

## EXECUTIVE SUMMARY

This executive summary presents an overview of the main findings of the Environmental Impact Assessment Report for establishing a detergent manufacturing and packaging plant of 23 Kanal 7 marla of area, under namely, IFS Chemicals located at Bridge Canal, Saroki, Kunjah, District Gujrat. The main goal of this project is to provide good quality detergent to the market.

### 1. Introduction

The proposed project involved the installation of the Detergent manufacturing and packaging plant for the quality assured detergent. According to Schedule-II of IEE and EIA Regulations, 2022; the project fall under **Category B (Manufacturing and Processing) Sub category 2 (Chemical manufacturing units, including pharmaceuticals and cosmetic)** i.e., the project requires an EIA Study. Thus, an EIA Report is being prepared and submitted accordingly for environmental approval.

The estimated project cost is **95 Million PKR.**

### 2. Project Description

The project comprised of Detergent manufacturing and packaging in an environmental friendly manner. The total area of the project is 23 Kanal and 7 marla and area around the project is open agricultural land. It is located at Bridge Canal, Saroki, Kunjah, District Gujrat. Approximately, the production capacity of the factory is 6 tons/day. Hence, the EIA of IFS Chemicals is being submitted for environmental approval.

#### Salient Features of Project

•	Project Title	IFS Chemicals
•	Project Location	Bridge Canal, Saroki, Kunjah, District Gujrat
•	Proponent	Fayyaz Ahmad S/O Muhammad Shafi R/O: main Alipur road, Street Zainab Colony, Gujrat CNIC: 34201-4262297-3
•	Consultant	EnvironTech Consultants.
•	Total Area	23 Kanal and 7 marla
•	Total covered area	95,193 SFT
•	Capacity of Project	<b>Detergent=</b> 100 ton/day <b>Corrugated boxes=</b> 30,000 pieces/day
•	Location of project	32°32'17.5"N 74°00'07.8"E
•	Nature of Area	Agricultural

•	Present status of Land Use	Open/Vacant plot
•	Land use in the surroundings of project site. North South East West	The project is located in agricultural. The surroundings are: Open Plot Open Plot Road Open Plot
•	Cost of Project	PKR 95 million.
•	Raw material	Detergent manufacturing= LABSA, Caustic Soda, Soda Ash, Sodium Silicate, Zeolite, Detergent base, Sodium chloride etc. Corrugated boxes= flute paper/gum Wrapper= LDPE,HDPE etc.
•	Product	Packed Detergent
•	Purpose of proposed project	Manufacturing of Detergent and its packaging
•	Nearby emergency services i.e. Hospital, police station, rescue, fire brigade etc.	Within 2-3 km.
•	Tree Planation	At Designated Green Areas
•	Water Source	Ground Water
•	Status of Project	Open/Vacant Land
•	Source of Power	GEPCO

### 3. Impacts and Recommended Mitigation Measures

In order to identify all the impacts associated with the project during construction and operational activity with potential to cause adverse environmental impacts, a thorough review has been conducted. Although, there is very low chances of any adverse impact occurrence on the surrounding environment. However, in case of impact arises from the project activity possible necessary measures will be adopted to control the same. Overall the project has positive social impacts specifically on the local population and generally contributes in Pakistan's GDP. The project may have some adverse environmental impacts of minor to moderate magnitude which will be controlled through mitigation measures proposed in Environmental Management and Monitoring Plan (EMMP). Moreover, clearing of the

vegetation will be done during site clearance but restoration and reclamation will be carried out by the plantation of native species in specified green areas. Environmental impacts have been identified and mitigation measures are recommended within the Project Area of Influence; which lies within 1.0 km boundary of the proposed project facilities. The major impacts on physical, biological and social environments are described as under:

### Impact Summary

Environmental Parameters	Impact Assessment during Different Phases	
	Construction	Operational
<b>A: Physical</b>		
<b>Land Resources</b>		
Soil Erosion and Contamination	-2p	0
Transportation	-1t	-1t
Solid Waste and By-Products	-2t	-2p
Land Use	-2p	NA
<b>Air Resources</b>		
Noise Pollution	-1t	-1t
Air Emission	-1t	-1t
Dust	-1t	-1t
Odor	NA	-2t
<b>Water Resources</b>		
Ground Water	-1p	-1p
Surface Water	NA	NA
Wastewater	-1p	-2p
<b>B : Ecological</b>		
<b>Flora</b>		
Tree Cutting	-1p	+1p
<b>Fauna</b>		
Terrestrial Fauna	-1p	+1p
<b>C: Socio-Economic</b>		
Employment Opportunities	+1t	+1p
Land Value Appreciation	+1t	+2t
<b>D: Hazards</b>		
Biological Hazards	NA	NA
Physical Hazards	-1t	-1p
Chemical Hazards	0	-1p
Health and Safety	-1t	-1p
<i>Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible</i>		

#### 4. Environmental and Social Monitoring Plan

Environmental Management and Monitoring Plan (EMMP) were developed for effective implementation of the recommended mitigation measures. The EMMP includes check and balance to control and minimize the identified impacts and monitoring programs to oversee residual impacts, if any, during the operational phase. The EMMP describes procedures to be

followed throughout the construction and operation of the project. It also identifies the roles and responsibilities of all concerned personnel, including the persons reporting during the different project phases. Mitigations for physical, biological and socio-economic parameters will be measured to determine compliance with standards established in EMMP. The Monitoring Plan will record the inputs provided by various participants in the environmental and social management process. It will also check whether the prescribed national and provincial guidelines and plans are being followed and that the required mitigation measures and activities are being accomplished in time.

## **5. Monitoring Plans**

During operational phase, monitoring is required to be carried out at least once in a month during rainy season to check the soil contamination and surface water level/condition. Moreover, periodic monitoring should also be carried out regarding ambient air quality, noise and dust level and worker safety. A detailed site monitoring plan has been developed and given in Chapter-6 of this EIA Report.

## **6. Conclusion**

The findings of EIA Report showed that although the Detergent manufacturing and packaging is expected to have significant minor to moderate negative impacts on the environment during the construction and operational phases, but the severity of these adverse impacts can be reduced significantly by adopting EMMP with true spirit as proposed in the Chapter 7 of this EIA Report. The impacts were assessed by frequent site visits, studying related projects and by reviewing the documents. Generally, the project is planned to follow efficient environmental management systems. Specific environmental and social benefits have been mentioned below which depend on the proper application of mitigation measures suggested in EMMP and best engineering practices.

## **7. Recommendations**

The intensity and severity of impacts occurred due to the Detergent manufacturing varies with change in the nature and magnitude of the project as well as depends upon the baseline environmental conditions of the area. The mitigation measures will require constant information flow and consultation with the stakeholders to ensure the least adverse social-economic impact to outweigh the “no project development” scenario.

- ⊙ The adverse environmental impacts can be reduced significantly by adopting best management and monitoring practices as well as by implementation EMMP with true spirit

- ⊙ Proper PPEs including gloves, face masks, head gear etc. will be provided
- ⊙ No compromise on public health and environment should be allowed
- ⊙ Waste minimization practices should be introduced to workers by conducting lectures on spot to aware the workers about the long-term benefits of the same in lieu of surrounding environment
- ⊙ A proper tree plantation plan should also be developed in order to make the process environment friendly
- ⊙ Small domestic waste storage bins should be placed at different locations for proper collection and disposal of the solid waste
- ⊙ It is recommended that the Proponent should obtain an Environmental Approval (NOC) from the Punjab-EPA before proceeding further

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# 1 INTRODUCTION

## 1.1 Project Background

Detergents are compounds widely used in various cleaning products for their ability to lower the surface tension of water, allowing water molecules to interact more effectively with oil, grease, and dirt. This property makes detergents highly efficient cleaning agents. Beyond household cleaning, detergents are also used in lubricants, inks, herbicides, emulsifiers, and fabric softeners. When added to cleaning formulations, detergents enable the mixture to blend easily with water, helping to lift and remove dirt or stains from different surfaces. Without detergents, cleaning agents would not mix well with water and would be far less effective.

The demand for detergents surged in 2020 as consumers increased their use of cleaning, sanitizing, and disinfecting products to combat COVID-19. This strong demand trend continued through 2021 due to heightened awareness and improved cleaning habits among consumers. Industrial, institutional, and commercial sectors also account for a significant portion of detergent use across various cleaning applications.

The proposed project for which impact assessment study is being carried out is entitled as IFS Chemicals is planned to be established at Bridge Canal, Saroki, Kunjah, District Gujrat. The proponent of the proposed project is expected to provide high quality of Detergent to fulfill the development requirement of the country.

The development of any project leads to positive and negative changes in environment and social set up around the project area. The intensity and level of change, however, depends upon the nature of the project and the baseline environmental conditions of the area. The commencement of proposed project will cause minor to moderate adverse environmental and social impacts on the surrounding area. Thus, an environmental and social impact assessment study is mandatory to establish the baseline conditions, evaluate the possible adverse impacts if any, and devise the mitigation measures accordingly.

## 1.2 Project Nature and Size

The proposed project will involve the manufacturing and packaging of the quality detergent products. The estimated project cost is **95 Million PKR**. The total area of the proposed project is 23 Kanal & 7 Marla.

### 1.3 Project Location

The proposed location for the installation of proposed project of **IFS Chemicals** is at Bridge Canal, Saroki, Kunjah, District Gujrat. The geographical location of the proposed area is 32°32'17.5"N 74°00'07.8"E.



**Figure 1: Area of IFS Chemicals**

The nearest population is Saroki present near the project area is at the distance of 1151 Meters.

Environmental sensitivity of the project includes the distance between the project area periphery from ecologically important features and socially significant infrastructures present in the study area. No ecology sensitive receptor such as; forest or reserved area is present within 10 km vicinity that could be impacted due to the installation and operation of the proposed project.

### 1.4 Regulatory Compliance

As per IEE/EIA Regulations 2022, it is mandatory for the proponent of any development project to obtain Environmental Approval (NOC) from EPA by filing an IEE or EIA as the case may be. The said project is proposed by the proponent to meet the ever-increasing demand of raw material for the development projects. For this purpose, the proponent has decided to engage environmental consultants, **M/S EnvironTech Consultants Private Limited** to prepare EIA Report. The purpose of this study is to identify the environmental and social baseline of the project and study area i.e., physical, biological, socio-economic, cultural changes and to assess all possible impacts anticipated during the installation and operation

phases of the proposed project with the aim to find out appropriate mitigation measures to either eliminate those impacts or to bring them to acceptable level as well as to formulate Environmental Management and Monitoring Plan (EMMP) for implementation in sustainable manner. 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.

Following rules, regulations and acts are considered for the commencement of the proposed project:

- ⇒ Punjab Environmental Protection Act, 1997 (Amended 2012)
- ⇒ Punjab Environmental Quality Standards (PEQS)
- ⇒ Self-Monitoring and Reporting Rules (SMART)
- ⇒ Environmental, Health and Safety Guidelines

### 1.5 The Proponent

The details of the proponent of the proposed project are given below:

**Table 1 Details of Proponent**

1	<b>Name</b>	<i>Fayyaz Ahmad S/O Muhammad Shafi</i>
2	<b>Company</b>	<i>IFS Chemicals</i>
3	<b>Address</b>	<i>Main Alipur road, Street Zainab Colony, Gujrat</i>

### 1.6 Scope of Project

The scope of the Detergent manufacturing industry in Pakistan is broad, encompassing a large domestic market served by numerous organized and unorganized units, significant employment opportunities, and a growing demand for both mass-produced and handmade Detergent s. While the industry supports the economy through local production and labor, it has potential for growth in the export market, though it currently struggles to compete globally due to a lack of supporting activities, particularly in the Faisalabad region.

### 1.7 Details of Consultant

The proponent of the *IFS Chemicals* has engaged *EnvironTech Consultants Private Limited* to carry out the EIA Study for the installation and operation of aforesaid project in accordance with Punjab-EPA guidelines. For this purpose, the company engaged the group of professionals which comprises of environmental specialists and social scientists. The details of the consultant are given below:

Table 2: Consultant Details

Sr#		Consultant Details
1	Consultant	<i>EnvironTech Consultants Private Limited</i>
2	Address	Office no.11 (2 <sup>nd</sup> floor) Centre point Plaza, Main Boulevard Lahore.
3	Contact No.	0303-4342302
<b>Focal Person</b>		
4	Name	Kamal Ahmed Cheema (C.E.O)

### 1.8 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 that 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 supervise 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)**

## 2 *Screening and Scoping*

### 2.1 Screening/Type and Category of Project

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.” Punjab Environmental Protection Act provided the guidelines for categorizing the projects. According to Schedule-II of IEE and EIA Regulations, 2000; the proposed project falls under *Category B (Manufacturing and Processing) Sub category 2 (Chemical manufacturing units, including pharmaceuticals and cosmetic)* i.e., the project requires an EIA Study. Thus, an EIA Report is being prepared and submitted accordingly for approval.

The proposed project is the manufacturing of Detergent and its packaging.

### 2.2 Scoping:

- **Spatial and Temporal Boundaries of Environmental Assessment:**

Temporal and spatial boundaries for the effects assessment are defined by the characteristics of the project and the VECC being assessed. These boundaries encompass time periods and areas during and within which the VECCs are likely to interact with or be influenced by the project.

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

Temporal and spatial boundaries for the effects assessment are briefly discussed in chapter-6.

- **Views, Concerns and Suggestions of Various Stakeholders**

Community showed a lot of concerns; a few are being mentioned here:

- ⊗ Removal of shrubs and trees should be avoided to the extent possible
- ⊗ The project will become the source of income for local to earn their livelihood easily and honorably
- ⊗ The area will become further industrialized
- ⊗ For the solid waste management and waste disposal, proper disposal techniques should be adopted
- ⊗ Employment opportunities will be generated, and locals should be hired on the priority basis

- ⊗ The air pollution is one of the major impacts of the proposed project, so ambient air quality should be monitored regularly
- ⊗ Water spraying/sprinkling should be done on the regular basis during construction phase to avoid dust emissions
- ⊗ Removal of shrubs and trees should be avoided to the extent possible
- ⊗ 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
- ⊗ The contractor should prefer hiring local labor from adjacent nearby villages
- ⊗ Indigenous trees around the facility should be planted to control air pollution and as the compensation
- ⊗ Noise reducing barriers should be installed to reduce noise pollution as the nearest community lies within the radius of 2km.

### **Concerns**

- ✚ Workers should be hired from local community
  - ✚ Proper disposal of solid waste should be practiced
  - ✚ Indigenous trees around the facility should be planted to control air pollution
  - ✚ Removal of shrubs and bushes should be avoided to the extent possible
- **Significant impacts and factors to be determined**

The proposed project is of manufacturing of Detergent. The nature of the land is open/vacant land having native vegetation such as Neem, Kikar, Safeda and wild grass. The study area is leveled and agricultural land. In addition, to the noise and fugitive dust emissions during the development phase solid waste management and disposal issues may arise along with wastewater disposal issues. There are few minor impacts associated with the operation of manufacturing unit includes the management of the municipal solid waste generated during the, raw-material storage which will be managed according to local practices of area.

The impacts from the establishment of IFS Chemicals will occur during the construction and operation 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 the area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

## 2.3 Alternatives

The details of the site alternatives and technology alternatives are discussed below:

### 2.3.1 Site Alternatives

No site alternative was available to be considered as feasible option for the installation of the plant as the land is owned by the proponent. The proposed site was selected because of the following reasons;

- 1) Proposed project site is located in self-developed industrial zone.
- 2) The site is at the distance of 1151 Meters from the nearest residential area is Saroki
- 3) No surface water body is located within the 3 km.
- 4) The site is well connected to the other parts of the city through Saroki Bridge and Canal Road.
- 5) No human settlements displacement or relocation associated with the project development and operation
- 6) Operation of the Detergent processing unit in the respective zone will provide job opportunities to local people and will improve their socio-economic status of the study area as 10 employees will be hired during the operational phase

### 2.3.2 Technology/Design Alternatives.

Latest machinery will be installed which shall be sourced by electricity, also environment and eco-friendly. So, no other technology will be taken under consideration.

#### ***Environmental Alternatives:***

No important religious, archaeological, recreational site or ecologically/declared protected area and human settlement exists within proximity of the selected site i.e., within 5 Km which is a safe distance. In view of these facts, it can be concluded 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. For this reason, no environmental alternatives have been considered.

#### ***Economic Alternatives:***

The technology selected for establishment of above stated project will be economical viable than alternatives present as compared to majority of the other available production technologies, but it will be most efficient and convenient to use

### **3 PROJECT DESCRIPTION**

This section of the study concentrates on details of the project and its salient features; such as its location, site layout, objectives, selection of alternative sites and technology, cost and magnitude of operation at various phases and process employed for the processing of Detergent.

#### **3.1 Objectives of Project**

Although the principle purpose of the proposed project relates to the chemical industry development of the city at national level, the proposed development also aims to:

- Fulfill the cleaning products like: Detergent demands in an efficient manner which are environmentally approachable as well as secure.
- Be fully integrated with and supplement the existing infrastructure in the city.
- Remain competitive.
- Create new employment opportunities as a part of the project activities scope.

#### **3.2 Location and Layout of Project**

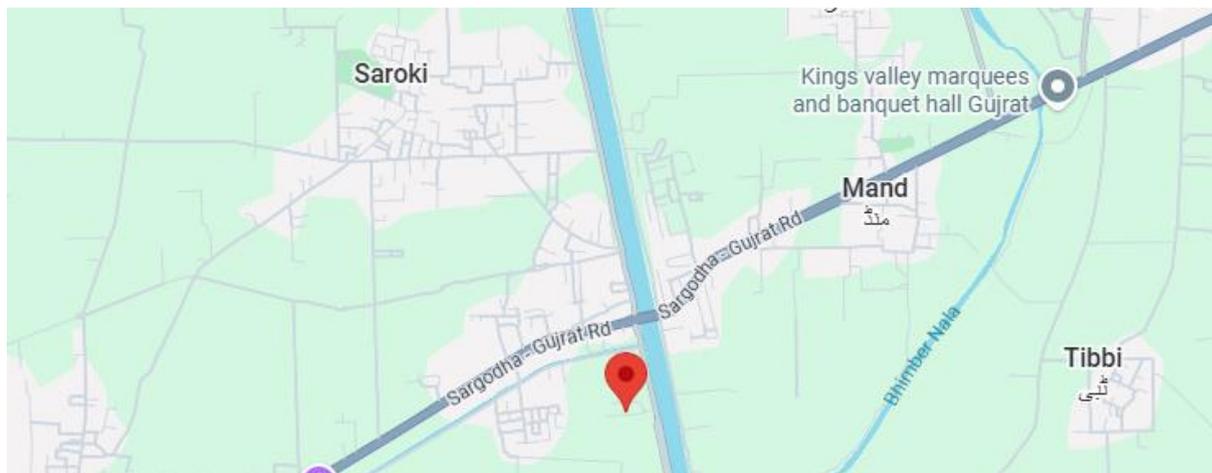
The proposed location for the installation of proposed project of IFS Chemicals is located at Bridge Canal, Saroki, Kunjah, District Gujrat. The geographical location of the proposed area is 32°32'17.5"N 74°00'07.8"E. The nearest town age Saroki is present near the project area is at the distance of 1151 Meters.

#### **3.3 Land Use on Site:**

The surface land in and around the project area is leveled and agricultural in nature. Boundary wall is constructed around the plot. No ecology sensitive receptor such as; forest or reserved area is present within **5 km** vicinity that could be impacted due to the installation and operation of the Detergent manufacturing unit.

#### **3.4 Road Access**

The project site is linked to Sargodha-Gujrat Road.



**Figure 2: Road Access Plan**

### 3.5 Vegetative Features

The area around the project is Agricultural. There is no indigenous plant species, or any sensitive vegetative features present which would be affected with the proposed project proceedings whereas, the vegetative features of the area include self-growing plants; bari, neem and kikar, and some of the plantation has been done by the industrial estate and operational industry excessive tree plantation will also be done by the proponent of the proposed project.

### 3.6 Amenities

The following social amenities are present at site and the management of the waste (solid waste and effluents) is explained in sub-sections below:

#### 3.6.1 Electricity

Electricity will be supplied by industrial estate which will be purchased from WAPDA (GEPCO).

#### 3.6.2 Ground Water Resource

During operational phase ground water will be consumed which will be supplied by the industrial estate, 300-500 liters/day will be used for the overall consumption.

### 3.7 Management Plans

Following management plans will be employed to reduce the impact of the proposed activity

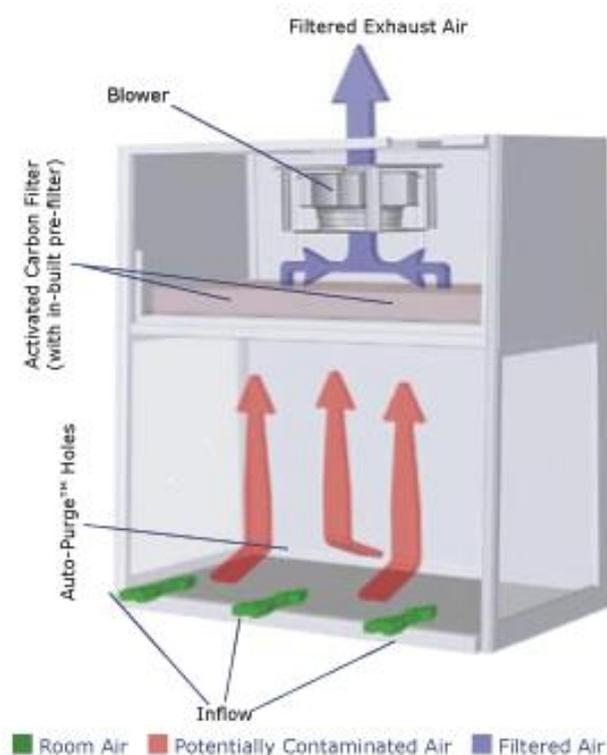
#### 3.7.1 Air Emissions

Particulate dust will be generated during construction phase there will be a closed-circuit process. But due to mixing and drying some of the particles have the capacity to escape and for this purpose, Fume hood technology will be installed at the unit. The workers dealing with the

process activities will be provided with masks, safety shoes and all other necessary PPEs. To reduce the public nuisance native trees will be planted on the boundary to reduce the nuisance and to reclaim the disturbed soil effectively.

### Fume Hood design and working principle

A fume hood works by pulling air away from the user into the enclosure with a blower. The fume hood then filters and vents the air to the outdoors through a facility exhaust system. Alternatively, a fume hood may filter the air to remove dangerous fumes and then return the air to the room is sprayed into the exhaust is caught in a filter.



### Specifications:

**Voltage** 440 Volt

**Airflow (m<sup>3</sup>/h or CFM)** 1500- 5000 CFM

**Orientation** Horizontal

**Type** Fume hood

**Automation Grade** Automatic

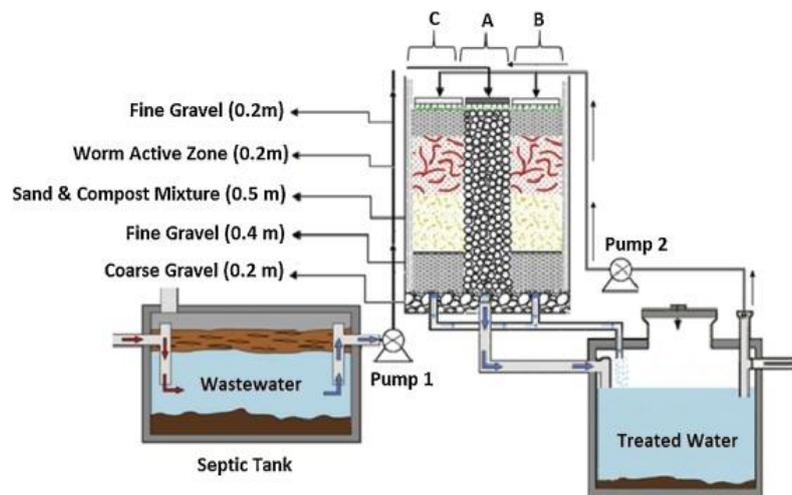
**Material of Construction** Stainless Steel

**Power Source** Electricity

**Efficiency** >95%

### 3.7.2 Wastewater Management and Disposal

For construction stage the ground water will be used. About average 94 meter cube per day of ground water will be used in construction phase of the project. In the proposed project the wastewater from the operations of project generated wastewater will be municipal only. Water used for cooling purpose will be recirculated for the same cooling purpose during the process activities, water used in process entirely utilized. The municipal amount of the wastewater generated will be 200 liters (0.2m<sup>3</sup>) by the sanitation activities if per person wastewater generation is 20 liters and the manpower is 10 (20\*10). This wastewater will be discharged in settling tank and ultimately in the drain. Water balance at site will be:



**Figure 3: Wastewater Generation and Disposal Mechanism**

### 3.7.3 Waste Management

The solid waste will be generated during the workers mess and other domestic activities. The amount of the solid waste generated will be quite low, which will be disposed off by using sustainable practices of the compost manufacturing. The generated waste will be collected in the bins and at the end of the day it will be dumped in the ground. The generated compost will be used for the horticultural practices at site.

No hazardous waste will be generated in the process activity. As the water used in process will be completely used and no leftover water/wastewater will be generated. Regular training will be given to the workers dealing with the waste management it will include identification, segregation and management of waste.

### 3.8 Staff/Manpower

Around 10 workers will be required during process related activity. The breakdown of the workers employed is given below:

**Table 3: Details of the Officers**

Sr#	Designation	No.
-----	-------------	-----

1	Production Manager	01
2	Deputy Manager	01
3	Asst. Manager	01
4	HSE Manager	02
5	Electrical Manager	01
6	Mechanical Manager	01
7	Metallurgical Manager	01
8	HSE Inspectors	02
<b>Total Manpower</b>		<b>10</b>

### 3.9 Emergency Preparedness

Emergency response preparedness committee will be formulated consisted of heads of all departments and nominated members. Project Manager will be the head of the team who will chair the Committee. In the case of emergency, he will immediately inform the concerned authorities. HSE Manager will be responsible for on-site HSE management.

First aid facilities will be available at facility which will include; blankets, hot water bottles, sterilized dressing, snake bite kit, cotton and iodine (2% alcohol).

#### 3.9.1 Safety Trainings

Skilled, semi-skilled and un-skilled staff will be provided with proper training about the work and safety practices that need to adopt during the process activities.

#### 3.9.2 Use of Drugs and Narcotics

Drugs and narcotics are strictly prohibited during working hours in working area. Smoking will be only allowed during rest timings at properly isolated places.

#### 3.9.3 Personal Protective Equipment's

Following Personal Protective Equipment (PPEs) will be provided to the workers:

- ✓ Safety Helmet
- ✓ Safety Shoes/Dry Shoes
- ✓ Dust Mask
- ✓ Safety Gloves
- ✓ Safety Jackets
- ✓ Earmuffs
- ✓ Insulating Gloves and Suits

### 3.10 Cost and Magnitude of Operation

The proposed project includes the production of detergent and its packaging

The activities will include:

- ➔ Installation of the machinery
- ➔ Purchase of lab instruments
- ➔ Health and Safety Management at site

→ **Transportation of raw-material and final product**

→ **Plantation of trees**

<b>Total Cost</b>	<b>95 Million</b>
Land Cost	32 million
Land development and infrastructure	52.5 million
Machinery	8 million
Environmental Budget:	2.5 million

### 3.11 Land ownership Documents

Land ownership documents have been attached as Annexure of submitted EIA Report, which clearly shows that the selected area for the installation of IFS Chemicals has been owned by the proponent.

### 3.12 Schedule of implementation

It is projected that the installation of machinery will be started after getting environmental approval from EPA Punjab and complete in the period of 1-2 months. Activities involved are:

- **Assessment of environmental impacts and its mitigation measures**
- **EIA approval, other local issues**
- **Implementation of recommended alteration in system, if required**
- **Commencement of operation.**

### 3.13 Project Description

The project includes the manufacturing of Detergent. The products manufacturing detailed processing is given below.

**Table 4: Products manufacturing list**

Sr#	Product Name	Raw Materials	Project Capacity
1.	Detergent	LABSA, Caustic Soda, Soda Ash, Sodium Silicate, Zeolite, Detergent base, Sodium chloride etc.	100 ton/day
<b>Corrugated Packaging</b>			
2.	Corrugated boxes	Flute paper/glue	30,000 pieces/day

#### **Raw material and quantity of Required Raw Materials/Day**

Detergent Base= 400 kg

Caustic Soda =3500 kg

Water= 28 Liter

#### ***Manufacturing Process for Detergent:***

Detergents are synthetic cleaning agents that contain surfactants and other additives to enhance cleaning efficiency. The detergent manufacturing process involves several stages, including raw material preparation, mixing, drying, post-addition, and packaging. The process can vary slightly depending on the type of detergent. Following steps are involved in the manufacturing of Detergent.

### 1. Raw Material Preparation

The main raw materials used in detergent production include:

- **Surfactants:** LABSA (Linear Alkyl Benzene Sulphonic Acid), SLES (Sodium Lauryl Ether Sulfate), and SLS (Sodium Lauryl Sulfate).
- **Builders:** Soda ash (sodium carbonate), sodium silicate, sodium tripolyphosphate (TSP), zeolite.
- **Fillers:** Sodium sulphate, sodium chloride.
- **Additives:** Carboxymethyl cellulose (CMC), enzymes, perfumes

### 2. Slurry Preparation

In the slurry preparation section, the surfactants, builders, and fillers are mixed with water in a slurry tank. Whereas, the whole water will be used and no extra or wastewater will be generated.

- LABSA is neutralized with caustic soda to form a surfactant base.
- Sodium silicate and other alkaline materials are added to adjust pH and improve cleaning performance.
- The mixture is continuously agitated to form a homogeneous slurry of the desired viscosity.

### 3. Spray Drying

The prepared slurry is pumped into a spray dryer, where it is atomized into fine droplets and contacted with hot air.

- The water evaporates instantly, forming fine detergent powder particles.
- The hot air is exhausted through a cyclone separator and bag filter to capture fine dust and prevent air emissions.
- The resulting base powder is collected at the bottom of the dryer.

### 4. Dry Mixing

The base powder from the spray dryer is transferred to a dry mixer or blender. In this stage, heat-sensitive materials and special additives are introduced, such as: Enzymes, perfumes, and

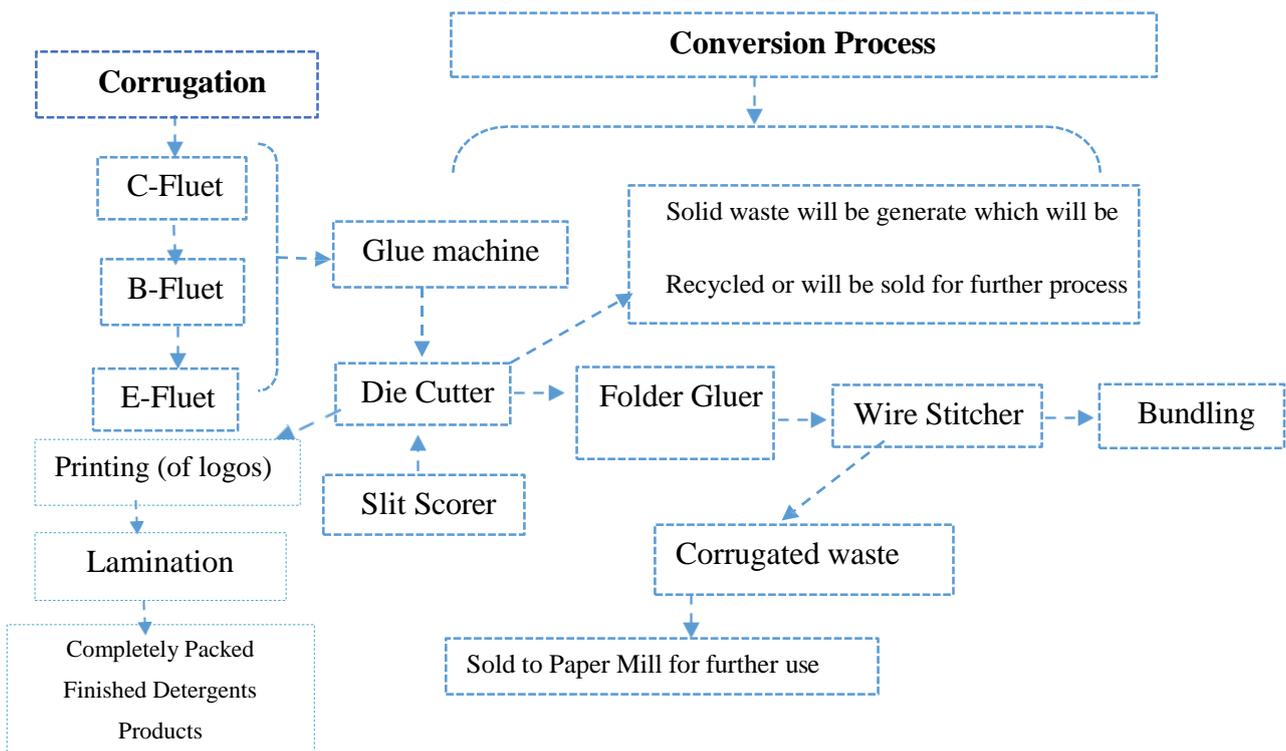
additional surfactants. The blending ensures uniform distribution of all components and achieves the desired product quality, fragrance, and color.



**Process Flow**

After the detergent manufacturing, products will be sent to the packaging unit. In the packaging unit, corrugated boxes will be manufactured along with the in house printing/laminating and the final product with a completed wrapping/packaging is sent to the market for consumers.

**Corrugated Boxes Manufacturing Process**



### List of Machinery

Sr. No.	Machinery	Qt.
1.	Storage hopper	6
2.	Slurry mixer	5
3.	Stirrer/Agitator	5
4.	Transfer pumps	4
5.	Spray Dryer	3
6.	Fume hood	1
7.	Dry Mixer	2
8.	Screening Machine	2
9.	Conveyer Belt	3
10.	Glue machine	4
11.	Die Cutter	4
12.	Wire Stitcher	5
13.	Printing/ Lamination Machine	2

#### 3.15 Relocation and Rehabilitation Plan

There exists no human settlement at 1151 Meters radius of the selected project site to be displaced owing to the commencement of the proposed project. Moreover, no structure of any significance stands at the site is proposed to be relocated or dismantled. The project area is owned by the partners partnership deed is attached along with this EIA Report. So, no restoration and rehabilitation are required.

## **4 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 baseline data. The underlying principles and practices adopted in this regard are also discussed.

### **4.1 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:

### **4.2 Data Collection**

The primary data was collected by visiting the project area and its communities in its nearby vicinity. 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 species (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 and government and Non-Government Organizations (NGOs). The socioeconomic aspects were studied and analyzed by studying detailed village profile and by conducting household surveys.

#### **4.2.1 Social Survey**

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

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

#### **4.2.2 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.

### 4.2.3 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 Annexure.

### 4.2.4 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. Data sets were processed. Analysis of the data and preparation of conclusions in the minimum possible time was done using statistical techniques of data analysis.

## 4.3 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 Central Environment Services reviewed the environmental policies, national, international and provincial laws and guidelines relevant to the development of project which helped in systematic identification of impacts.

## 4.4 Baseline Conditions

This chapter provides baseline data (physical, biological and socio-economic parameters) related to the project and study area

## 4.5 Physical Environment

Pakistan Can be divided into five broad physiographical regions. These are the mountainous regions of the north, the western highlands and plateaus, the sub-mountains Indus region, the Potohar Plateau, Salt Range, and the Indus Plain. Brief description of these regions are given below:

Region	Characteristics	Location	Height
Northern Mountainous	Hindu Kush Karakoram and Himalayan Mountain Ranges	Northern Part of KPK, Gilgit Agency, Northern Areas and Kashmir.	Rises above 8,000m
Western Highlands and Plateaus	Toba Kakar, Sulaiman, Central Baruhi, Saihan,	Mainly in Baluchistan, also parts of Sindh and KPK	Between 1,200 to 3,000 m

	Central Makran, Makran Coastal and Kirthar Ranges		
Sub-Mountains Indus	Alluvial filled Basins	Plains of Peshawar Kohat and Bannu	Less than 1,000 m
Potohar Plateau and Salt Range	Flat to gently undulating surface, broken by gullies,	Mainly northern parts of Punjab, some parts of KPK	Less than 1,000 m
Indus Plain	Flood plains of the Indus, Jhelum, Chenab Ravi and Sutlej Rivers	Punjab and Sindh	Less than 1,000 m

#### 4.6 PROJECT AREA

##### 4.6.1 Topography

Natural elevation of Gujrat is 232 meters mean sea level (MSL) and soil is alluvial in nature transported by river Chenab thus comprising specific flood plain area. Soil is silt clayey in nature and fertile due to presence of good nutrients and moisture. The site area is having no hilly terrain and plain in nature. The project location is industrial in nature.

##### 4.6.2 Geology & Seismology

Pakistan is basically divided into 5 earthquake zones, four of them ranging from zero to four (0-4) and one zone i.e. five which is intensively dangerous ranges from five to ten (5-10) which is shown in map 4.4. Zone zero describes least earthquake chances and destruction while 5-10 shows most chances of earthquake origination with extensive destruction like 08 October 2005 earthquake across the country. According to the map, district Gujrat comes under zone number two which is further divided into two zones i.e. zone 2A & 2B, more than half falls in zone 2A and remaining part in zone 2B and no tectonic or thrust fault line is passing underneath the district Gujrat thus making it less vulnerable to the destruction due to less seismic activity in the area

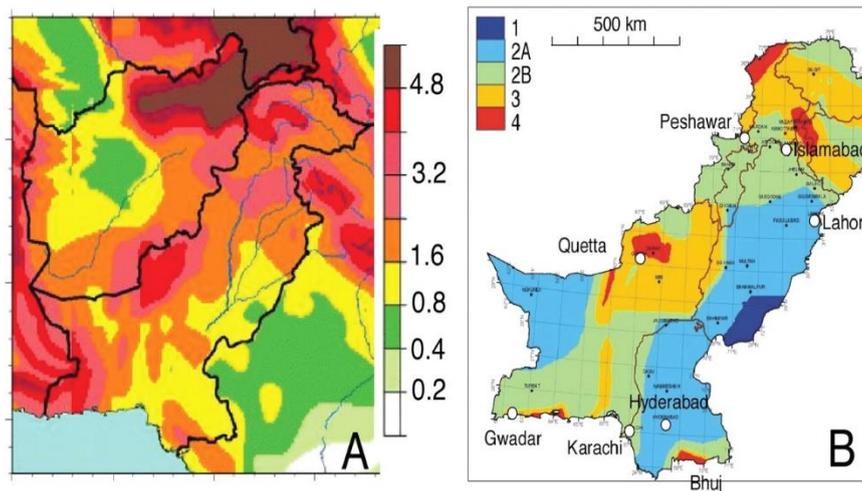


Figure 4: Seismic Zone of Pakistan (Geological Survey of Pakistan)

### 4.6.3 Climate

The climate of the proposed project area is warm and semi-arid. In Pakistan, there are four seasons prevailing in the country on the basis of temperature, which are winter (December to march), summer (April-June) monsoon (July-August) and autumn (September- November). The survey of Pakistan classifies country into eight climatic zones on the basis of monthly temperature and precipitation data. The zones are shown in map given below (Pakistan climatic zone map).

These climatic zones are characterized by mild, moist winters and hot dry summers in the north to semi-arid and arid zones in the west and parts of the south. The north-eastern mountains and sub-mountainous areas receive more than 1,700 mm annual precipitation and get huge amount of precipitation (over 1000 mm) from summer monsoon. On the other hand, the extremely arid plains of southwest Baluchistan get only 30 mm precipitation during the whole year. Temperature variance ranges from extreme daily, seasonal, and annual difference: temperatures can fall as low as -26oC over the northern mountains and go as high as 52oC over the central arid plains. In the semi-arid plains, temperatures of 42oC are recorded at various stations in the month of May and June (biodiversity guide to Pakistan)

Gujrat's climate is warm and semi-arid. Gujrat is adjacent to Azad Kashmir so climatic conditions of Kashmir have good impact on Gujrat's climate due to cool air and excessive rainfall. There are two main types of rainfall seasons i.e. monsoon and winter season rainfall. Monsoon starts from mid-July and ends in mid-September while winter season rainfall occurs from December to March. The temperature of Gujrat varies between 45oC in the summer and 2oC in the winter. The annual average rainfall of Gujrat is 670 mm.

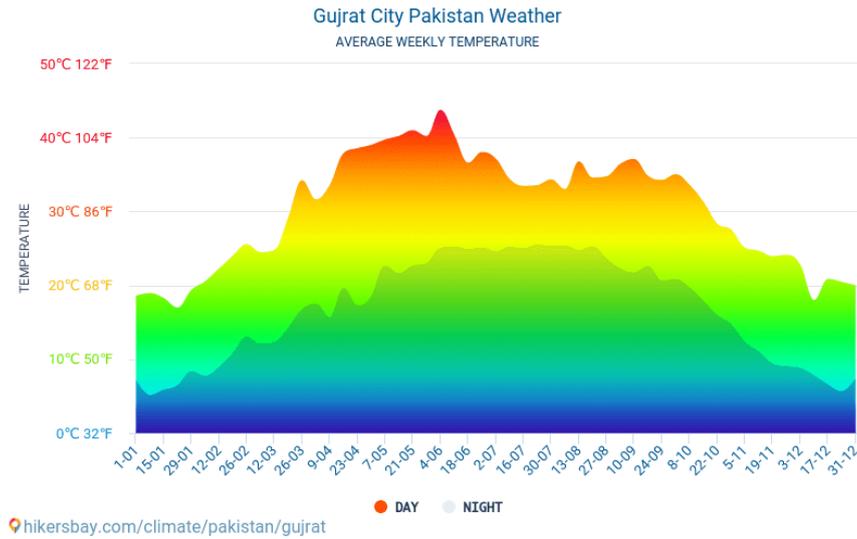


Figure 5: Climate of Pakistan, regions of minimum temperature

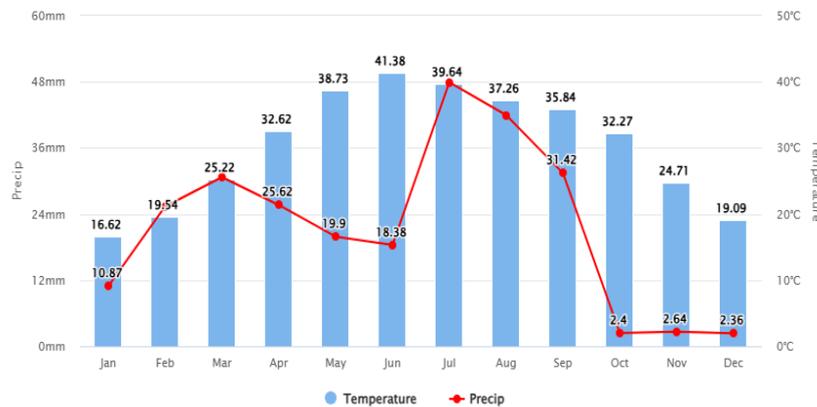


Figure 6: Climate of Pakistan, Regions of Maximum Temperature

#### 4.6.4 Temperature

The temperatures are highest on average in June, at around 34.0 °C (93.2°F). At 12.4 °C (54.3°F) on average, January is the coldest month of the year. The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Gujrat. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. For vacation planning, you can expect the mean temperatures, and be prepared for hotter and colder days.

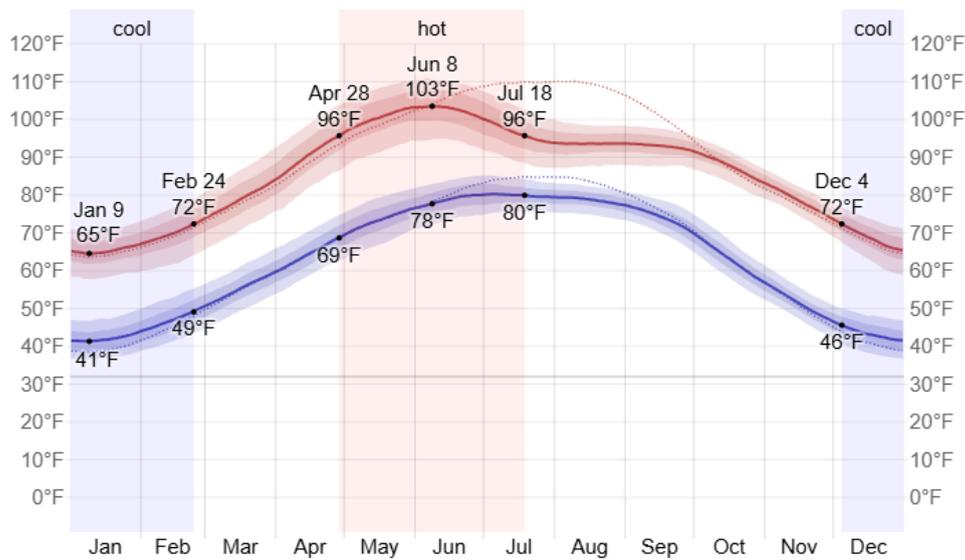


Figure 7: Maximum and Minimum temperature ranges in Gujrat

#### 4.6.5 Rainfall

There is not much rainfall in Gujrat all year long. The least amount of rainfall occurs in November. The average in this month is 8 mm (0.3 inch). In August, the precipitation reaches its peak, with an average of 205 mm (8.1 inch).

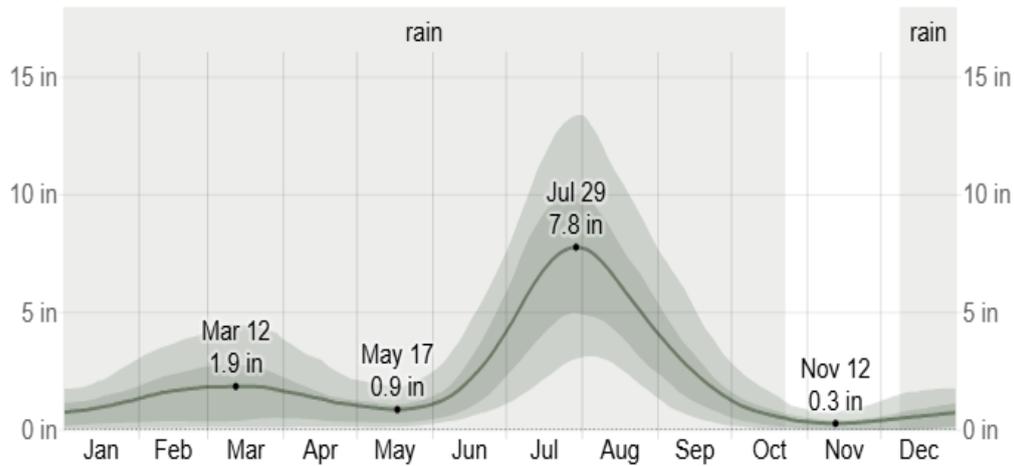


Figure 8: Precipitation days in Gujrat

#### 4.6.6 Water resources

##### Surface water

There is no surface water body near the proposed project site.

##### Ground water

The water requirements for the site for construction work will be extracted from groundwater aquifer by the help of turbines. Groundwater in Gujrat can be found at various depths ranging

from 20 feet in depth in various villages and goes up to hundreds of feet in depth like municipal water supply turbines of Gujrat extract water from 650 feet. The water table in the ground varies in depth according to the climatic conditions as water table surface is high in rainy season lowers in hot and dry season. The groundwater at proposed site area is extracted from 220 feet down.

#### **4.6.7 Solid waste**

In the Study Area, mostly in surrounding villages bad solid waste collection and transportation system is in practice.

### **4.7 ECOLOGICAL RESOURCES**

#### **4.7.1 Wildlife, fisheries and aquatic biology**

There is no wildlife present near the project site. There are only few animals are found near the project site like dogs, cats, rodents like squirrels, rats, mice and bats. Common species of birds found in the district include the common house sparrow, crow, pigeon, dove, yellow and white eyed myenas. There is no surface water body present near project area.

#### **4.7.2 Vegetation cover and trees**

There is no tree present on the site but proponent is planning to plant 100 trees of fruit and indigenous plant species.

### **4.8 SOCIO-ECONOMIC AND CULTURAL FEATURES**

This section describes the key socioeconomic features of the study area like administrative setup, population and communities, education, health, transportation, infrastructure and archaeological sites etc.-:

#### **4.8.1 Population and Communities**

The proposed project area comes under the administration of TMA Gujrat. The population of city is roughly 0.6 million with a growth rate of 2.5 percent. Majority of the population is Muslim with Punjabi as their mother tongue. The major castes found in the city include Sayyed, Rajpoot, Mughals, Kashmiris, Arain, Jutt, Gujjar and Sheikh. Minority groups include Christian, Ahmadies and Hindus. The nearest villages are Chak khalaas and Gunja which are just adjacent to the proposed site. The majority of the population comprised of farmers, merchants and labour community like daily wages. The building structures of typical Pakistani design made by bead brick, cement and concrete. Approximately 99% of the houses are well

built with bricks, cement and concrete. Majority of the residents in the project area speak Punjabi along with Urdu.

#### **4.8.2 Educational Institutions**

The project site area is situated near Gujrat city where Zamindar Govt. College is one the most significant colleges of Pakistan which provides human resource to every institution of the Pakistan, many well-known personalities were educated from this college like Javed Chaudhry, Anwar Masood etc. There are other educational institutions in Gujrat as well like Marghzar College for women, Fatima Jinnah College, Gujrat Law College, Science College, and Swedish College, Dar-E-Arqam school, Municipal Model School, Beacon House, the Roots School Systems, Chenab and Punjab group of Colleges. The area's largest institution is university of Gujrat with its own transportation for the students and employees and it is situated just few kilometers from Gujrat city.

#### **4.8.3 Transportation**

The project area is situated Gujrat which provides round the clock transportation access. Transport services include buses, trucks, vans, cars, pickups, motorcycles, rickshaws, and bicycles. The site area can be accessed by airline for international via Sialkot international airport which is approximately 66.28 km away and for domestic flights Gujrat Airport (23.76). For railway services, one can go to Gujrat Railway station from where rail service is available throughout the Pakistan

#### **4.8.4 Infrastructure**

The project area is situated near Gujrat and provides round the clock transport access. All the other villages in the area are connected with metaled roads. The buses, motorcycle rickshaws, motorcycles, vans and pickups provide very convenient mode of transportation throughout the area. All villages in the area have electricity provided by GEPCO along with telephone and natural gas facilities. Gujrat has well developed drainage system which fulfills the requirement of the town in rain season as well as in dry weather. The project site area will also be provided with the modern facilities like electricity by GEPCO, natural gas by Sui Northern gas pipelines limited, phone facilities by Pakistan Telecommunication Company limited, and very well designed drainage system along with a septic tank for primary treatment of sanitary water before throwing it to public sewerage. No surface water is available to the area and only source of water to the area is groundwater, which is extracted by means of motor turbines, tube wells and hand pumps.

## **4.9 QUALITY OF LIFE VALUES**

### **4.9.1 Socioeconomic value**

Residents of nearby villages are mostly belonging to agricultural and livestock business. Some are very affluent portion of the society including army officials, industrialists, bankers, politicians, educationists, medical professionals, scientists, business communities and real estate business owners. There is a rising trend in the society to change their traditional socioeconomic pattern of life. Print and electronic media are playing key role in bringing tangible change in the old pattern of life.

### **4.9.2 Public Health**

The medical facilities are available within city as few very good hospitals are situated in Gujrat city like Aziz Bhati Shaheed Hospital, Gujrat hospital, Butt hospital, City hospital, Social Security Hospital, Butt Hospital and Family hospital. In Gujrat city, from kachehry Chowk to district headquarter hospital, whole area is full of clinics and hospitals thus providing very good medical facilities to the people of area.

### **4.9.3 Archeologist and Historical Treasures**

No archaeological sites are observed in the vicinity of the project during the field survey.

### **4.9.4 Gender analysis**

The section describes the importance of role of women in the project area. Responsibilities of women in the area belongs to their household activities like cooking the daily meal, dishwashing, feeding and milking the cattle, cloths washing, bringing up the children as well as working in the fields. In the area, awareness regarding formal education is prescient and approximately every child in the area especially girls are getting education from the educational institutions. This is also because govt. of Punjab has made formal education totally free and also provides free of cost course books to the students till their matriculation. Majority of the working-class women are teachers in govt. school as well as in private institutions while remaining are doctors and nurses in the hospitals. The female population is found to be 48% of the total population of Gujrat district

## **4.10 LAB REPORTS**

Lab Reports are attached with and submitted to EPA. To assess the environmental conditions of the project area, following environmental parameters were monitored;

- Ambient air quality monitoring
- Noise monitoring
- Water sampling and analysis

#### **4.11 SUITABILITY OF THE SITE**

The consultations demonstrated that goodwill towards the project proponents indeed exists; approval for project activities by the communities was evident. The consultations were considered a good gesture and appreciated. The project will help in improving the health conditions of the area so the respondents were positive about the development. Proponent recognizes that benefits from the project should be distributed judiciously and equitably especially among primary stakeholders in the project area, and will continue to ensure that this principle is followed in its projects and community development program

## 5 PUBLIC CONSULTATION AND INFORMATION

### DISCLOSURE

Public consultation refers to the process by which the concerns of local affected persons and others who have a plausible stake in the environmental 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, public consultation is mandatory for any socio-environmental study.

#### 5.1 Proponent's Environment Management Team

Following are the designated roles and responsibilities of the employees involved in the monitoring and management of the adverse impacts and will be appointed after operation of project starts.

Roles and Responsibilities		
Sr#	Concerned Persons	Duties
1	The Project Manager	<p>Following will be the responsibilities of the Project Manager</p> <ul style="list-style-type: none"> <li>• Ensure that the contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment.</li> <li>• Ensure that all stipulations within the EMMP are communicated and adhered to by contractor(s)</li> <li>• Monitor the implementation of the EMMP throughout the project by means of site inspections and meetings. This will be documented as part of the minutes of the site meeting documents</li> <li>• Ensuring project execution within defined budget and timelines</li> <li>• Conducting regular check of the project status and meetings with project team</li> <li>• Provide support and guidance to project team as and when needed</li> <li>• Project Manager is expected to continually monitor and improve the overall performance of their operation</li> </ul>
2	HSE Manager	In addition to the health and safety responsibilities held by staff, managers and supervisors must do whatever is reasonably

		<p>practical to ensure that both the workplace and the work itself are safe. This includes:</p> <ul style="list-style-type: none"> <li>• Ensuring that staff are appropriately trained and supervised</li> <li>• Identifying, assessing and managing health and safety risks</li> <li>• Consulting with workers (including staff, affiliates and contractors):             <ol style="list-style-type: none"> <li>i. Health and safety risk assessments</li> <li>ii. Decisions are made about the measures to be taken to eliminate or control these risks</li> <li>iii. Health and safety risk assessments</li> </ol> </li> <li>• Implementing health and safety risk management programs relevant to their operations, teaching, research and consulting functions and work environment</li> <li>• Reporting (to the Human Resources Unit), investigating and responding to all hazards, accidents, incidents and taking action to control the risk</li> <li>• Assisting with the development, implementation and maintenance of a return to work program for injured staff.</li> <li>• Be fully conversant with the EIA and conditions of its approval</li> <li>• Be fully conversant with the EMMP</li> <li>• Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance</li> <li>• Convey the contents of this document to the contractor site staff and discuss the contents in detail with the Project Manager and Contractor</li> <li>• Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMMP</li> <li>• Take appropriate action if the specifications contained in the EMMP are not followed</li> <li>• Monitor and verify that environmental impacts are kept to a minimum, as far as possible</li> <li>• Review and approve construction methods, with input from the Site Manager, where necessary</li> </ul>
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		<ul style="list-style-type: none"> <li>• Ensure that activities on site comply with all relevant environmental legislation</li> <li>• Compile progress reports on regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post excavation audit</li> <li>• Liaise with the Site Manager regarding the monitoring of the site</li> <li>• Report any non-compliance or remedial measures that need to be applied</li> <li>• All environmental problems arising on the construction area will be reported to the Site Manager by the Environmental Manager. Reports on such problems will be submitted to the Project Manager by the Site Manager</li> </ul>
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## 5.2 The Responsible Authority

Impact assessment survey and public consultation sessions held with different stakeholder groups that may be impacted by the proposed project commencement. 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 installation and operation**
- ⊙ **Access the impacts on the physical, biological, and socioeconomic environment**
- ⊙ **Understand stakeholder concerns regarding various aspects of the project commencement**
- ⊙ **Find out valuable suggestions by the 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 construction and operation of IFS Chemicals at the proposed location. Saroki is the nearest community located at 1151 Meters distance 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 Detergent manufacturing plant in G. Public consultation performas is attached as Annexure of this EIA Report.

### **5.3 Objectives of Consultation**

Public consultation plays a vital role in studying the impacts of the proposed project on stakeholders in successful implementation and execution of the 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 the consultation with the 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 the 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.

### **5.4 Identification of Stakeholders**

All the people who are directly or indirectly affected or concerned with the project are the stakeholder. Besides the living population of the surrounding areas, some other stakeholders were identified and contacted which enlisted below. They are the key players including; shops, 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. Following stakeholders are identified for this project:

Project Affected Persons (PAPs) include the settled families, either property owners or the tenants, businessmen (big, shopkeepers, vendors, etc.), employees of the commercial entities. PAPs are of two types, for instance:

- **5.4.1 Direct Stakeholders**

As, no disturbance in the local community is being foreseen due to the installation of the Detergent manufacturing and packaging plant as the minimum distance between the community and the project area is 1151 Meters (Saroki). No property loss is being envisaged due to the construction of the IFS Chemicals.

- **5.4.2 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 the proposed project, the citizens of nearby small towns (Saroki & Mand) will get opportunities of being employed. So, in the early development stages and

during the operational phase the people will be benefited due to the installation of the IFS Chemicals.

- **5.4.3 Other Departments and Agencies**

Following departments are related to the project in public consultation:

- ❖ **Government agencies responsible to deal with the project related activities**
- ❖ **Government Agencies directly, indirectly or widely involved in the execution and monitoring of the proposed project**
- ❖ **Government departments such as TMA and Planning & Development Department, Forest Department, Agricultural Department Industrialist around the estate and working on the other development activities are considered as indirect stakeholders**
- ❖ **Workers of political, cultural, religious or social scientific bodies, directly or indirectly related to the project**

## **5.5 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.

## **5.6 Consultation Process**

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

- ⊙ **Data collection regarding the socioeconomic condition of the 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**
- ⊙ **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**

## 5.7 Environmental Practitioners and Experts

Officers of government departments and other industries, 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. List is attached as an annexure.

## 5.8 Affected and Wider Community

In addition, to the use of direct methods to evince the response of the various stakeholders in the population of the study area was ascertained by conducting a sample survey, through specially formatted questionnaires (attached in the Annexure 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 amenity.

- ➔ **Disclose the proponent plan of the construction of the proposed facility**
- ➔ **To share information on the design and specifications of proposed project works**
- ➔ **To analyze the expected impact on the socioeconomic environment**
- ➔ **To understand their concerns regarding various aspects of construction and operation**

### 5.8.1 Views, Concerns and Suggestions of Various Stakeholders

Community showed a lot of concerns; a few are being mentioned here:

- ⊗ Removal of shrubs and trees should be avoided to the extent possible
- ⊗ The project will become the source of income for local to earn their livelihood easily and honorably
- ⊗ The area will become further industrialized
- ⊗ For the solid waste management and waste disposal, proper disposal techniques should be adopted

- ⊗ Employment opportunities will be generated, and locals should be hired on the priority basis
- ⊗ The air pollution is one of the major impacts of the proposed project, so ambient air quality should be monitored regularly.
- ⊗ Water spraying/sprinkling should be done on the regular basis during construction phase to avoid dust emissions
- ⊗ Removal of shrubs and trees should be avoided to the extent possible
- ⊗ 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
- ⊗ The contractor should prefer hiring local labor from adjacent nearby villages
- ⊗ Indigenous trees around the facility should be planted to control air pollution and as the compensation
- ⊗ Noise reducing barriers should be installed to reduce noise pollution as the nearest community lies within the radius of 0.8 km

### *Concerns*

- ✚ Workers should be hired from local community
- ✚ Proper disposal of solid waste should be practiced
- ✚ Indigenous trees around the facility should be planted to control air pollution
- ✚ Removal of shrubs and bushes should be avoided to the extent possible





**Figure 9: Consultation with General Public**

### **5.8.2 Addressing Public Concerns**

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

#### **a. Grievances Redressed Committee**

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

### **5.9 Acceptance Level of the Project**

The opinions of the respondents were noted during the public consultation. The majority of respondents (88%) of Saroki were in favor of the proposed project. They expect that installation of the Detergent manufacturing unit 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.

## 6 **IMPACT ASSESSMENT METHODOLOGY**

This section discusses the potential environmental impact of Detergent manufacturing and packaging unit. The impacts may include the disturbance of area's geomorphology, soil, water resources, air, biological resources and socio-economic condition and, where applicable, identifies mitigation measures that will reduce, 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.

### 6.1 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 which may cause adverse impacts**
- ⊗ **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 impact's assessment methodology for the establishment of detergent unit, located in Gujrat has been defined. It includes the magnitude, the extent of the impact and the nature of the anticipated impact.

### 6.2 Methodology

This Section discusses the project's potential environmental impact of establishment of the Detergent s on the area's geomorphology, soil, water resources, air resource, biological resources and socioeconomic condition and, where applicable, identifies mitigation measures that will reduce, 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 based on magnitude, immediacy and sustainability. Evaluation criteria are as follows:

#### 6.2.1 Magnitude

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

### 6.2.2 Immediacy

Immediacy of the impact focus on the following parameters:

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

### 6.2.3 Sustainability and Reversibility

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

- ⇒ **Mitigability (Fully/Partially)**
- ⇒ **Monitoring (Fully/Partially)**

## 6.3 Purpose of Mitigation Measure

The basic purpose of mitigation measures is to reduce the impacts of the establishment of Detergent manufacturing unit on the socio-environment up to the maximum possible extent.

The mitigation measures are suggested based on the following parameters:

### 6.3.1 What is the problem?

The proposed project is of manufacturing of Detergent. The nature of the land is agricultural having native vegetation such as Neem, Kikar, Safeda and wild grass. The study area is fertile, leveled and agricultural land. In addition, to the noise and fugitive dust emissions during the development phase solid waste management and disposal issues may arise along with wastewater disposal issues. There are few minor impacts associated with the operation of manufacturing unit includes the management of the municipal solid waste generated during the, raw-material storage which will be managed according to local practices of area.

### 6.3.2 When problem will occur and when it should be addressed?

The impacts from the establishment of Detergent manufacturing unit will occur during the construction and operation 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 the area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

### 6.3.3 Where problem should be addressed?

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

### 6.3.4 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, to manage liquid waste proper treatment may be made before discharging into the receiving body. The change landscape is estimated to be quite minor and the removed topsoil may be used to reclaim the disturbed areas.

### **6.3.5 Ways of Achieving Mitigation Measures?**

Following ways will be adopted to reduce the impacts of the Detergent manufacturing:

### **6.3.6 Changing in Planning Design**

There is no endangered and threatened species present in the project area. Moreover, there is not any human settlement or infra-structure that will be dislocated or dismantled due to the proposed project development. Hence, there is no need to change the design of project.

### **6.3.7 Improved Management and Monitoring Practices**

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 installation of the Detergent plant, the vegetation present on-site will be removed and the geography/landscape of the area will be changed on the permanent basis, however, there is no protected or environmentally sensitive area present within 10.0 km vicinity of the project that could be impacted. Hence, no compensation in the monetary terms will be required. However, for the removal of the one tree from the project area 3-5 trees will be planted as the compensation.

#### **b. Replacement/Relocation/Rehabilitation**

The proposed project is located in open land which is in agricultural where there is no sensitive area, human population or preserved natural resource is present which could be impacted due to the commencement of the proposed project. No replacement, relocation and rehabilitation will be required for the commencement of the aforesaid project.

## **6.4 Impacts Associated with Project Location**

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

- ⇒ There is no community or human settlement present on-site or in the project proximity that could be impacted due to the commencement of the proposed project
- ⇒ There is no fauna or flora belonging to an endangered species present on-site
- ⇒ The site has accessible through road network i.e., connected to the main road via access roads
- ⇒ 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 5 km of the selected site that could be impacted

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.

## 6.5 Impact Assessment Methodology

The impact assessment methodology for the installation of the Detergent manufacturing is given below:

### 6.5.1 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.

### 6.5.2 Identification of Mitigation Measures

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

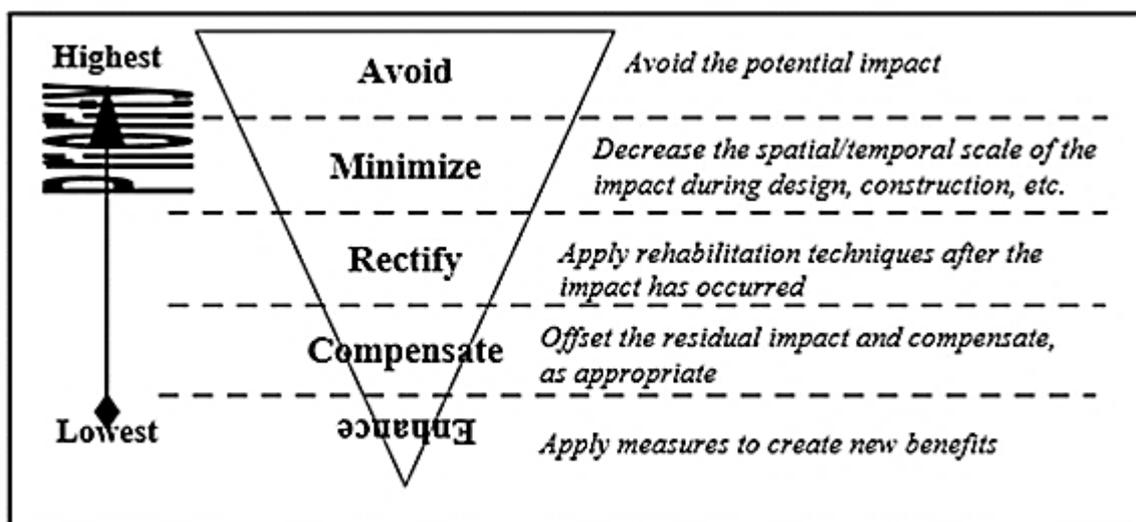


Figure 10: Hierarchy of Mitigations

### **6.5.3 Evaluation of the Residual Impacts**

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of the 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.

### **6.5.4 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 the monitoring is to confirm that the impact is within the prescribed limits and to provide timely information if acceptable limits are being breached.

## **7 SCREENING OF IMPACTS AND THEIR MITIGATION**

### **MEASURE**

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 Detergent manufacturing units. It also identifies measures that will help to mitigate the adverse environmental impacts and will enhance positive impacts of the project. Impacts are assessed by analyzing their magnitude and sensitivity, which is a legal requirement.

#### **7.1 Impact Evaluation**

Impact screening checklist and project impact evaluation matrix have been developed to evaluate the potential impacts of the establishment of Detergent manufacturing plant on the basis of set procedures as given in the environmental guidelines by Punjab EPA.

##### **7.1.1 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:

1. An Impact Screening Checklist
2. 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 the potentially insignificant environmental and social impacts from the potentially significant adverse environmental and social impacts during planning & designing, construction and operational phases of the project. The objective of the impact screening process is to assess the significance of the issues related to the air, water, noise, soil, transportation, communication, the hazards and external constraints. The positive and adverse impacts of the project during planning & designing, construction and operational phases are identified based on their duration, location, frequency, extent, significance and reversibility. Each activity impacts on various environmental parameters are given below

Table 5: 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.
<b>Beneficial Impacts</b>														
1.	Employment Opportunity	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
2.	Availability of Raw-Material	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
3.	Appreciation in Land Value	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
4.	Energy Availability	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
<b>5. Adverse Impacts</b>														
6.	Air Pollution		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
7.	Wastewater		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
8.	Solid Waste and By-Products	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
9.	Health and Safety		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.	Chemical Hazards		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
11.	Physical Hazards		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
12.	<b>Security Risks</b>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

## b) Project Impact Evaluation Matrix

The Project Impact Evaluation Matrix was developed by placing different environmental parameters that are likely to be affected by the proposed project actions, grouped into categories i.e., physical, ecological and socio-economic environment. For the impact assessment 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 below:

**Table 6: Impact Evaluation Matrix**

Environmental Parameters	Impact Assessment during operational Phase
<b>A: Physical</b>	
<b>Land Resources</b>	
Soil Erosion and Contamination	0
Transportation	-1t
Solid Waste and By-Products	-2p
Land Use	NA
<b>Air Resources</b>	
Noise Pollution	-1t
Air Pollution	-2t
Dust Emissions	-1t
<b>Water Resources</b>	
Ground Water	-1p
Surface Water	NA
Wastewater	-2p
<b>B : Ecological</b>	
<b>Flora</b>	
Tree Cutting	+1p
<b>Fauna</b>	
Terrestrial Fauna	+1p
<b>C: Socio-Economic</b>	
Employment Opportunities	+3p
Land Value Appreciation	+2t
Availability of Local Raw-Material	+2p
Economic Uplift	+3p
<b>D: Hazards</b>	
Physical Hazards	-1p
Chemical Hazards	-1p
Health and Safety	-1p

*Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible*

## 7.2 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 the project, mitigation plan for all the adverse impacts should be predicted to find out the best alternative. The objectives of mitigation are to:

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

In this part of the EIA Report, several complications including cleanliness, environmental health and safety, societal and environmental managing and inspection, industrial vulnerability, tools and apparatuses and during operational activities, influx of workers and procurement of land have been deeply elaborated.

### 7.2.1 Approaches for Mitigation Measures

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

**Table 7: Approaches for Mitigation Measures**

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

## 7.3 Expected Positive Impacts

Following are the expected outcome of the establishment of the Detergent manufacturing unit:

### 7.3.1 Increase in Employment Opportunities

Due to the establishment of Detergent manufacturing unit in Gujrat the employment opportunity will be enhanced. During construction phase 10-20 workers will work and during operational phase the manpower number may be up to 10. It will include 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.

### 7.3.2 Economic Uplift of the Area

In addition to all these benefits, the project will result in the general economic and social uplift in the areas of the Punjab Province as it will provide raw material for other allied industries such as feed in the region.

### 7.3.3 Raw-Material Availability

Currently, the demand of the Detergent has increased many folds in the country due to the various innovations. Chemical industry is the basic department in all the developmental activities of country. Due to the installation of the proposed project Detergent will be added in the existing market which is considered insufficient to fulfill the ever-increasing demand.

### 7.3.4 Enhance Competitiveness of Domestic Detergent

The installation of the proposed project will have following benefits:

- ➔ **Improve global competitiveness of Pakistan by providing high-quality Detergent chemical to cope with increase in demand.**
- ➔ **Enhance competitiveness by helping industries located in Lahore, Multan, Gujranwala and Sheikhpura to save logistics costs**

## 7.4 Adverse Impacts and Mitigation Measures

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

### 7.4.1 Impacts and Mitigations during Operational Phase

Following impacts are envisaged due to the establishment of Detergent manufacturing unit:

**i Air Emissions**

There will be no air emission expected as the process will take place in closed circuit, electricity will be used as fuel for machinery. But on a safer side to deal with any accidental or unpleased event occurrence fume hood will be installed whose efficiency will be >90% and for safety purpose the workers dealing with the process activities will be provided with masks, safety shoes and all other necessary PPEs. To reduce the public nuisance native trees will be planted on the boundary to reduce the nuisance and to reclaim the disturbed soil effectively.

**ii Solid Waste and Process Waste Products**

In the aforesaid project of the Detergent manufacturing unit, no significant hazardous solid waste will be generated from the processing activities, the only waste generated would be from municipal source. There will be a waste from corrugated section of the unit. The corrugated waste will be mostly recycled. The improper disposal may impose health impacts on the workers and the nearby community because the disease vectors will be produced.

**Nature of Impact**

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

**Mitigations**

General waste management practices will be adopted which will include:

- 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
- The generated solid waste will be disposed off by using the process of composting and compost will be later on used for the on-site horticultural activities
- 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
- Equipment and material containing asbestos, PCBs and ozone depleting substances will not be used

**iii Water Consumption and Wastewater Production**

In the aforesaid project, it is estimated that 200 liters (0.2m<sup>3</sup>) of water will be consumed for sanitation purposes for 20 workers. No wastewater will be produced during process activities. Water used for cooling purpose will be reused for the same purpose. For this purpose, a septic tank will be installed at site for the efficient treatment of wastewater before final disposal in drain.

### **Nature of Impact**

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

### **Mitigations**

Following mitigation measures will be adopted:

- Freshwater conservation techniques should be adopted to ensure sustainable development
- Monitoring of effluents shall be carried out as per requirement of Self-Monitoring and Reporting Tools (SMART) to ensure compliance with the NEQS
- It will be ensured that no solid waste will be entered in the wastewater
- There is no surface water body present in the project proximity that could be impacted
- The evaporation loss may be minimized by adopting closed system.

#### iv Occupational Health and Safety

The health and safety impacts include:

- Slips, Trips and Falls on the Same Level
- Falls from Height
- Unguarded Machinery
- Falling Objects
- Working in Confined Spaces
- Moving Machinery, On-Site Transport, Forklifts and Cranes
- Contact with Hot Metal
- Fire and Explosion
- Extreme Temperatures
- Noise and Vibration
- Electrical Burns and Electric Shock

### **Nature of Impact**

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

### **Mitigation**

The following mitigation measures are suggested that could be applied to reduce the risk of health and safety:

- ⊙ **Floor surfaces shall be maintained regularly, and kept clean and free of oil spills, other slippery fluids or materials and obstructions.**
- ⊙ **Workers who may be exposed to noise levels exceeding occupational standards shall receive regular audiometric testing.**
- ⊙ **The effective use of hearing-protection devices shall be ensured.**
- ⊙ **Proper training will be provided to workers entering and working in the confined space of the hazards, protective measures and emergency rescue procedures;**
- ⊙ **Proper radiation shielding may be provided.**
- ⊙ **Edged parts of rolls shall be securely guarded to prevent severe injuries.**
- ⊙ **Transport routes shall be planned and constructed to minimize the risk of collision and with sufficient safe clearance to allow for aisles and turns, or other types of control area. Where appropriate, maps showing the proposed route should be provided.**
- ⊙ **Transport routes shall be clear of obstructions and, where possible, without irregular surfaces.**
- ⊙ **Loads should be lowered slowly and smoothly.**

#### v **Chemical Hazards**

Exposure to chemicals (gases and vapors) may occur during the handling of chemicals related to cleaning and disinfecting process areas. Avoid the chemical exposure to the workers who are working in the process area or related to the process.

#### **Nature of Impact**

The nature of the proposed impact will be direct, low, long-term and hence 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 disinfection**
- ✓ **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**
- ✓ **All chemicals shifting will be taken through pipe in closed circuit**
- ✓ **Chemicals and detergents will be stored properly, and all precautionary measures will be adopted**

#### vi **Security Risks**

A large number of workers will be hired including; engineers and laborers. The increase in the number of the 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 the proposed impact will be direct, low, long-term and hence significant.

### **Mitigation measures**

- **Proper security will be provided to the workers**
- **Security guards will be appointed**
- **Before hiring any worker and his criminal record may be checked**
- **CNIC of all the workers will be kept by the Proponent**
- **Strict law will be enforced to control the crime at site**

#### **vii Emergency Response**

Emergency response preparedness committee will be formulated consisted of five members. Project Manager will be the head of the team who will chair incident control headquarters. In the case of emergency, it will 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 the proposed impact will be direct, low, long-term and hence significant.

### **Mitigation**

- **Workers should be given adequate training of handling machinery**
- **Emergency call service must be made available.**
- **First aid box shall be available within the facility**

#### **viii Accidental Spillage**

Accidental release of chemicals can occur on campus at any time. A chemical release can result in either an exposure to a person or as a spill contaminating work area or the environment. There is a potential for the development of harmful effects depending on the chemical involved

and the associated hazards. A proper plan and mitigation measure have been planned to with such event.

**Nature of Impact:**

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

**Mitigations:**

- ↪ **Inspection of the chemical storage areas shall be conducted on a monthly basis for sanitation, maintenance, and housekeeping purposes.**
- ↪ **Safety, housekeeping, and chemical storage problems will be addressed as part of normal facility operations and maintenance programs.**
- ↪ **Inspection observations shall record on the Chemical Inspection Form included with this Plan.**
- ↪ **Potentially reactive or non-compatible materials will not be stored together in the same storage or containment unit.**
- ↪ **Damaged or leaking containers will be isolated, when possible, in a containment area or repackaged to prevent loss, exposure or hazards.**
- ↪ **Containment areas should be kept clear of extraneous materials.**
- ↪ **Containment areas should be kept in good repair.**
- ↪ **Chemicals are to be stored in designated areas.**
- ↪ **Spill response equipment maintained at the site includes spill kits, a full array of maintenance equipment and tools, and a variety of forklifts and service equipment. Spill kits are located at the tool storage sheds. Spill kits will contain absorbent media, portable containment booms, and pads.**
- ↪ **All current and future employees are to receive training with regard to the Accidental Spill Prevention Plan.**
- ↪ **Training will be provided as part of new employee orientation and includes a review of chemicals stored and utilized at the Facility. This training includes a basic review of MSDS, availability of MSDS for chemicals present at the Facility, familiarization with basic emergency procedures, location and contents of spill kits, emergency escape routes, and responsibilities.**

**ix Socio-Economic Impact**

It is envisaged that the local community will be disturbed due to increase in the traffic load i.e., vehicles carrying hens, raw material, final product and by-product. The intensity of the aforesaid project will be quite low. The installation of the aforesaid project will have a beneficial impact such as; increase in employment opportunity, increase of the wages in local area, increase in revenue generation, provision of social welfare funds of the employees and appreciation of land value.

**Nature of Impact**

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.

## **7.5 Potential Environmental Enhancement Measures**

### **7.5.1 Tree Plantation**

Tree plantation within and outside the premises is a potential environmental enhancement measure. A large area will be reserved for tree plantation and among plants native flora like Peepal, Kikar, Dherak, Safeeda and Amaltas will be planted in the specified green zone which will have the maximum capacity to reduce noise pollution and tolerance index of these species are more than 10. Some floral species like roses and other ornamental evergreen plants will also be introduced in the lawn which will enhance aesthetic beauty. In addition, trees like Safeeda and Amaltas will be planted as boundary wall inside the lawn which will look like green wall. The proponent will also make arrangements for protection and maintenance of trees.

## **8 ENVIRONMENTAL MANAGEMENT AND MONITORING**

### **PLANS**

This chapter summarizes the various mitigation measures as outlined previously in this EIA Report that will be implemented during the construction, operational and decommissioning stages of project. It does not discuss further the mitigation measures which have been adopted within the design and planning of the project, as these are comprehensively covered in previous section of this EIA Report.

Outline and key features of the EMMP for operations phase is presented. As per the environmental legislation in Pakistan, the EMMP for the 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.

#### **8.1 Objectives**

An Environmental Monitoring Plan was outlined alongside Environmental Management Plan to ensure all the corrective actions to counter adverse impacts which gives a detailed EMMP. The EMMP will serve as a principal execution module of the project that would not only mitigate adverse environmental impacts during the construction and the operational phase of the project but also ensures that environmental standards and good in-housekeeping are being practiced. Continuous environmental monitoring is exercised to ensure that preventive measures are in place and effective to sustain environmental integrity. The key objectives of EMMP are:

- To outline functions and responsibilities of persons
- To state and implement standards and guidelines which are required under environmental legislations particular in context to the Project
- To facilitate the implementation of the mitigation measures by providing the technical details of each Project's impact and proposing implementation schedule of the proposed mitigation measures
- Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented
- Identify the resources required to implement the EMMP and outline corresponding financing arrangements

## 8.2 Management Approach

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

### 8.2.1 Proponent

The project proponent will undertake overall responsibility for compliance with the EMMP. The concerned departments will carry out verification checks to ensure that the contractors are effectively implementing their environmental and social requirements.

### 8.2.2 Contractors

The contractors will implement the majority of environmental and social mitigation measures. The contractors will carry out field activities as part of the project. The contractors are subject to certain liabilities under the environmental laws of the country, and under its contract with proponent.

## 8.3 Components of EMMP

The EMMP consists of the following:

- **Institutional arrangements**
- **Mitigation plan to reduce the severity of associated impacts**
- **Monitoring plan to monitor the impacts and their severity**
- **Environmental and social trainings to raise awareness**

### 8.3.1 Remedial and Mitigation Measures

The objective of remedial and mitigation measures in any project is to identify practices, technologies or activities that would prevent, minimize or mitigate all significant negativities that are likely to occur due to the proposed project.

## 8.4 Environmental Management and Monitoring Framework

The purpose of the environmental management and monitoring framework is to facilitate the implementation of environmental commitments, included in the environmental impact assessment. The proponent is committed for the protection of the environment and to the sustainable management of its related operations and activities.

### 8.4.1 Institutional Arrangements and Responsibilities

The proposed institutional arrangement for the implementation of EMMP is based on the discussions held with the Forest Department, Environmental Protection Department, Local

Union Council Office and Proponent. The discussion concluded that three types of institutional arrangements are essential for the effective implementation of EMMP, these are follows:

- **Establishment of Environment/Social Management Group**
- **External Monitoring by EPA certified laboratory**
- **EMC established by Proponent after consultation with consultant**

**a. Roles and Responsibilities**

Following are the designated roles and responsibilities of the employees involved in the monitoring and management of the adverse impacts:

**Table 8: Roles and Responsibilities**

Roles and Responsibilities		
Sr#	Concerned Persons	Duties
1	The Project Manager	<p>Following will be the responsibilities of the Project Manager</p> <ul style="list-style-type: none"> <li>• <b>Ensure that the contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment.</b></li> <li>• <b>Ensure that all stipulations within the EMMP are communicated and adhered to by contractor(s)</b></li> <li>• <b>Monitor the implementation of the EMMP throughout the project by means of site inspections and meetings. This will be documented as part of the minutes of the site meeting documents</b></li> <li>• <b>Ensuring project execution within defined budget and timelines</b></li> <li>• <b>Conducting regular check of the project status and meetings with project team</b></li> <li>• <b>Provide support and guidance to project team as and when needed</b></li> <li>• <b>Project Manager is expected to continually monitor and improve the overall performance of their operation</b></li> </ul>
2	HSE Manager	<p>In addition to the health and safety responsibilities held by staff, managers and supervisors must do whatever is reasonably practical to ensure that both the workplace and the work itself are safe. This includes:</p> <ul style="list-style-type: none"> <li>• <b>Ensuring that staff are appropriately trained and supervised</b></li> <li>• <b>Identifying, assessing and managing health and safety risks</b></li> <li>• <b>Consulting with workers (including staff, affiliates and contractors):</b> <ul style="list-style-type: none"> <li>iv. Health and safety risk assessments</li> <li>v. Decisions are made about the measures to be taken to eliminate or control these risks</li> <li>vi. Health and safety risk assessments</li> </ul> </li> <li>• <b>Implementing health and safety risk management programs relevant to their operations, teaching, research and consulting functions and work environment</b></li> </ul>

		<ul style="list-style-type: none"> <li>• <b>Reporting (to the Human Resources Unit), investigating and responding to all hazards, accidents, incidents and taking action to control the risk</b></li> <li>• <b>Assisting with the development, implementation and maintenance of a return to work program for injured staff.</b></li> <li>• <b>Be fully conversant with the EIA and conditions of its approval</b></li> <li>• <b>Be fully conversant with the EMMP</b></li> <li>• <b>Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance</b></li> <li>• <b>Convey the contents of this document to the contractor site staff and discuss the contents in detail with the Project Manager and Contractor</b></li> <li>• <b>Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMMP</b></li> <li>• <b>Take appropriate action if the specifications contained in the EMMP are not followed</b></li> <li>• <b>Monitor and verify that environmental impacts are kept to a minimum, as far as possible</b></li> <li>• <b>Review and approve construction methods, with input from the Site Manager, where necessary</b></li> <li>• <b>Ensure that activities on site comply with all relevant environmental legislation</b></li> <li>• <b>Compile progress reports on regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post excavation audit</b></li> <li>• <b>Liaise with the Site Manager regarding the monitoring of the site</b></li> <li>• <b>Report any non-compliance or remedial measures that need to be applied</b></li> <li>• <b>All environmental problems arising on the construction area will be reported to the Site Manager by the Environmental Manager. Reports on such problems will be submitted to the Project Manager by the Site Manager</b></li> </ul>
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### 8.5 Proposed Monitoring Program to Assess Performance or Output of EMP

The purpose of the environmental management and monitoring framework is to facilitate the implementation of environmental commitments, included in the environmental impact assessment. The proponent is committed for the protection of the environment and to the sustainable management of its related operations and activities.

Environmental monitoring can be categorized into two types; 1) compliance monitoring and 2) effects monitoring. The environmental monitoring program is summarized in **Table 11** which identify the roles and responsibilities of project monitoring, further described in detail in following section

### 8.5.1 Compliance monitoring

Compliance monitoring will be carried out to ensure compliance with the requirements of the IEE. The objectives of the IEE compliance monitoring will be to:

- **Systematically observe the activities undertaken by the contractors or any other person associated with the project.**
- **Verify that the activities are undertaken in compliance with the EIA and other conditions identified by project proponent.**
- **Document and communicate the observations to the concerned person(s) of project proponent so that any corrective measures, if required, can be taken timely.**
- **Maintain a record of all incidents of environmental significance and related actions and corrective measures.**

Compliance monitoring will be the responsibility of all teams involved in the project activities i.e. project proponent and the contractors. Project proponent staff and contractors will carry out the inspections on a set frequency.

### 8.5.2 Effects monitoring

To monitor actual impacts of the project on selected sensitive receptors so that impacts not anticipated in the EIA or impacts which exceed the levels anticipated in the EIA can be identified and appropriate mitigation measures can be adopted in time. This objective will be achieved through effects monitoring.

Considering the environmental conditions of the project area and the assessment of potential impacts of the project made in the EIA, the following environmental parameters will be monitored at identified locations.

**Air Quality Monitoring** – Air quality monitoring will be done during the construction and operation phase of the project at the representative locations. Ambient air quality parameters will include NOX, SOX, CO, PM<sub>10</sub>, and Smoke.

**Water Quality Monitoring** – Ground and surface water quality monitoring will be done during the construction and operation phase of the project at the representative locations.

**Groundwater Quality Parameters:** Total Coliforms, Total Colonial Count, E-Coli, pH, TDS, Total Hardness, Nitrate, Chloride, Fluoride, Colour, Manganese, Aluminium, Chromium, Cadmium, Boron, Barium, Antimony, Arsenic, Cyanide, Mercury, Nickel.

**Wastewater Quality Parameters:** pH, DO, TSS, Alkalinity, BOD<sub>5</sub>, COD, Turbidity.

**Noise Monitoring** - The monitoring will be carried out at key locations covering all receptors.

**Table 9: Environmental Monitoring and Management Plan**

Category	Impact	Project Activity	Monitoring Mechanism	Frequency	Monitoring Agency
				Operations	Operations
Land Resource	Solid Waste and By-Products	Implementation of SW* Management System	Record keeping and timely transfer of SW from bins to the disposal site for ultimate management and disposal	As per EPA, Punjab Guidelines	Proponent
	Soil Contamination	Implementation of Management Plans	Visual monitoring and regular site inspection	As per EPA, Punjab Guidelines	Project Manager
Air Resource	Air Emission during construction phase Air Emission during operational phase	Air quality will deteriorate due to transportation related activities There will be no air emissions expected during process activities. But on a safer side to deal with any accidental or unpleased event occurrence dry scrubber will	Monitor the emissions as per PEQ standards	As per EPA, Punjab Guidelines	EA**

		be installed to cope the situation.			
<b>Ecological Resource</b>	Flora	Uprooting of trees during Construction phase and maintenance of photographic record	Re-vegetation during operation phase	As per EPA, Punjab Guidelines	EA**
<b>Wastewater during constructional phase</b>		Domestic wastewater will be produced during constructional phase. This produced wastewater will be treated through settlings tanks.			
<b>Wastewater During Operational Phase</b>		Wastewater will be generated mainly from domestic use and cooling water will be reused for same purpose. Water used in process activities will be whole used as H2SO4 will be also produced as by produced, water will be used in its production.	Regular testing of the effluents that are being discharged	As per EPA, Punjab Guidelines	EA**

## 8.6 Training and Capacity Building

Training and capacity building trainings are conducted on the regular basis to enhance the capacity of the workers hired for the working. Following is the detailed plan along with the schedules of the training:

**Table 10: Training and Capacity Building Plan**

Training and Capacity Building Plan				
<b>Potential Impacts</b>	<b>Operation Phase</b>			
	During operational phase, nearby society will face problems like: <ul style="list-style-type: none"> <li>• Noise Pollution due to processing and movement of vehicles</li> <li>• Disease vector production due to improper management of solid waste</li> <li>• Contamination of ground water if the wastewater is not disposed off properly</li> <li>• HSE issues may arise</li> </ul>			
<b>Mitigation</b>	<b>Training and Capacity Building Plan</b>			
<b>Management Plan</b>	Project will ensure in-house training for the project staff and the supervisory staff of the Proponent/EA through the provision of one day basic training and one day advanced training, covering environmental and social aspects of the projects in general, and implementation requirements will emphasis on the development projects in general, and implementation requirements with emphasis on the roles and responsibilities of the staff and the labour while executing the environmental monitoring plan in particular. The training protocols will include the following aspects: <ul style="list-style-type: none"> <li>• Procedures for monitoring water quality parameters and measures to</li> <li>• be adopted for avoiding or minimizing water pollution, particularly from the wastewater effluent generated from municipal uses and in the process activity</li> <li>• Safe solid and process waste disposal practices</li> <li>• Safety measures against hazards for workforce and the local communities arising from the construction activities</li> <li>• Use of safety gadgets by the workforce</li> <li>• Training for the use of PPEs</li> </ul>			
<b>Monitoring</b>	<b>Responsibility</b>	<b>Responsible</b>	<b>Budget</b>	<b>Monitoring Duration</b>
	Training of staff, vehicle operators and labour	Project Manager / HSE Manager	20,000/-	1-day training once a year

## 8.7 Proposed EMP Reporting and Reviewing Procedures

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

### 8.7.1 Meetings

As environment is multidisciplinary subject with environmentalist having a dynamic role therefore Environment Officer would be considered as integral part in both constructional and operational team. Participation of Environment Officer in daily morning meeting and any other special meeting is mandatory. Besides internal meeting HSE Engineer/Environment Officer is also responsible to conduct meeting with local in keeping administration in liaison.

### 8.7.2 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.

## 8.8 Impacts and their Mitigation Summary

Environmental and social impacts have been identified for the process of Detergent manufacturing their impacts had been mitigation by adopting required measures as recommended in EMMP of this EIA Report within the Project Area of Influence. The major impacts on physical, biological and social environment are described as under:

**Table 11: Impacts Summary of Detergent manufacturing**

Environmental Parameters	Impact Assessment during operational Phase
	Operational
<b>A: Physical</b>	
<b>Land Resources</b>	
Soil Erosion and Contamination	0
Transportation	-1t
Solid Waste and By-Products	-2p
Land Use	NA
<b>Air Resources</b>	
Noise Pollution	-1t
Air Pollution	-1t
Dust Emissions	-1t
<b>Water Resources</b>	
Ground Water	-1p
Surface Water	NA
Wastewater	-2p
<b>B : Ecological</b>	
<b>Flora</b>	
Tree Cutting	+1p
<b>Fauna</b>	
Terrestrial Fauna	+1p
<b>C: Socio-Economic</b>	
Employment Opportunities	+3p
Land Value Appreciation	+2t

Availability of Local Raw-Material	+2p
Economic Uplift	+3p
<b>D: Hazards</b>	
Physical Hazards	-1p
Chemical Hazards	-1p
Health and Safety	-1p
<i>Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible</i>	

### 8.9 Equipment Maintenance Details

The Client and Contractor will be responsible to maintain equipment with higher efficiency and in good working conditions. The equipment will be maintained twice a year as well as monthly inspection will be done on the regular basis to keep the process going without any interruption.

### 8.10 Environmental Budget

The environmental budget for the project is PKR 2.5 lacs which will be used for environmental enhancement, tree plantation at various designated sites, EMMP for the operational phase and monitoring of environmental parameters (such as ambient air, noise and wastewater). The total cost of the project is PKR 95 million. EMMP and the monitoring will be carried out on the regular basis. So, more than 1% of the total project cost will be allocated for the environmental protection.

Operational Phase		
Serial No.	Activity	Environmental Budget
Serial No.	Activity	Environmental Budget
1.	Air Quality Monitoring/Emission monitoring	Pkr/- 200,000
2.	Noise Monitoring	Pkr/- 100,000
3.	Wastewater Monitoring	Pkr/- 200,000
4.	Fire Safety	Pkr/- 200,000
5.	Accidental Spillage	Pkr/- 200,000
6.	Health and Safety	Pkr/- 100,000
7.	PPE's	Pkr/- 100,000
8.	Potential Environment Enhancement Measures	Pkr/- 500,000
Total		<b>Pkr/- 205,000,0</b>

## **9 CONCLUSION AND RECOMMENDATIONS**

The findings of EIA Report showed that although the Detergent manufacturing and its packaging is expected to have significant negative impacts on the environment during the construction and operational phases, but the severity of these adverse impacts can be reduced significantly by adopting the suggested mitigation measures in EMMP with true spirit. Moreover, their severity can be further reduced by adopting relative mitigation measures as proposed in the Chapter 7 of this EIA Report. The impacts were assessed by frequent site visits, studying related projects and by reviewing relevant documents. Generally, the project is planned to follow efficient environmental management systems. Specific environmental and social benefits have been mentioned below which depend on the proper application of mitigation measures suggested in EMMP and best engineering practices.

### **9.1 Merits and Demerits**

The major positive impacts include;

- ⊙ **Increased job opportunities,**
- ⊙ **Business opportunities,**
- ⊙ **Availability of the local Detergent**
- ⊙ **Environmental enhancement through tree planation.**

The project will raise the income of the persons directly associated with project as well as it will also improve the socio-economic status of the area. The project is expected to stimulate the local economies of the community as the majority of the people living in the nearby areas are associated with the labor related activities.

In general, potential adverse environmental effects resulting from the proposed activities will be temporary in nature, short-term and of low magnitude. Through application of standards, recommended mitigation measures, adherence to applicable permit conditions and regulations, adverse impacts can be effectively minimized. The project is not likely to have significant adverse environmental impacts which cannot be mitigated. Negligible negative impacts that are likely occur during Detergent s processing includes; air pollution due to movements of vehicles, removal of bushes and shrubs, potential impact to the local water resources and social impacts may affect the locals residing in the nearby community can be foreseen. Mitigation measures will be implemented to minimize environmental impacts though they are still negligible. There are certain mitigations suggested to cater for the aforesaid issues.

## 9.2 Recommendations

The intensity and severity of impacts occurred due to the Detergent manufacturing and its packaging varies with change in the nature and magnitude of the project as well as depends upon the baseline environmental conditions of the area. The mitigation measures will require constant information flow and consultation with the stakeholders to ensure the least adverse social-economic impact to outweigh the “no project development” scenario.

- ⇒ The adverse environmental impacts can be reduced significantly by adopting best management and monitoring practices as well as by implementation EMMP with true spirit
- ⇒ Proper PPEs including aprons, rubber gloves and shoes should be provided to workers
- ⇒ No compromise on public health and environment should be allowed
- ⇒ Waste minimization practices should be introduced to workers by conducting lectures on spot to aware the workers about the long-term benefits of the same in lieu of surrounding environment
- ⇒ A proper tree plantation plan should also be developed in order to make the process environment friendly
- ⇒ Small domestic waste storage bins should be placed at different locations for proper collection and disposal of the solid waste
- ⇒ It is recommended that the Proponent should obtain an Environmental Approval (NOC) from the Punjab-EPA before proceeding further

## GLOSSARY

<b>Agency</b>	A business or organization providing a particular service on behalf of another business, person, or group.
<b>Climate</b>	The weather conditions prevailing in an area in general or over a long period.
<b>Consultant</b>	A person who provides professional advice or services to companies for fee.
<b>Construction Waste</b>	Waste generated from the buildings and construction industry and includes material like bricks, concrete, tiles, debris, ceramics and more.
<b>Demographic</b>	A single vital or social statistic of a human population, as the number of births or deaths.
<b>Ecology</b>	The branch of biology that deals with the relations of organisms to one another and to their physical surroundings.
<b>Endangered species</b>	A species of animal or plant that is seriously at risk of extinction.
<b>Environment</b>	Relationship of natural world (human beings, animals and plants) with physical surroundings (air, land, water).
<b>Excavation</b>	Excavation is the act or process of digging, especially when something specific is being removed from the ground. Archaeologists use excavation to find artifacts and fossils.
<b>Framework</b>	A framework is a real or conceptual structure intended to serve as a support or guide for the building of something that expands the structure into something useful.
<b>Hazardous Waste</b>	Hazardous Waste is waste that poses substantial or potential threats to public health or environment.
<b>Impact</b>	The action of one object coming forcibly into contact with another.
<b>Livelihood</b>	A set of activities involving Securing the basic necessities –food, water, shelter and clothing of life.
<b>Lockdown</b>	A state of isolation or restricted access instituted as a security measure.
<b>Municipal Waste</b>	Municipal Solid Waste (MSW)—more commonly known as trash or garbage—consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. This comes from our homes, schools, hospitals, and businesses.
<b>Nature</b>	The phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations.
<b>Proponent</b>	A person who advocates a theory, proposal, or course of action.
<b>Rehabilitation</b>	To restore to a condition of good health, ability to work, or the like.
<b>Resettlement</b>	The settlement of people in a different place.
<b>Sanitation</b>	Conditions relating to public health, especially the provision of clean drinking water and adequate sewage disposal.
<b>Stakeholder</b>	A stakeholder is a party that has an interest in a company and can either affect or be affected by the business. The primary stakeholders in a typical corporation are its investors, employees, and customers.
<b>Detergent</b>	A chemical agent capable of reducing the surface tension of a liquid in which it is dissolved
<b>Topography</b>	Topography is the study of the shape and features of the surface of the Earth and other observable astronomical objects including planets, moons, and asteroids.
<b>Vegetation</b>	Plants considered collectively, especially those found in a particular area or habitat.

### LIST OF ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AOI	Area of Interest
BOD	Bio-chemical Oxygen Demand
CC	Construction Contractor
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
EA	Executive Agency
EIA	Environmental Impact Assessment
EMMP Plan	Environmental Management and Monitoring
EPA	Environment Protection Agency
EPD	Environment Protection Department
GDP	Gross Domestic Product
gm	Gram
GOP	Government of Pakistan
IEE	Initial Environmental Examination
LABSA	Linear Alkylbenzene Sulphonic Acid
mg/l	Milligrams per liter
NO <sub>2</sub>	Nitrogen Dioxide
NOC	No Objection Certificate
OH & S	Occupational Health and Safety
PEPA	Pakistan Environmental Protection Act
PEQS	Punjab Environmental Quality Standards
PM	Particulate Matter
SO <sub>2</sub>	Sulfur Dioxide
SOP	Standard Operating Procedures
SWM	Solid Waste Management
TORs	Terms of Reference

### LIST OF PEOPLE AND ORGANIZATION CONSULTED

SR. NO.	NAME	ID CARD NUMBER	OCCUPATION	CONCERN/VIEWS
1.	Ghulam Shabir	36303-7360882-5	farmer	Positive
2.	Ansar Ali	34101-5615463-9	Farmer	Positive
3.	Liaqat Ali	34101-527.5075-1	Farmer	Positive
4.	Abdul Rehman	34102-0434594-7	Shop Owner	Concerned about pollution
5.	Muhammad Bilal	36303-9299987-3	Shop Owner	Concerned about Noise pollution
6.	Muhammad Yousaf	36302-5965175-3	Daily Wager	Positive
7.	Haroon Hafeez		SDO GEPCO	Sanitation of the area should be ensured
8.	Muhammad Asif	36303-4107290-1	Daily Wager	Positive
9.	Muhammad Iqbal	36303-1561962-1	Vendor	Positive
10.	Abdul Hameed	36302-0474840-7	Vendor	Positive
11.	MUHAMMAD YOUSAF	36302-6595576-7	Health and Safety Manager Itefaq Chemicals	Such facility will greatly help in reducing pressure of increasing demand of local paints as well as provide economic violability.
12.	Muhammad Imran	42201-3691562-7	Daily Wager	Positive
13.	Anas Khan	36302-0917523-6	Field Officer Horticulture department	Workers should be hired from local community
14.	Muhammad Sabir	36303-9221124-3	Vendor	Concerned noise pollution

## Sources of Data

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- Nugrahani, R. A., Redjeki, A. S., Teresa, Y., & Hidayati, N. (2017). Synthesis of Compound-Containing Sulphonic Acid from Epoxidized Methyl Oleic of Rice Bran Oil and Linear Alkylbenzene Sulphonic Acid. *Journal of Chemical Technology and Metallurgy*, 52(5), 797-802.
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- Gouda, A. M., Hagra, A. E., Okbah, M. A., & El-Gammal, M. I. (2021). Influence of the Linear Alkylbenzene Sulfonate (LAS) on hematological and biochemical parameters of Nile Tilapia, *Oreochromis niloticus*. *Saudi Journal of Biological Sciences*.
- Field Surveys
- Public Consultations

### PROJECT TEAM AND RESPONSIBILITIES

Name of expert	Position held	Highest Qualification	TERM OF REFERENCES
Kamal Ahmed Cheema	Chief Environmentalist	M. Phil. Environmental Economics, PIDE, Islamabad	Mr. Kamal would be responsible for: <ul style="list-style-type: none"> <li>❖ Environmental Assessment &amp; Management.</li> <li>❖ Supervision of monitoring team for air water noise and soil analysis.</li> <li>❖ Preparation of technical EMP</li> </ul>
Mr. Shahzaib Ahmed	Social Scientist	M. Phil Development Studies, PIDE, Islamabad.	Mr. Shahzaib would be responsible for: <ul style="list-style-type: none"> <li>❖ Detailed social survey of project sites</li> <li>❖ Social impact assessment</li> </ul>
Arslan Iqbal	Environmentalist-2	MPhil Environmental Sciences, UOL	Mr. Arslan would be responsible for: <ul style="list-style-type: none"> <li>❖ Biodiversity assessment</li> <li>❖ Detailed flora fauna survey of project sites</li> <li>❖ Identification of threaten and endangered species</li> <li>❖ Project impacts on flora and fauna</li> <li>❖ Detailed social survey of project sites</li> <li>❖ Social impact assessment</li> <li>❖ Consultation with stakeholders</li> </ul>
Amna Hafeez	Environmentalist-3	M.Sc Mountain Conservation and Watershed Management, University of the Punjab	Ms. Amna would be responsible for: <ul style="list-style-type: none"> <li>❖ Report writing</li> <li>❖ Field surveys and consultation with stakeholders</li> <li>❖ Preparation of Environment monitoring plan</li> <li>❖ Preparation of technical EMP</li> <li>❖ Identification of sensitive receptors</li> <li>❖ Capacity building &amp; training</li> <li>❖ Conducting and monitoring of health assessment surveys</li> <li>❖ Environment health risk assessment and management</li> </ul>
Huda Ashfaq	Environmentalist-4	M.Phil Environmental Sciences, UVAS, Lahore	Ms. Huda would be responsible for: <ul style="list-style-type: none"> <li>❖ Detailed flora and fauna survey of project sites</li> <li>❖ Site Monitoring</li> </ul>

			<ul style="list-style-type: none"> <li>❖ Socio-Economic survey &amp; analysis</li> <li>❖ Report Writing</li> <li>❖ Detailed survey of project sites</li> <li>❖ Environmental Assessment</li> <li>❖ Social Assessment</li> </ul>
Asra Amin	Environmentalist-5	BS (Hons) Environmental Science, GC University, Lahore.	<p>Ms. Asra would be responsible for:</p> <ul style="list-style-type: none"> <li>❖ Site Monitoring</li> <li>❖ Socio-Economic survey &amp; analysis</li> <li>❖ Risk Assessment (OHS &amp; EMP)</li> </ul>