMMENDATION

The report presents Environmental Impact Assessment (EIA) Study for the establishment of loose cotton and yarn dyeing unit by M/s Cottonera Pvt. Limited in District Lahore. Its main objective is to provide high quality dyed cotton and yarn supply to the market. EIA Report of project is performed according to guidelines of Environmental Protection Agency (Punjab). It includes; description of the project, description of the environmental baselines conditions, potential environmental impacts and suggested mitigation measures that are supposed to be adopted to control the same. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study.

The performed EIA Study showed all anticipated impacts (both positive and negative), associated with the project are with the prescribed limited of the applicable standards. Appropriate mitigation measures as explained in the above sections will reduce, if not eliminate, these impacts so that these are within acceptable limits. Moreover, no deterioration, depletion or exploitation of local natural resources is expected to be caused by this project implementation. Based on overall assessment of the environmental impact of the project, it is concluded that the project is not likely to cause any significant adverse impact on the social, physical and biological environment of area, provided that suitable mitigation measures as identified in this study are implemented with true spirit.

It is accordingly recommended that Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponent of the project.

8.1 Recommendations

The EIA study and survey results are finally evaluated to recommend the following:

- No activity should be undertaken at the site which could pose any sort of a threat to public health.
- Worker should be provided with ear plugs or ear muffs (PPEs) like mufflers, goggles, safety gloves, safety shoes, etc.
- Separate parking spaces should be demarcated at the site for parking of vehicles.

- Establishments shall be regularly advised to keep noise levels within acceptable limits.
- Waste minimization practices should be employed and workers should be encouraged to adopt such methods.
- Wages should be distributed on time and wages should not be below minimum wages as prescribed.
- Workers should be told and encouraged to use PPE's.
- Proper ventilation can limit the amount of indoor air pollutants.
- Proper tree plantation plan should also be developed in order to make the unit environment friendly.
- Small waste storage bins should be installed at different corner for proper waste collection and discharge.
- Obligatory insurance should be provided to work laborers against accidents.
- Basic medical training should be provided to the specified work staff and basic medical service and supplies to workers.
- Prohibiting flammable materials in the warehouse premises.
- The Security Guards shall also be trained to act in case of all possible emergency situations. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.
- The Environmental Management & Monitoring Plan should be implemented with true spirit.

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