EXECUTIVE SUMMARY

This executive summary presents an overview of the main findings of the Environmental Impact Assessment Report for establishing Hexon Chemicals (Pvt.) Ltd. Formulation of Agro-Chemicals and seed processing plant of 144000 SFT of area, located at B-75, Phase-1B, FIEDMC Faisalabad, District Faisalabad. The main goal of this project is to provide good quality Agro Chemicals and seed to the market.

1. Introduction

The proposed project involved the installation of the agro chemicals formulation and seed processing plant for the quality assured crop stimulators. According to Schedule-II of IEE and EIA Regulations, 2000; the project fall under **Category B (Manufacturing and Processing)** 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 **60 Million PKR.**

2. Project Description

The project comprised of Hexon Chemicals (Pvt.) Ltd formulation by granulation, blending and filtration techniques and seed processing by grading. The total area of the project is 144000 SFT and area around the project is open industrial land. It is located at B-75, Phase-1B, FIEDMC Faisalabad, District Faisalabad. Approximately, the production capacity of the factory is 5 tons/day. Hence, the EIA of Hexon Chemicals (Pvt.) Ltd. is being submitted for environmental approval.

Salient Features of Project

1.	**Project Title**	**Hexon Chemicals (Pvt.) Ltd.**
2.	Project Location	B-75, Phase-1B, FIEDMC Faisalabad, District Faisalabad
3.	Proponent	Mushtaq Ahmad S/O Rehmat Ali Khan House No. 149, Block A, Wapda Town, Bosan Road, By Pass, Multan.
4.	Consultant	EnvironTech Consultants.
5.	Total Area	144000 SFT
6.	Total covered area	83295 SFT

7.	Total open area	88604 SFT
8.	Capacity of Project	**2500 kg /day (solid)** **2500 liters/day (Liquid)**
9.	Location of project	**31°38'13.4"N 73°12'28.4"E**
10.	Nature of Area	Industrial
11.	Present status of Land Use	Open/Vacant plot
12.	Land use in the surroundings of project site. North South East West	The project is located in industrial estate. The surroundings are: Open/Vacant land Open/Vacant land Road Open/Vacant land
13.	Cost of Project	PKR 60 million PKR
14.	Raw material	Macro nutrients and micro nutrients
15.	Product	Agro chemicals
16.	Purpose of proposed project	Formulation of Agro-Chemicals and seed processing
17.	Nearby emergency services i.e. Hospital, police station, rescue, fire brigade etc.	Fazal Memorial Hospital Jhumra (12.0Km) and THQ Hospital chak jhumra (15.3km) Rescue 1122 Sangla Hill (20.0 Km). FIEDMIC Model Police Station (5.2 Km)
18.	Tree Planation	At Designated Green Areas
19.	Water Source	Ground Water
20.	Status of Project	Open/Vacant Land
21.	Source of Power	Wapda (FESCO)

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**
A: Physical		
Land Resources		
Soil Erosion and Contamination	-2p	0
Transportation	-1t	-1t
Solid Waste and By-Products	-2t	-2p
Land Use	-2p	NA
Air Resources		
Noise Pollution	-1t	-1t
Air Emission	-1t	-1t
Dust	-1t	-1t

Odor	NA	-2t
Water Resources		
Ground Water	-1p	-1p
Surface Water	NA	NA
Wastewater	-1p	-2p
B : Ecological		
Flora		
Tree Cutting	-1p	+1p
Fauna		
Terrestrial Fauna	-1p	+1p
C: Socio-Economic		
Employment Opportunities	+1t	+1p
Land Value Appreciation	+1t	+2t
D: Hazards		
Biological Hazards	NA	NA
Physical Hazards	-1t	-1p
Chemical Hazards	0	-1p
Health and Safety	-1t	-1p
Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible		

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 agro chemicals formulation and seed processing plant 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 agro chemicals and seed processing 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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GLOSSARY

Environmental Management System (EMS):

A set of management process and procedure that allows an organization to analyse and reduce the environmental impacts of its activities. Environmental Monitoring Systematic, geo-referenced observations of the environment essential to detecting changes in ecosystems over time. Environmental Protection Plan (EPP) a practical tool that describes the actions required to minimize environmental effects before, during and after project implementation. The plan may include details about the implementation of the mitigation measures identified in the environmental assessment, such as who is responsible for implementation, where the measures are intended to be implemented, and within what timeframe.

Habitat:

Land and water used by wildlife. This may include biotic and Abiotic aspects such as vegetation, exposed bedrock, water, and topography.

Impact:

Any aspect of a project that may cause an effect; for example, land clearing during construction is an impact, while a possible effect is loss and fragmentation of wildlife habitat.

Indirect Effect:

An effect in which the cause-effect relationship (e.g., between the project's impacts and the ultimate effect on a Valued Ecosystem Component) has intermediary effects. As an interaction with another effect is required to have a cumulative effect (hence, creating intermediary effects), cumulative effects may be considered as indirect. Industry Relations Corporation (IRC) The Corporation or organization that a First Nation has created to manage the First Nation's relations, including Consultation with Alberta, Canada and Industry.

Mitigation:

The elimination, reduction or control of the adverse environmental effects of the project. Mitigation includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

Non-Renewable Resource:

Natural resources that are in fixed supply such as coal, oil and minerals.

Project:

The activity or group of activities proposed by the Proponent. The types of activities that could be subject to Alberta's environmental assessment process are listed in the Schedule of Activities in the Environmental Protection and Enhancement Act and in the Water Act. The Project includes all associated construction, operation, decommissioning and reclamation activities and all phases of development described by the Proponent. Project Area Project Footprint/Study Area The area includes all lands subject to direct disturbance from the project and associated infrastructure. Project Components The different physical entities and activities that together make up the Project.

Residual Effect:

An effect that remains after mitigation has been applied

Scoping:

An activity that focuses the assessment on relevant issues and concerns and establishes the boundaries of the environmental assessment. A consultative process for identifying and possibly reducing the number of items (e.g., issues, VECs) to be examined until only the most important items remain for detailed assessment. Scoping ensures that assessment effort will not be expended in the examination of trivial effects.

Significance:

A measure of the magnitude, duration, frequency, timing, probability of occurrence, ecological and social context, geographic extent, and degree of reversibility of an effect on a Valued Ecosystem Component.

LIST OF ABBREVIATIONS

°C	Degree Celsius
CO_2	Carbon dioxide
CPEC	China Pakistan Economic Corridor
EIA	Environmental Impact Assessment
IEE	Initial Environmental Examination
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
GDP	Gross Domestic Product
m^3	Cubic meter
m^3/h	Cubic meter per hour
FIEDMC	Faisalabad Industrial Estate Development & Management Company
MW	Megawatt
NEQS	National Environmental Quality Standards
No.	Number
NOC	No Objection Certificate
NO_x	Oxides of Nitrogen
PEPA, 2012	Punjab Environmental Protection (Amendment) Act, 2012
PEPC	Pakistan Environmental Protection Council
PEPO	Pakistan Environmental Protection Ordinance
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipment
QA	Quality Assurance
RO	Reverse Osmosis
SOPs	Standard Operation Procedures
SEAL	Solution Environmental & Analytical Laboratory
TMA	Town Municipal Authority

1 INTRODUCTION

1.1 Project Background

Pakistan being an agro based country has always been in need for the agro chemicals and it provided a ground for new capital investment and growth. The agro chemicals industry of Pakistan has enormous potential and is well on its way to becoming one of the biggest agro chemicals exporters in the region in the coming years.

Being primarily an agrarian state, Pakistan's growth is heavily dependent on the agro chemicals industry. According to reports, Pakistan's agro chemicals demand has always remained higher than its supply. However, with the advancement of technology and increased number of players in the industry, production capacity has increased to approx. 9 million tons per year, which has consistently surpassed the national demand over the last few years.

Furthermore, the consumption of agro chemicals has increased manifold due to heightened awareness among farmers that its usage in good quantity is fruitful for higher yields and a significant increase in their income as the commodity is provided subsidized rates.

The proposed project for which impact assessment study is being carried out is entitled as Hexon Chemicals (Pvt.) Ltd. is proposed to be established at B-75, Phase-1B, FIEDMC Faisalabad, District Faisalabad. The proponent of the proposed project is expected to provide high quality of agro chemicals 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 formulation of the quality agro chemicals products. The products are under the following Product names along with the composition.

Sr#	Product Name	Specification	Raw Materials	Project Capacity (Per/Day)
Fertilizers				

1.	Macro Plus (liquid)	Nitrogen = 8%, Phosphorous (P_2O_5) = 8 %, Potash (K_2O) = 6%	Pellets of nitrogen, phosphorus and potassium	2 Metric Ton/Day
2.	Nobel Gold liquid	Zn= 10%	Zinc Sulphuric acid	2 Metric Ton/Day
3.	V Care Liquid	Nitrogen = 5%, Phosphorous (P_2O_5) = 5%, Potash (K_2O) =20 %	Pellets of nitrogen, phosphorus and potassium	2 Metric Ton/Day
4.	Charger Extra Liquid	Humic Acid = 10%,Potash (K_2O) = 3.5%	Humic acid Fulvic acid Potassium oxide	3 Metric Ton/Day
5.	Charger Plus (Granules)	Humic Acid = 40%,Potash (K_2O) = 7%	Humic acid Fulvic acid Potassium oxide	3 Metric Ton/Day
6.	Radiant Plus 5% (Granules)	Chelated Zinc = 5%	Zinc Sulphuric acid	2 Metric Ton/Day
7.	NS 20 (20%)	Nitrogen 20 %	Ammonium nitrate Ammonium sulphate	2 Metric Ton/Day
8.	Priority 10G	Zinc = 7%, Iron (ferrous) = 3%	Zinc sulphate Iron sulphate	3 Metric Ton/Day
9.	KSol 30% liquid	Potash (K_2O) = 30 %	Potassium phosphate Phosphoric Acid	4 Metric Ton/Day
10.	Growth Plus	Zn= 6%, Fe=2%, Mn=1%, Cu=1%	Micro Elements (Zn, Mn, Fe)	4 Metric Ton/Day
11.	Boron 5% Liquid	Boron= 5%	Glycol Humic Acid Boric Acid	3 Metric Ton/Day
12.	Chelated Zinc 6% Liquid	Chelated Zinc = 6 %	Zinc Sulphuric acid	2 Metric Ton/Day
Pesticides				

13.	Chlorpyrifos	400/Ltr(38.50W/W)	O-Diethyl Thiophosphoryl Chloride Sodium Salt of 3,5,6-Trichloropyridin-2-OL Dicholoro Methane (MDC)	4 Metric Ton/Day
14.	Emamectin	Emamectin Benzoate… 19g/Kg(2.1%W/W)	Ethyl Acetate Sodium Benzoate	2 Metric Ton/Day
15.	Glyphosate	480g/Ltr(41%W/W)	Dimethyl phosphonate (DMPP) Paraformaldehyde	3 Metric Ton/Day
16.	Pyriproxyfen	108g/Ltr(11.3%W/W)	P-phenoxyphenol Epoxy propane	3 Metric Ton/Day
17.	Monomehypo	Monomehypo 50 gm/kg (5% W/W)	methyl isocyanate, methalyl chloride, catechol, and o-nitrochlorobenzene	5 Metric Ton/Day
18.	Acetamiprid	Acetamiprid 200 gm/liter (20% W/V)	Methylamine Chloroform	2 Metric Ton/Day
19.	Imidacloprid	Imidacloprid 200 gm/liter (20% W/V)	Chloromethylpyridine Imidazolidine Butanon	2 Metric Ton/Day
20.	Lufenuron	Lufenuron 5% EC	Acarus tritici urea Solvent xylene Emulsifier polyoxyethylene alkyl phenol Thickener polyvinyl alcohol Antifreeze glycol Defoamer organosilicon	3 Metric Ton/Day
21.	Cypermethrin	Cypermethrin 10%	Cyano phenoxybenzyl Dichlorovinyl Dimethyl Cyclopropane carboxylate	3 Metric Ton/Day

22.	Atrazine	Atrazine 38 SC	Cyanuric chloride Isopropylamine Ethamine	2 Metric Ton/Day
23.	Lambda cyhalothrin	25g/Ltr(2.75%W/W)	Polyalkylene glycol ether Dodecyl benzene sulphonic acid sodium salt Polymeric fatty ester Sodium lignosulphonate Hydrated aluminum magnesium silicate Tetra sodium pyrophosphate Xanthan gum Titanium dioxide	300 Liter/Day
24.	Buprofezin	Buprofzine 25% WP	Buprofezin powder phenyl carbamyl chlorobenzene	5 Metric Ton/Day

*The estimated project cost is **60 Million PKR**

1.3 Project Location

The proposed location for the installation of proposed project of Hexon Chemicals (Pvt.) Ltd located at B-75, Phase-1B, FIEDMC Faisalabad, District Faisalabad. The geographical location of the proposed area is **31°38'13.4"N 73°12'28.4"E**.



Figure 1: Area of Hexon Chemicals (Pvt.) Ltd.

The nearest population is Burewali present near the project area is at the distance of 1163 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 2 km vicinity that could be impacted due to the installation and operation of the proposed project.

There are no particular sensitive areas as project is located far from populated areas. The details are given below in table 1:

Table 1: Sensitive receptors

	Residential Area (Arial Distance)	
1.	Burewali	1163 Meters

1.4 Regulatory Compliance

As per IEE/EIA Regulations 2000, 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)
- Punjab Fertilizer Act 2018
- Environmental, Health and Safety Guidelines

1.5 The Proponent

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

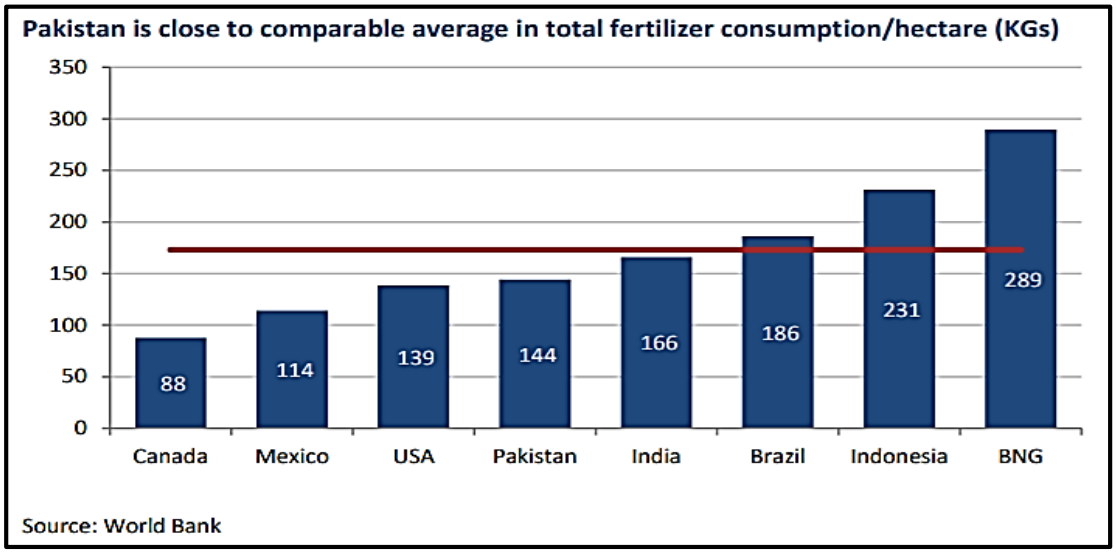
Table 2: Details of Proponent

1	**Name**	***Mushtaq Ahmad S/O Rehmat Ali Khan***
2	**Company**	**Hexon Chemicals (Pvt.) Ltd**
3	**Address**	**House No. 149, Block A, Wapda Town, Bosan Road, By Pass, Multan**

1.6 Scope of Project

The agro chemicals industry is an integral part of Pakistan's economy. The Pakistani agro chemicals industry produces, imports and distributes various types of agro chemicals. With agriculture continuing to be the mainstay of the Pakistan economy, the need to improve crop productivity and quality has assumed significant proportions over the year. To that end, the government has pursued a policy of supporting the industry in the form of feed gas subsidies and increasing support prices for commodities (which increase farmer's purchasing power for agro chemicals). Over the years, agro chemicals manufacturers have responded timely to farmer demands and, in the process, reaped handsome

profits. This is not extraordinary considering the fertilizer, by itself contributes nearly 25-75% in raising yields, depending on the crop and soil type. Better marketing, product development and prudent management have led to good return on equities for the local agro chemicals players. Nonetheless, the demand for agro chemicals is going to increase in future.



1.7 Details of Consultant

The proponent of the Hexon Chemicals (Pvt.) Ltd. 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 3: Consultant Details

Sr#	Consultant Details	
1	Consultant	***EnvironTech Consultants Private Limited***
2	Address	Office no.11 (2nd floor) Centre point Plaza, Main Boulevard Lahore.
3	Contact No.	0303-4342302
Focal Person		

4	Name	Kamal Ahmed Cheema (C.E.O)

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

Table 4: List of Experts

Name of expert	*Position held*	*Highest Qualification*
Dr. Mateen Shafqat	Chief Advisor	PhD Environmental Sciences, PMAS, Arid Agriculture University
Kamal Ahmed Cheema	Chief Environmentalist	M. Phil. Environmental Economics, PIDE, Islamabad
Mr. Shahzaib Ahmed	Social Scientist	M. Phil Development Studies, PIDE, Islamabad.
Arslan Iqbal	Environmentalist	M. Phil Environment Sciences, The University of Lahore BS Environmental Sciences The University of Lahore
Jawad Shafiq	Environmentalist	BS Environmental Sciences University of Gujrat
Amna Hafeez	Environmentalist	M.Sc. Mountain Conservation and Watershed Management, University of the Punjab, Lahore

Rahma Butt	Environmentalist	M.Phil. Environmental Science, U.E.T Lahore.
Saba Nazir	Environmentalist	M. Phil Environment Sciences, UOL, Lahore
Muhammad Ahmed	Environmental Engineer	B.Sc Environmental Engineering UET, Texila

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)** 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 Formulation of agro chemicals and seed processing Plant.

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 tress 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
- The provision of agro chemicals should be at economical rates for poor farmers
- Indigenous tress 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 formulation of Crops stimulator and seed processing which are synthetic in nature. The nature of the land is open/vacant land 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.

The impacts from the establishment of Hexon Chemicals (Pvt.) Ltd. 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 other 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) The site is at the distance of 1163 Meters from the nearest residential area is Burewali.
2) No surface water body is located within the 10 km.
3) The site is well connected to the other parts of the city through M-3 Industrial City Road.
4) No human settlements displacement or relocation associated with the project development and operation
5) Operation of the agro chemicals 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 Project Alternatives.

The alternative of the proposed project is to import agro chemicals from China and other countries. Agro chemicals and seed processing industry is considered as one of the important sectors of the agricultural country. A large portion of the revenue is generated from the agricultural sector. So, the installation of the agro chemicals and seed processing industry will help in boosting the crop production industry. The agriculture sector is the backbone of Pakistan's economy. It accounts for

approximately 10% of the GDP (excluding livestock) and provides employment to almost 45% of the country's total work force.

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 2 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:

Pakistan's agriculture sector contributes ~19% to its GDP. During FY20, the country's overall GDP contracted by ~0.4% on account of the Covid19 pandemic spread (a growth of ~1.2% in FY19). Despite the decline, agriculture sector posted a growth of ~2.7% (~0.6% in FY19), since it remained less vulnerable on account of its essentiality. The Country's real and nominal GDP were recorded at PKR~12.5trn (USD~79bln) and PKR~39trn (USD~246trn) respectively in FY20 as compared to PKR~12.6trn (USD~92trn) and PKR~36trn (USD~262trn) in FY19.

Agriculture is the largest sector of the economy in terms of labor employment. The Sector engages the largest workforce and provides raw material to certain manufacturing/industrial sectors. Moreover, demand for agricultural products has witnessed an increasing trend due to the country's growing population, which has increased at an average rate of ~2.1% over the last five years. In the light of above facts, there is a need to encourage local products of agro chemicals and seeds, which are also economical to poor farmers.

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 the organic agro chemicals.

3.1 Objectives of Project

The aim of the project is to enhance the production of crop stimulators for the consumption at the local farmer's level for the development in agriculture sector.

3.2 Location and Layout of Project

The proposed location for the installation of proposed project of Hexon Chemicals (Pvt.) Ltd. is located at B-75, Phase-1B, FIEDMC Faisalabad, District Faisalabad. The geographical location of the proposed area is **31°38'13.4"N 73°12'28.4"E.**

The nearest town Burewali located near the project area is at the distance of 1163 Meters, the details of the sensitive receptors near the project area are given below:

Table 5: Distance of Project Area from Sensitive Receptors

	Residential Areas (Arial Distance)	
1.	Burewali	1163 Meters

3.3 Land Use on Site:

The surface land in and around the project area is leveled and fertile and is industrial in nature. Boundary wall is constructed around the plot. No ecology sensitive receptor such as; forest or reserved area is present within **2 km** vicinity that could be impacted due to the installation and operation of the agro chemicals formulation and seed processing unit.





Figure 2: Current Status of Land

3.4 Road Access

The project site is linked to M-3 Industrial City Road.

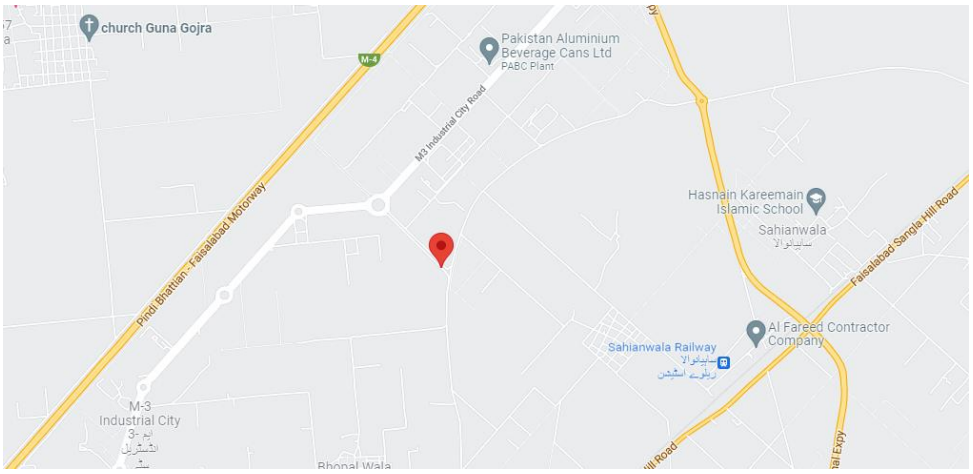


Figure 3: Road Access Plan

3.5 Vegetative Features

The area around the project area is industrial. There is no indigenous plant species or any sensitive vegetative features present which would be effected 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.

Table 6: Vegetative Features of the Project Area

Sr.#	Local Name	Type	Biological Name
1	Kikar	*Throne Tree*	*Prosopis juliflora*
2	Safeda	*Tree*	*Eucalyptus*
3	Sheesham	*Tree*	*Dalbergia sissoo*
4	Peepal	*Tropical Tree*	*Ficus religiosa*

5	Wild Grasses	*Grass*	--

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 (FESCO).

3.6.2 Ground Water Resource

During operational phase ground water will be consumed. The water will be pumped from ground from the depth of 250ft. will be loss as the result of evaporation and 200-300 liters/day will be used for the overall consumption. Water will be supplied by industrial estate.

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 and to deal with the air emissions during the operational phase wet scrubber will be installed. 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.

Dry Scrubber deign and working principle

Dry scrubbers work similarly to other scrubbers. The system sprays a collection of dry reagents into an exhaust stream. These chemicals can react differently depending on which material they are specifically targeting for removal. Some of these materials neutralize harmful pollutants in the stream through a chemical reaction, while others cause a material to react and turn into a different substance. That substance then falls out of the gas stream or is caught in a particle screen.

Dry scrubbers remove acid gases, this is done by introducing a series of dry reactants to exhaust gas at high speeds. This neutralizes the pollutants in the gas. This task is done in three steps: gas cooling,

reagent injection, and filtering. First, gas cooling will be done to prepare exhaust gases. In the gas cooling system, emission gases are cooled to make it easier to remove pollutants and other toxins from the gas. The exhaust gas is diluted using an evaporative cooler. Once the gas has been significantly cooled the reagent injection can begin. It is in this step that the harmful components are actually removed from the gas. Components of the dry reagent are generally chosen because of their neutralizing properties; thus, sodium bicarbonate is included for the said project scrubber. A variety of powders are mixed together and fired at high pressures into the exhaust gas. Chemical reactions occur that reduce the acidity of the gas and remove harmful pollutants. The final step is using a fabric filter to capture the used scrubbing powder as the cleaned gas exits the scrubbing chamber.

Dry scrubbing has been embraced widely, and one of the biggest advantages to using it is the positive environmental impact. The removal of hazardous substances from exhaust gas is important as it prevents a large number of pollutants from escaping into the air. Dry scrubbers are also more commonly used than wet scrubbers mainly because they produce comparatively little waste material. Most of this material that is sprayed into the exhaust is burned off in the heat of the stream or is caught in a filter. The use of dry scrubbers is less expensive as there is no associated cost with removing, transporting, and storing waste water from wet scrubbers.

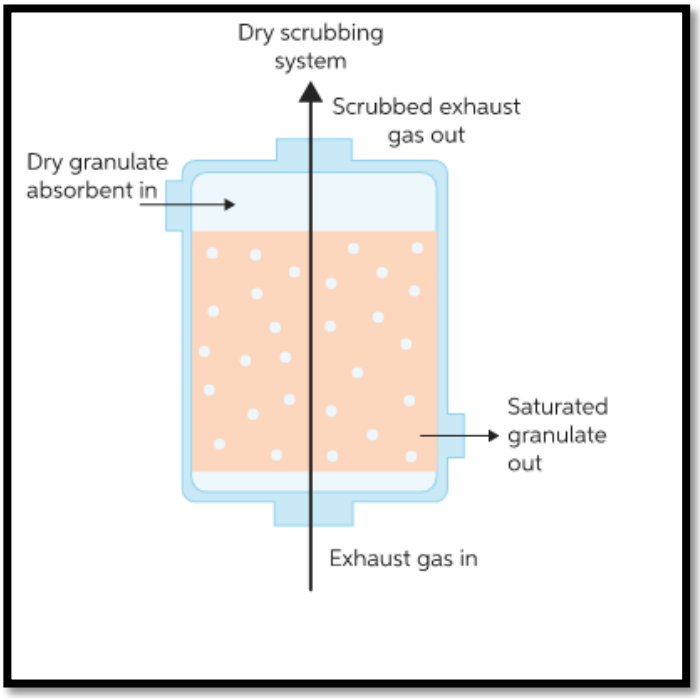


Figure 4: Design of Dry Scrubber

3.7.2 Wastewater Management and Disposal

In the proposed project the wastewater will be generated from process as well as municipal activities. The wastewater from the processing of chemicals will be reused on site during the production of bio stimulant liquid and other products also. The municipal amount of the wastewater generated will be 200 liters (0.2m^3) 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:

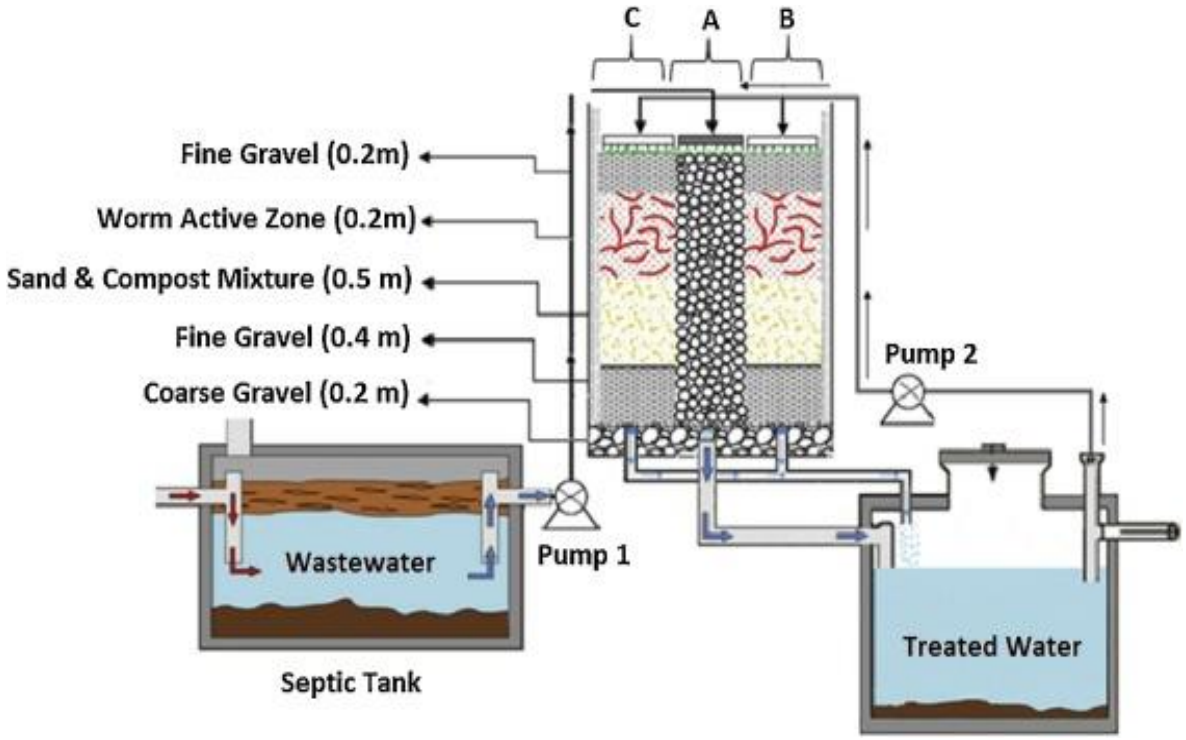


Figure 5: Wastewater Generation and Disposal Mechanism

It is proposed that tree plantation will also be carried out. The generated wastewater will be consumed for on-site horticultural activities after primary treatment.

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 agro chemicals formulation. It will be handed over to the garbage collecting trucks at the end of the day.

No hazardous waste will be generated in the process activity. 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 7: 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
Total Manpower		**10**

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 different crop agro chemicals products.

The activities will include:

- ➔ Installation of the machinery such as agro chemicals granulator, blender etc.
- ➔ Purchase of lab instruments
- ➔ Installation of the filtration and liquid unit.
- ➔ Health and Safety Management at site
- ➔ Transportation of raw-material and final product
- ➔ Plantation of trees

Total Cost	60 Million
Land Cost	30 million
Land development and infrastructure	15 million
Machinery	14.4 million

Environmental Budget:	0.6 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 Hexon Chemicals (Pvt.) Ltd. has been owned by the proponent.

3.12 Schedule of implementation

The completion duration of Hexon Chemicals (Pvt.) Ltd. is about 9-12 months. There will be a symmetrical process. The process is divided in to 3 phases

3.12.1. Preconstruction phase

This phase includes:

- Site investigation & Evaluation
- Budgeting
- Design
- Schedules of working
- Obtaining all relevant NOC

3.12.2. Construction phase

This phase includes:

- Management team& Construction Crew
- Excavation
- Construction of building
- Provision of allied facilities
- Mitigation process
- Amenities Development
- Managing safety
- Monitoring & Evaluation

3.12.3. Operational phase

This phase includes:

- Implementation of fire safety, emergency evacuation plans

- Security management
- Finishing of amenities
- Production of agro chemicals/Plant operations will start.

3.13 Project Description

The project includes the manufacturing of Agro-Chemical products. The products manufacturing list and detailed processing is given below.

Table 8: Products manufacturing list

Sr#	Product Name	Specification	Raw Materials	Project Capacity (Per/Day)
Fertilizers				
1.	Macro Plus (liquid)	Nitrogen = 8%, Phosphorous (P_2O_5) = 8 %, Potash (K_2O) = 6%	Pellets of nitrogen, phosphorus and potassium	2 Metric Ton/Day
2.	Nobel Gold liquid	Zn= 10%	Zinc Sulphuric acid	2 Metric Ton/Day
3.	V Care Liquid	Nitrogen = 5%, Phosphorous (P_2O_5) = 5%, Potash (K_2O) =20 %	Pellets of nitrogen, phosphorus and potassium	2 Metric Ton/Day
4.	Charger Extra Liquid	Humic Acid = 10%,Potash (K_2O) = 3.5%	Humic acid Fulvic acid Potassium oxide	3 Metric Ton/Day
5.	Charger Plus (Granules)	Humic Acid = 40%,Potash (K_2O) = 7%	Humic acid (Dry basis) Fulvic acid (Dry Basis) Potassium oxide	3 Metric Ton/Day
6.	Radiant Plus 5% (Granules)	Chelated Zinc = 5%	Zinc Sulphuric acid	2 Metric Ton/Day

7.	NS 20 (20%)	Nitrogen 20 %	Ammonium nitrate Ammonium sulphate	2 Metric Ton/Day
8.	Priority 10G	Zinc = 7%, Iron (ferrous) = 3%	Zinc sulphate iron sulphate	3 Metric Ton/Day
9.	KSol 30% liquid	Potash (K_2O) = 30 %	Potassium phosphate Phosphoric Acid	4 Metric Ton/Day
10.	Growth Plus	Zn= 6%, Fe=2%, Mn=1%, Cu=1%	Micro Elements (Zn, Mn, Fe)	4 Metric Ton/Day
11.	Boron 5% Liquid	Boron= 5%	Glycol Humic Acid Boric Acid	3 Metric Ton/Day
12.	Chelated Zinc 6% Liquid	Chelated Zinc = 6 %	Zinc Sulphuric acid	2 Metric Ton/Day
Pesticides				
13.	Chlorpyrifos	400/Ltr(38.50W/W)	O-Diethyl Thiophosphoryl Chloride Sodium Salt of 3,5,6-Trichloropyridin-2-OL Dicholoro Methane (MDC)	4 Metric Ton/Day
14.	Emamectin	Emamectin Benzoate… 19g/Kg(2.1%W/W)	Ethyl Acetate Sodium Benzoate	2 Metric Ton/Day
15.	Glyphosate	480g/Ltr(41%W/W)	Dimethyl phosphonate (DMPP) Paraformaldehyde	3 Metric Ton/Day

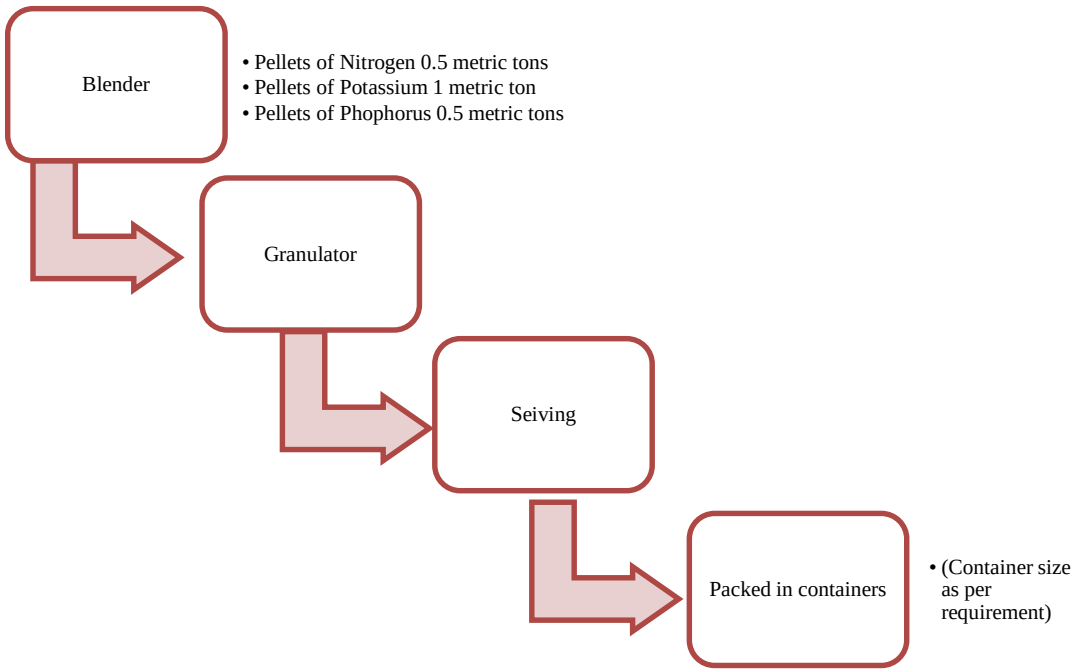
16.	Pyriproxyfen	108g/Ltr(11.3%W/W)	P-phenoxyphenol Epoxy propane	3 Metric Ton/Day
17.	Monomehypo	Monomehypo 50 gm/kg (5% W/W)	methyl isocyanate, methalyl chloride, catechol, and o-nitrochlorobenzene	5 Metric Ton/Day
18.	Acetamiprid	Acetamiprid 200 gm/liter (20% W/V)	Methylamine Chloroform	2 Metric Ton/Day
19.	Imidacloprid	Imidacloprid 200 gm/liter (20% W/V)	Chloromethylpyridine Imidazolidine Butanon	2 Metric Ton/Day
20.	Lufenuron	Lufenuron 5% EC	Acarus tritici urea Solvent xylene Emulsifier polyoxyethylene alkyl phenol Thickener polyvinyl alcohol Antifreeze glycol Defoamer organosilicon	3 Metric Ton/Day
21.	Cypermethrin	Cypermethrin 10%	Cyano phenoxybenzyl Dichlorovinyl Dimethyl Cyclopropane carboxylate	3 Metric Ton/Day
22.	Atrazine	Atrazine 38 SC	Cyanuric chloride Isopropylamine Ethamine	2 Metric Ton/Day

23.	Lambda cyhalothrin	25g/Ltr(2.75%W/W)	Polyalkylene glycol ether Dodecyl benzene sulphonic acid sodium salt Polymeric fatty ester Sodium lignosulphonate Hydrated aluminum magnesium silicate Tetra sodium pyrophosphate Xanthan gum Titanium dioxide	300 Liter/Day
24.	Buprofezin	Buprofzine 25% WP	Buprofezin powder phenyl carbamyl chlorobenzene	5 Metric Ton/Day

Formulation Process of Macro Plus (liquid) N,P,K:

The pellets of nitrogen, phosphorus and potassium will be mixed in a blender. 2nd step involves pellet making by using pelletizer/granulator. The pellets will then be packed into bags.

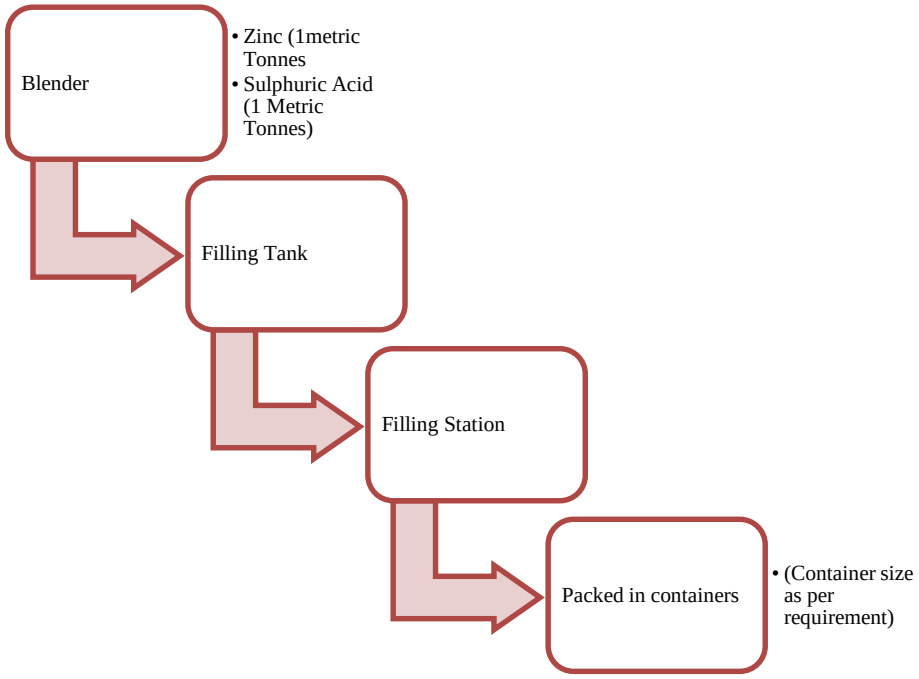
Mass Balance:



Formulation Process of Zinc:

There will be no such process involved only mixing of raw materials will take place. It will produce by mixing sulphuric acid, water and zinc in a blender, blender will have a structure just like a well in which a lever will be attached as a mixer.

Mass Balance:



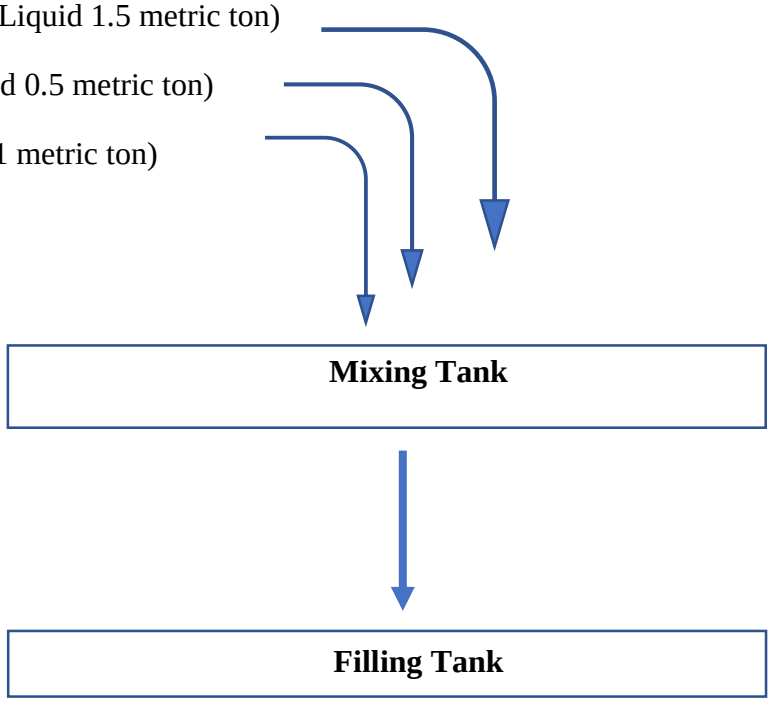
Formulation Process for Humic Acid (Liquid):

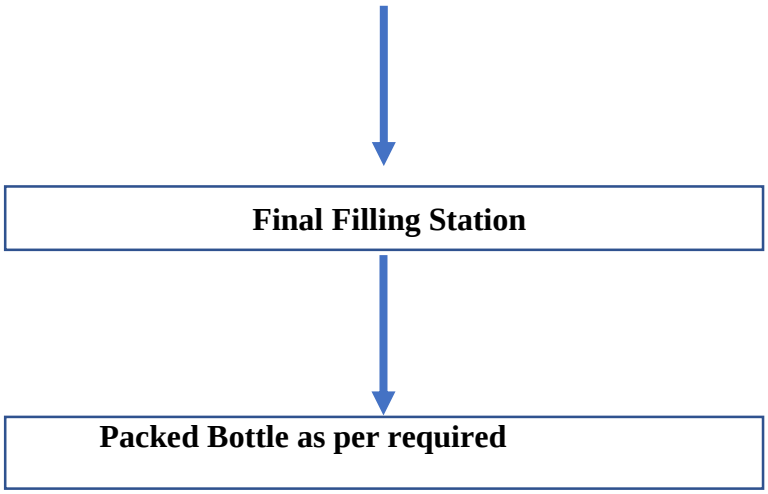
Humic acid liquid fertilizer which is prepared by the following components in parts by weight: 10-20 parts of fulvic acid potassium, 45-55 parts of major elements (N,P,K), 15-25 parts of trace elements (Zn, Mn, Fe). All three elements will be mixed with the ratio 20:55:25 in a mixing tank by adding them manually in to blender, from where they will be moved to a filling tank which is connected to blender with pipes. Now the humic acid is ready to be filled in small bottles as per requirements.

Macro Nutrients (Liquid 1.5 metric ton)

FulcivAcid (Liquid 0.5 metric ton)

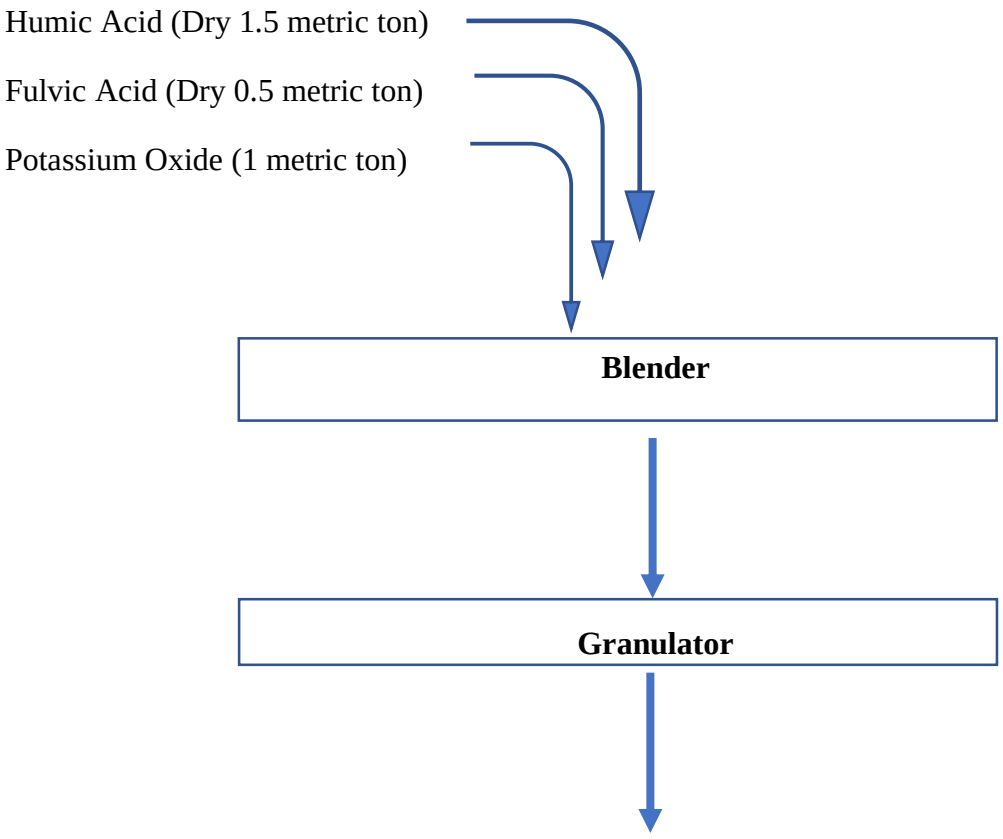
Micro Nutrients (1 metric ton)

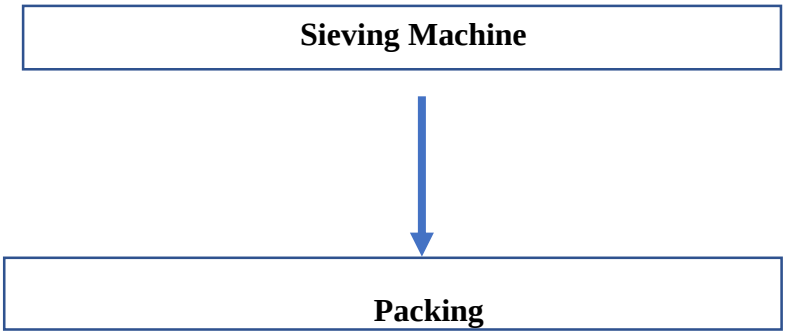




Formulation Process for Humic Acid (Granular):

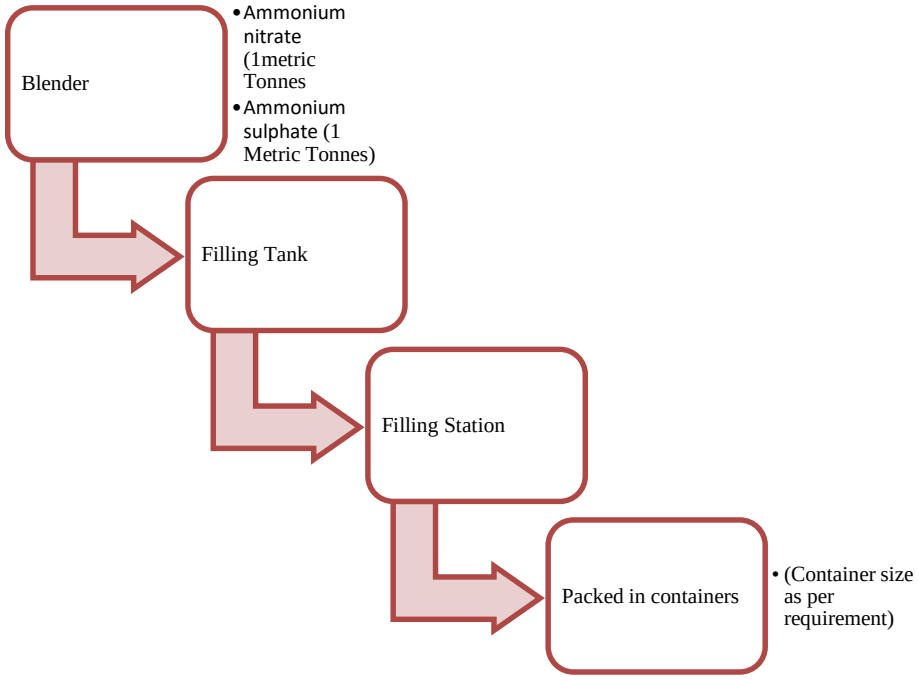
The potassium humate compound fertilizer is prepared by mixing humic acid (dry basis), fulvic acid (dry basis) and potassium oxide (K_2O). The potassium humate compound fertilizer will be granulated by using an electric drum physical agglomeration method. In which all three raw material with ratio 40:15:35 will be first added manually in a mixing drum (blender) from where it will be transfer to a granulator where it will be converted in to granules of about 2-4mm in size at last they will be transfer to a sieving machine to get ones ready to pack.





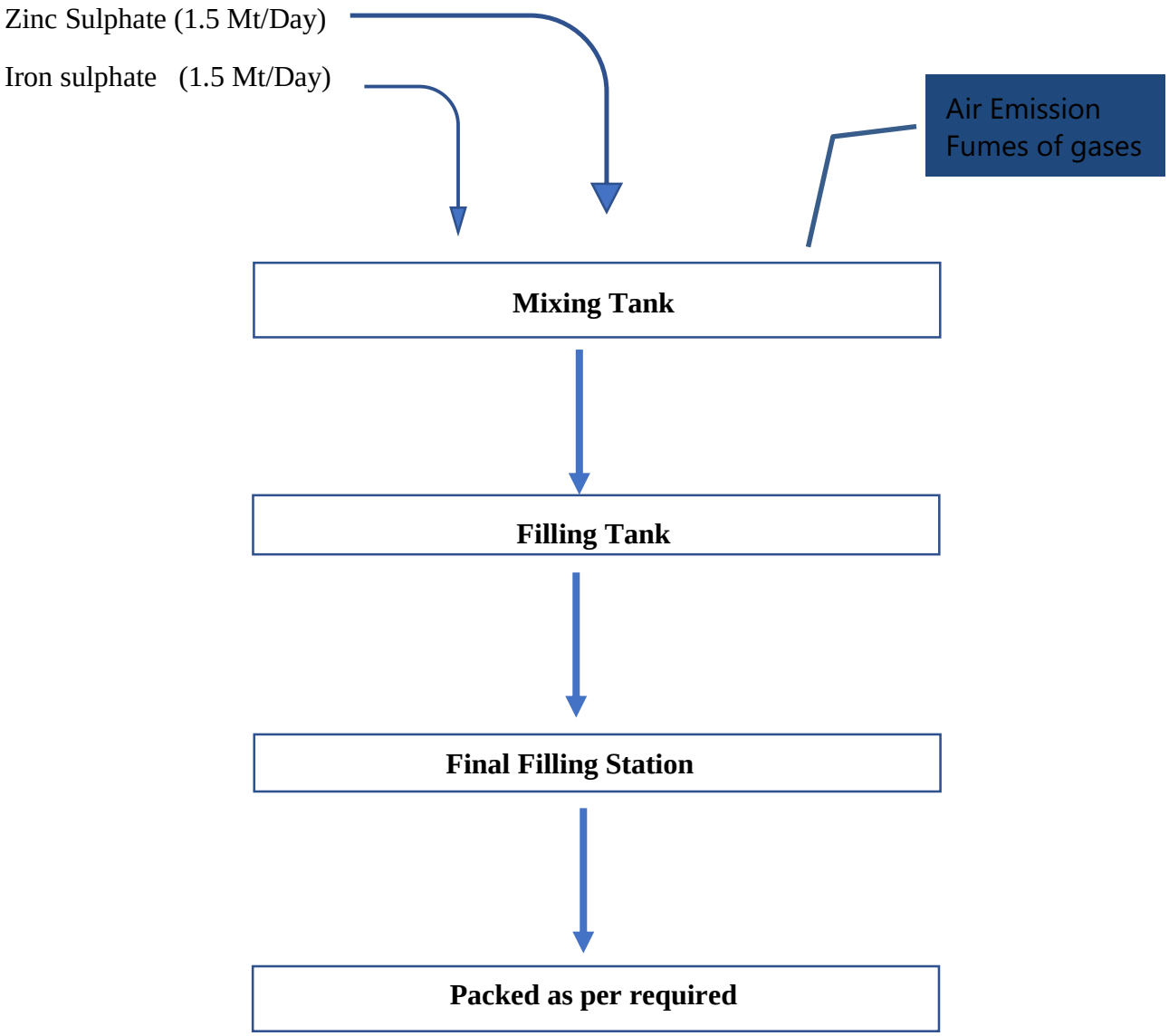
Formulation Process for NS 20

There will be no such process involved only mixing of raw materials will take place. It will produce by mixing Ammonium nitrate and Ammonium sulphate in a blender, blender will have a structure just like a well in which a lever will be attached as a mixer.



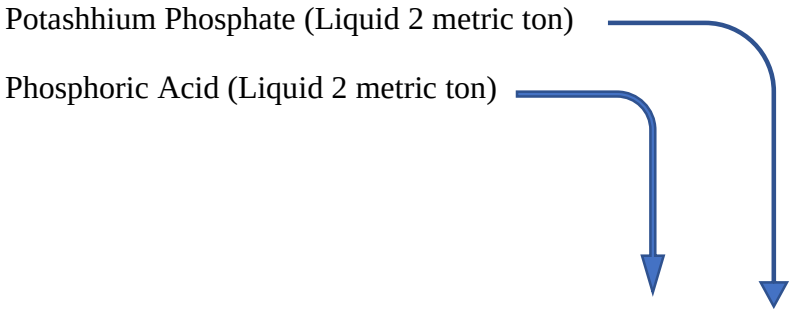
Formulation Process for Priority 10G

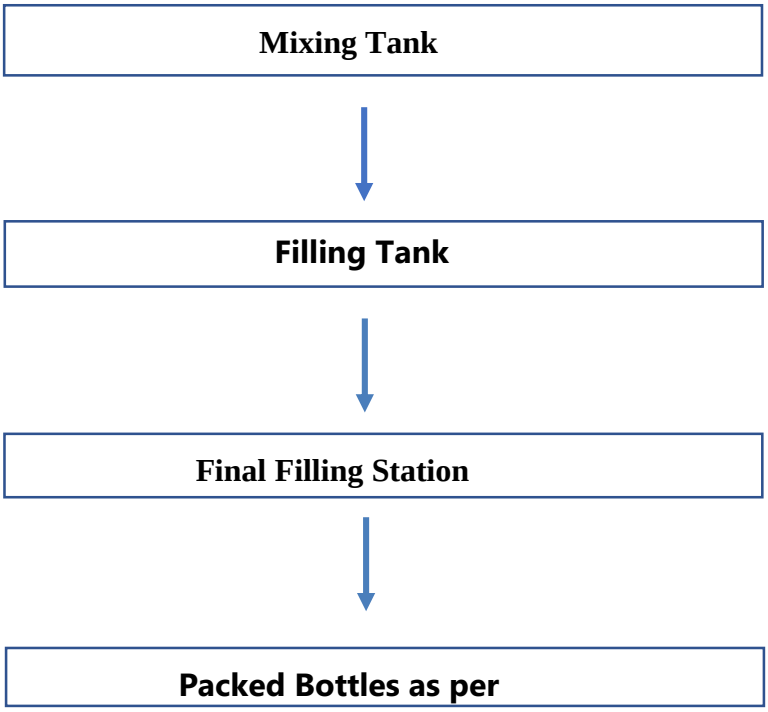
There will be no such process involved only mixing of raw materials will take place. It will produce by mixing Zinc sulphate and iron sulphate in a blender, blender will have a structure just like a well in which a lever will be attached as a mixer.



Formulation Process for Potash:

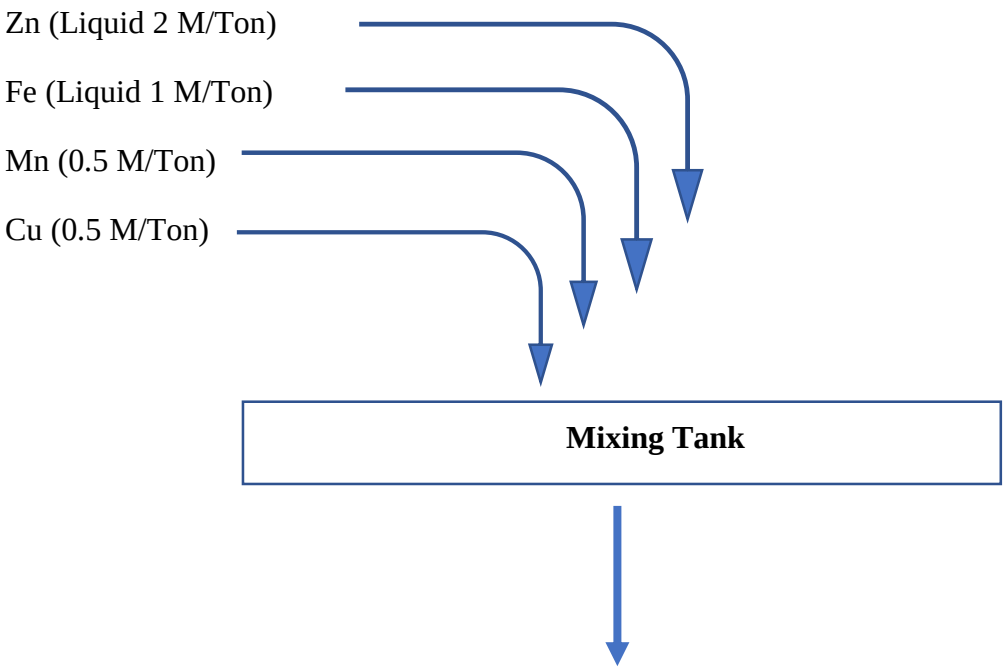
Potash will be liquid fertilizer. There will be no such process involved only mixing of raw materials will take place. It will produce by mixing Phosphoric acid and Potassium phosphate in a blender.

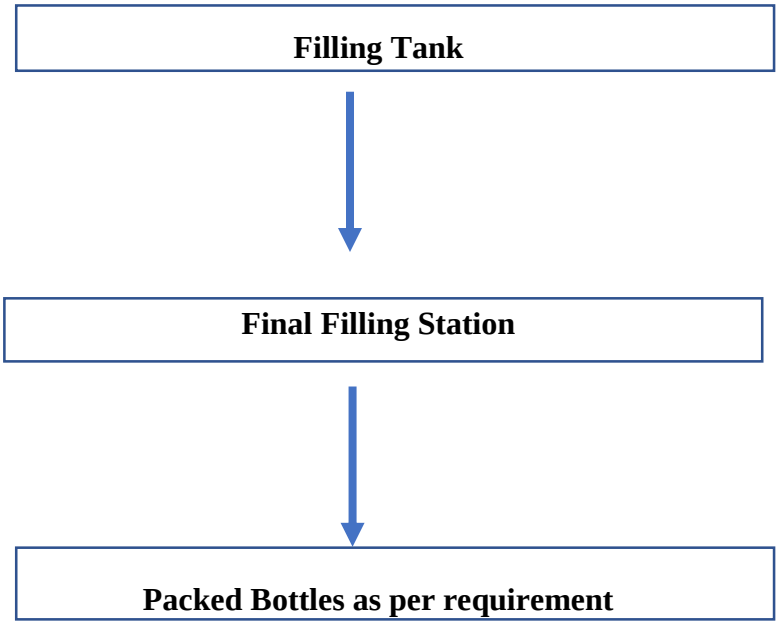




Formulation Process for Growth Plus:

Growth Plus will be a liquid fertilizer which is prepared by the following components in parts by weight: 6% of zinc, 2% of Fe, 1% of Mn and 1% of Cu. All the elements will be mixed in a mixing tank by adding them manually in to blender, from where they will be moved to a filling tank which is connected to blender with pipes. Now the formulated Gulistan is ready to be filled in small bottles as per requirements.

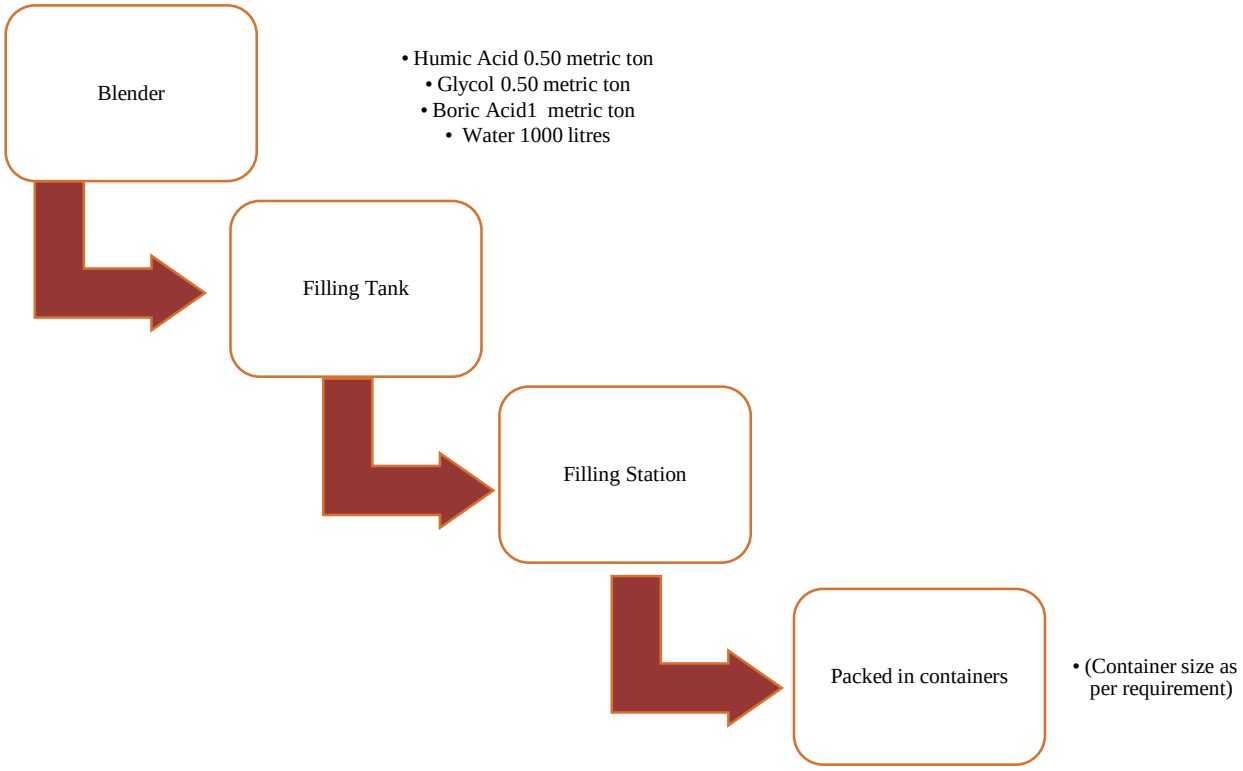




Formulation of Liquid Boron:

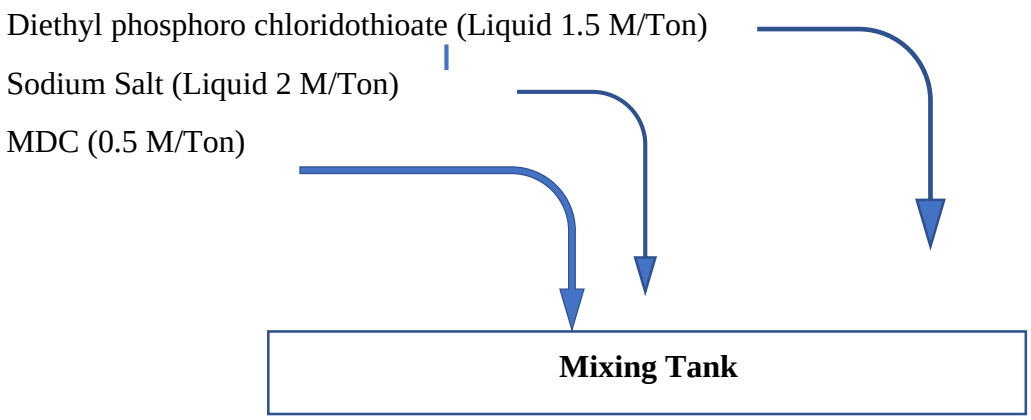
Said method includes the following steps: mixing water, 95% glycol, humic acid solution and boric acid according to a certain mixing ratio, continuously stirring several hours at a certain temperature, standing still and cooling to normal temperature, taking out the stirred material so as to obtain the invented liquid boron fertilizer.

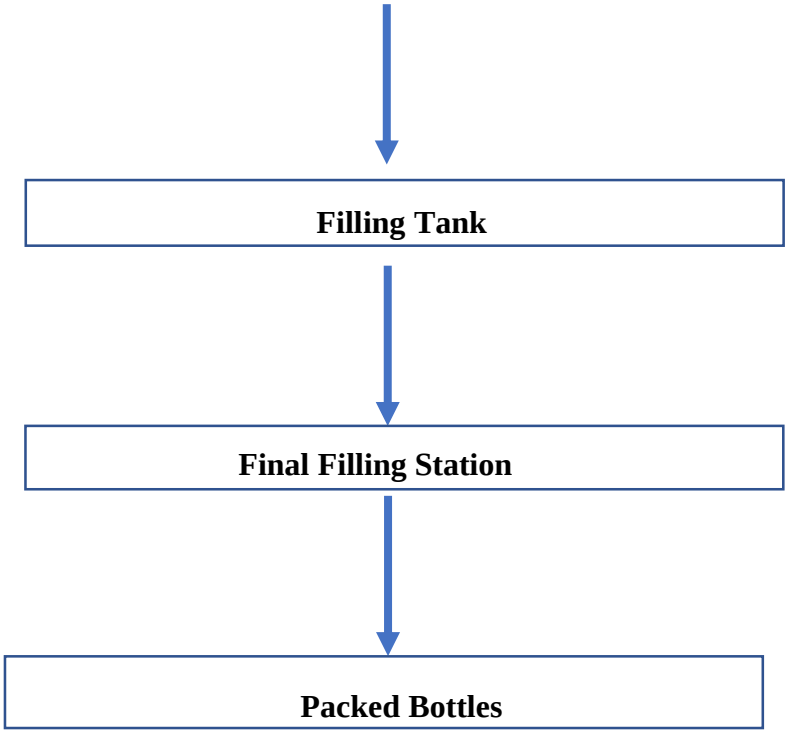
Mass Balance:



Formulation Process for Chlorpyrifos:

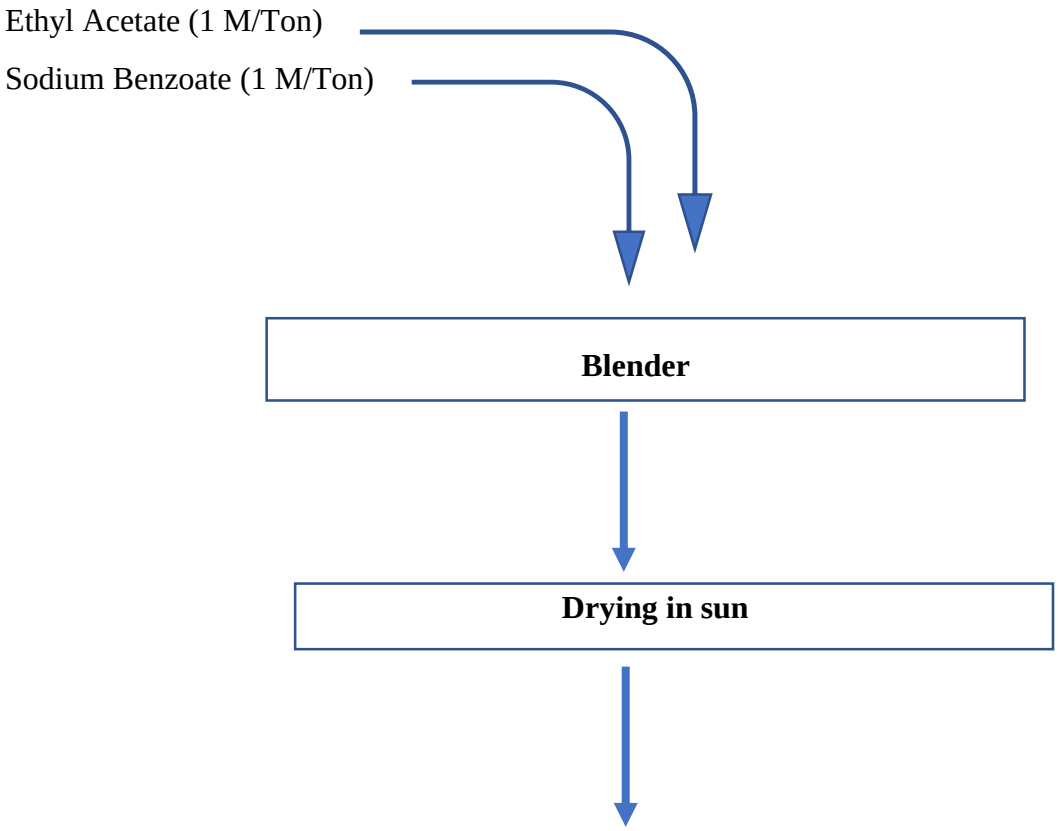
Diethyl phosphoro chloridothioate is charged in the reactor along with sodium salt of 3,5,6-Trichloropyridin-2-ol. MDC is used as a solvent. Reaction is allowed to take place in presence of phase transfer catalyst at about 30 – 35°C.

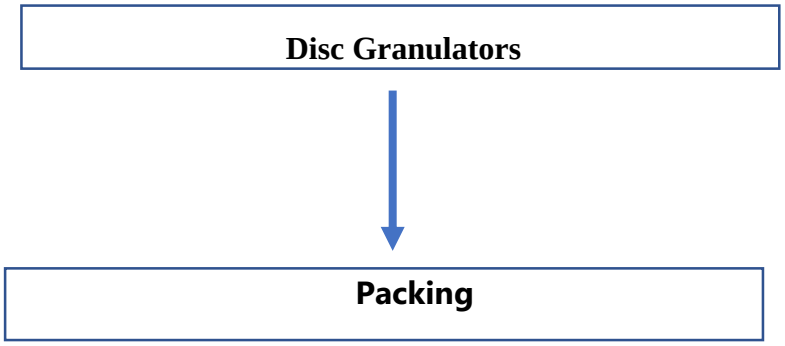




Formulation Process for Emamectin:

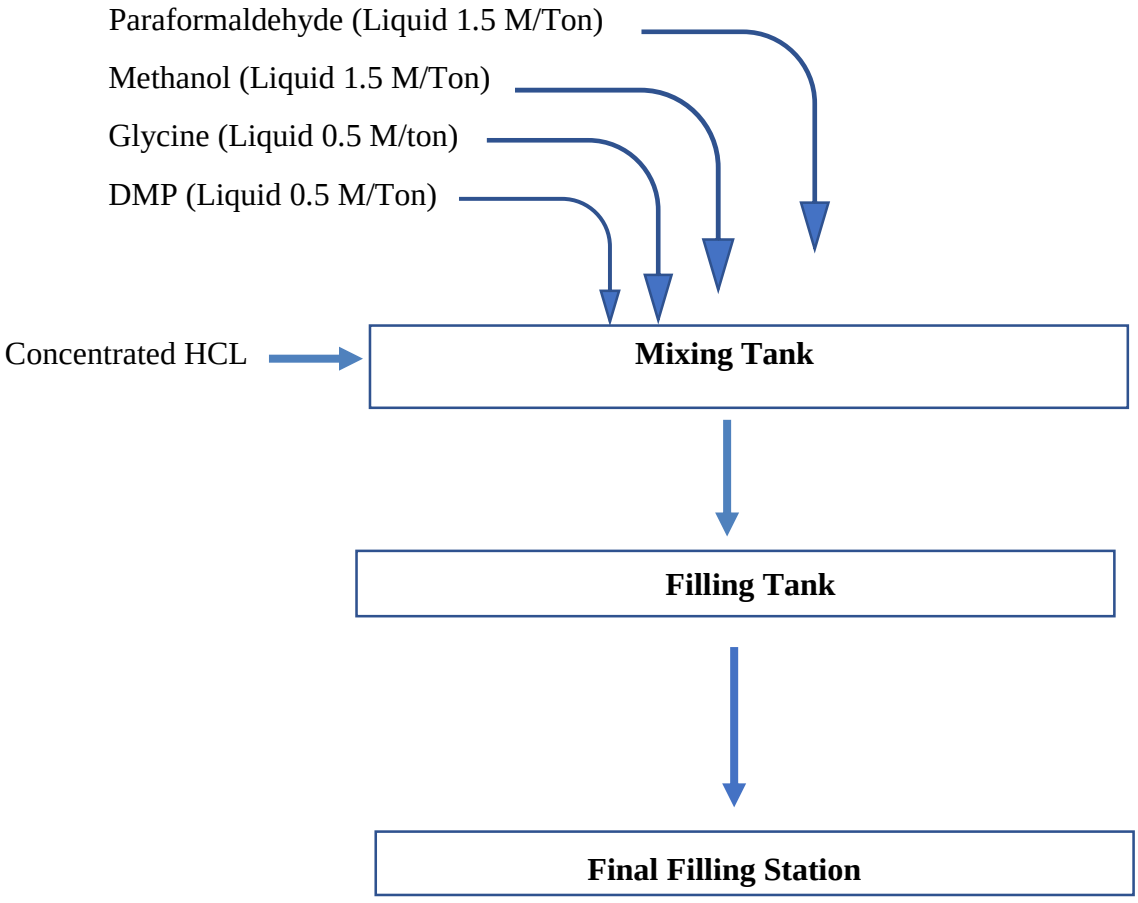
Ethyl acetate will be mixed with sodium benzoate in a mixing tank. After stirring evenly, the mixture will be dried in sunlight to get granules of emamectin benzoate.

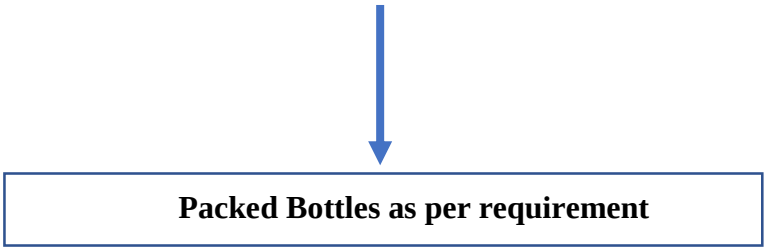




Formulation Process for Glyphosate:

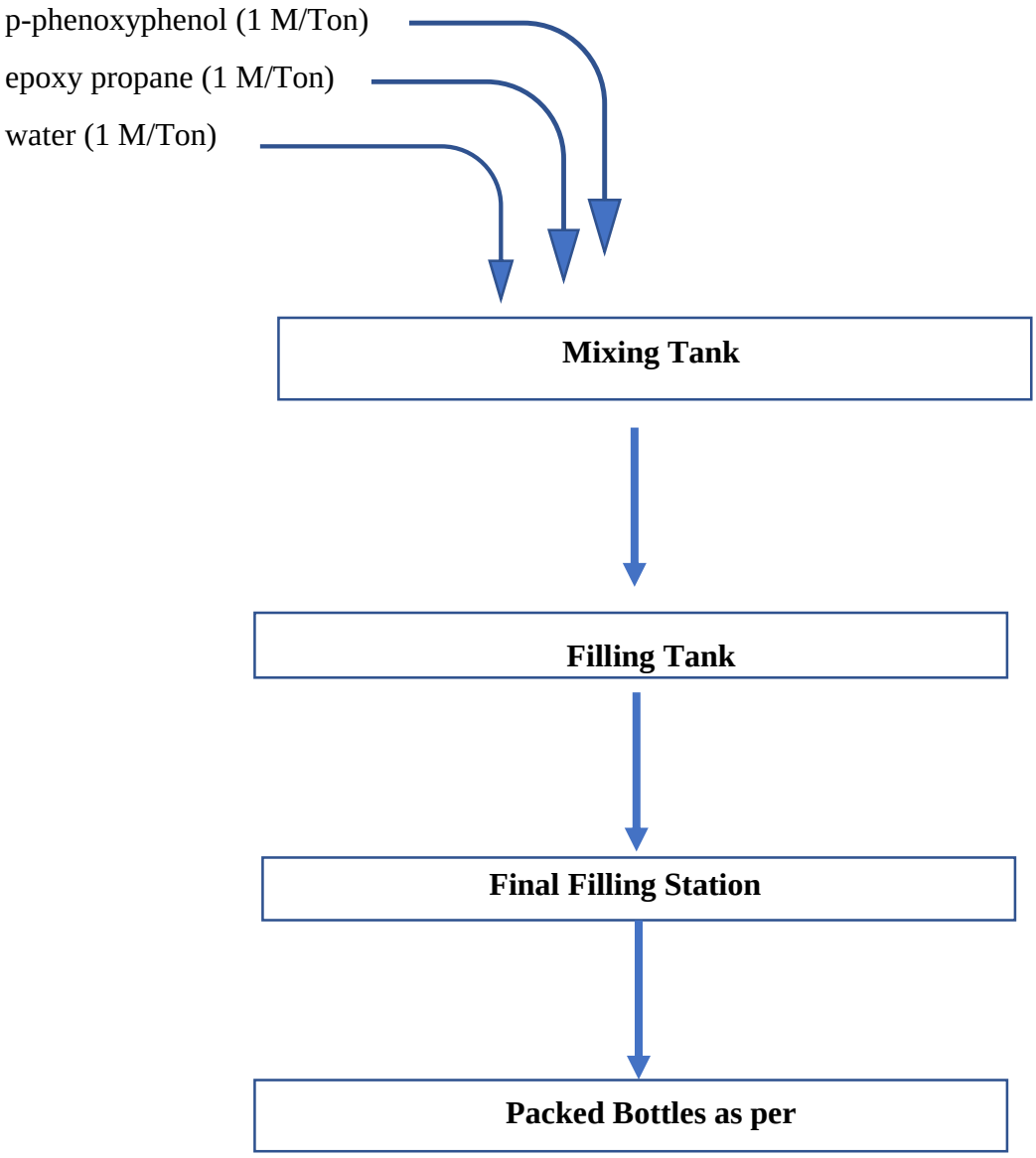
For the aforesaid product paraformaldehyde undergoes depolymerization catalyzed by triethylamine in anhydrous methanol. Successively it reacts with glycine and DMP, then concentrated aqueous hydrochloric acid (31%) will be added to the solution obtained above, thus the target product glyphosate will be formed. All steps involved in the manufacturing Glyphosate are manual, chemicals will be added to the tank by man power in controlled conditions with proper handling of chemicals and care.





Formulation Process for pyriproxyfen

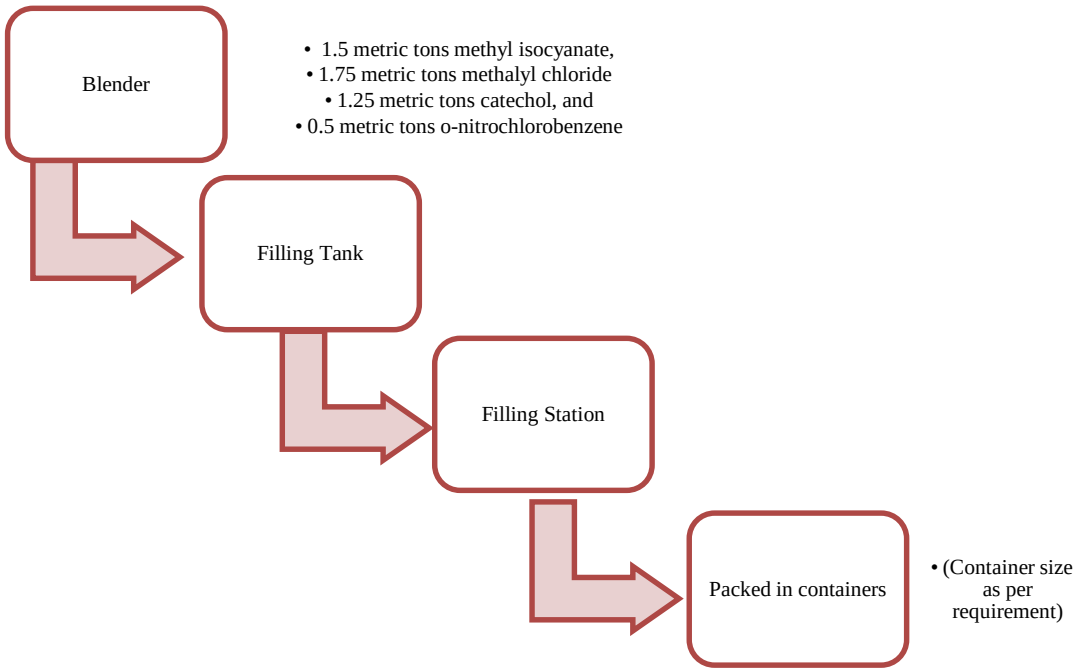
A process for preparing pyriproxyfen includes reaction between p-phenoxyphenol and epoxy propane in water under catalysis of alkaline.



Formulation process of Monomehypo

The raw materials are mixed in blender in equal quantities until a homogenous mixture is obtained. The final product is transferred to filling station. The last step is packing of product in containers of different sizes as required.

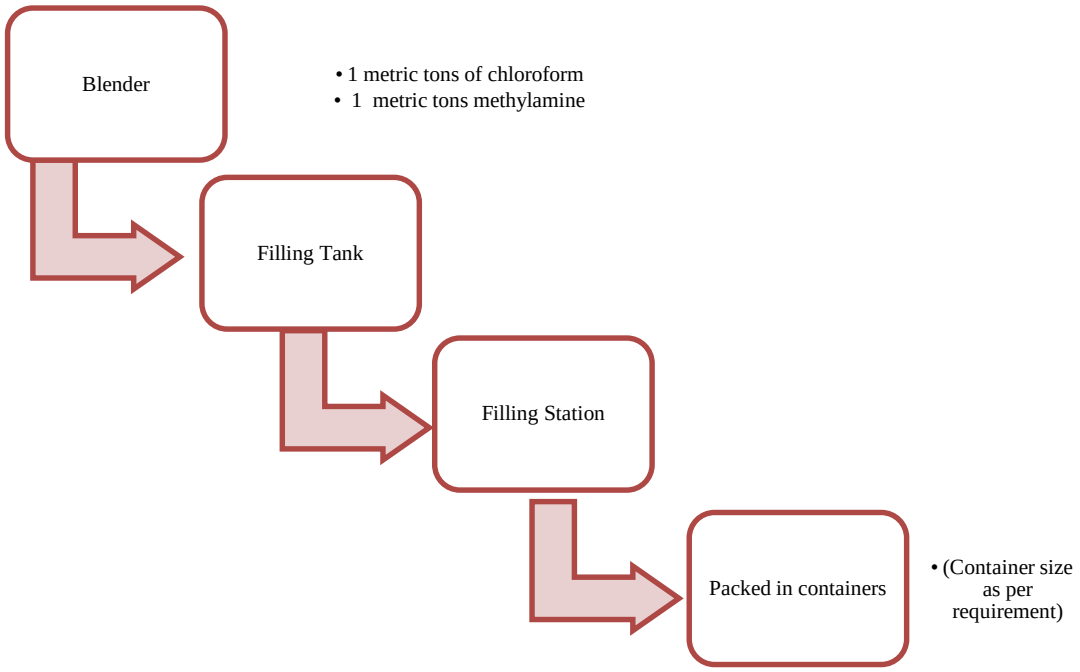
Mass Balance of Monomehypo:



Formulation process of Acetamiprid:

Chloroform is added to mixing tank and methylamine is introduced in it. The mixing takes place in the tank. The mixture will be stirred in blender until a homogenous mixture is obtained. The mixture will then be transferred to filling station to be packed into containers.

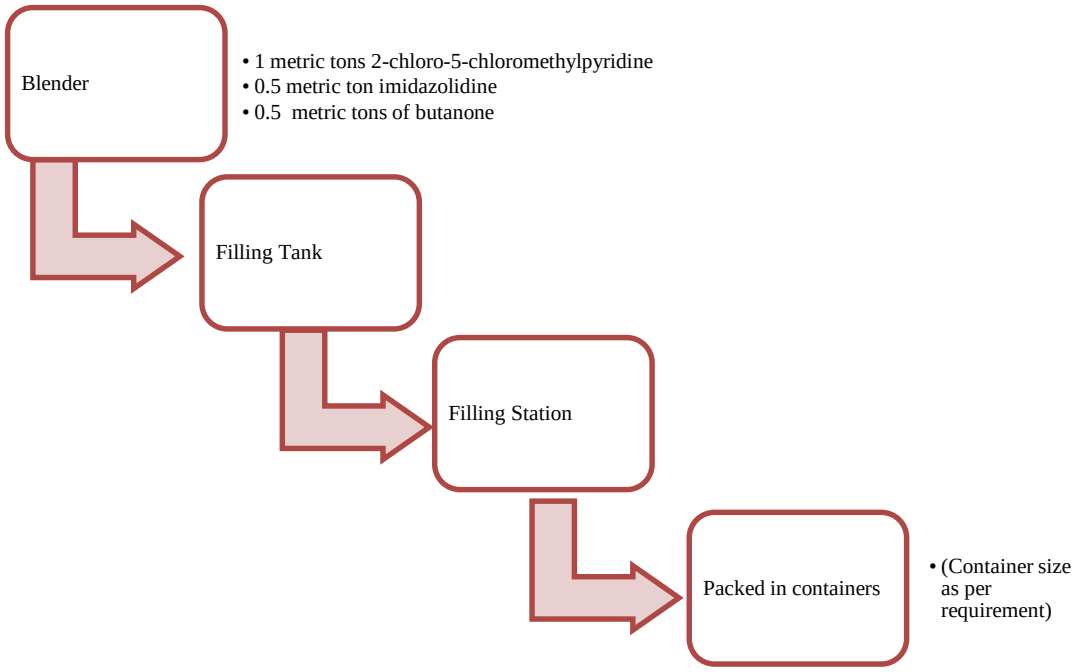
Mass Balance:



Formulation of Imidacloprid:

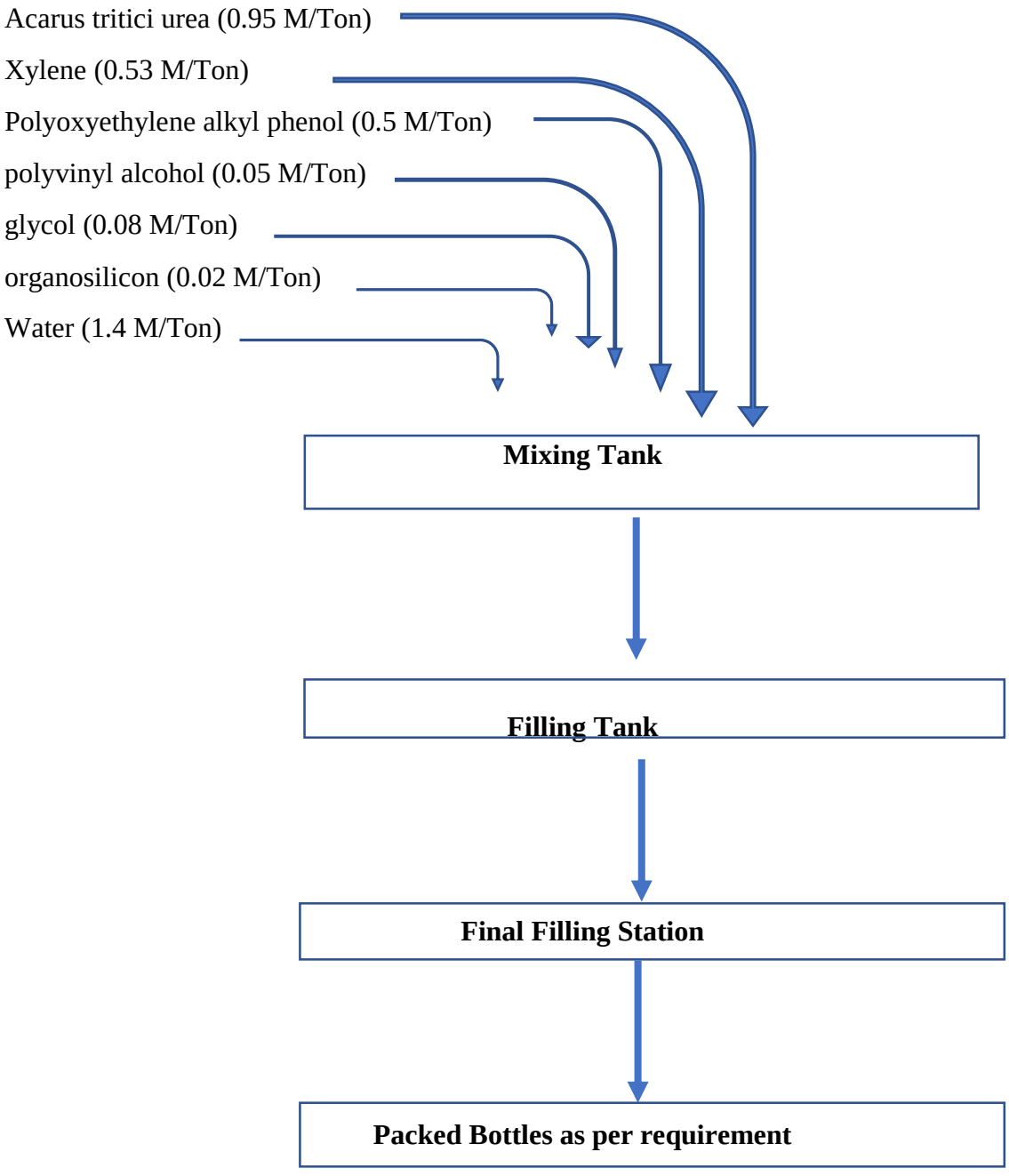
The imidacloprid is mainly obtained by synthesizing 2-chloro-5-chloromethylpyridine and imidazolidine at the temperature of between 40 and 50°C under weakly alkaline conditions by taking butanone as a solvent. The raw materials are mixed in blender for several hours and then transferred to filling tank. Final product is packed at filling station in containers as per requirement.

Mass Balance:



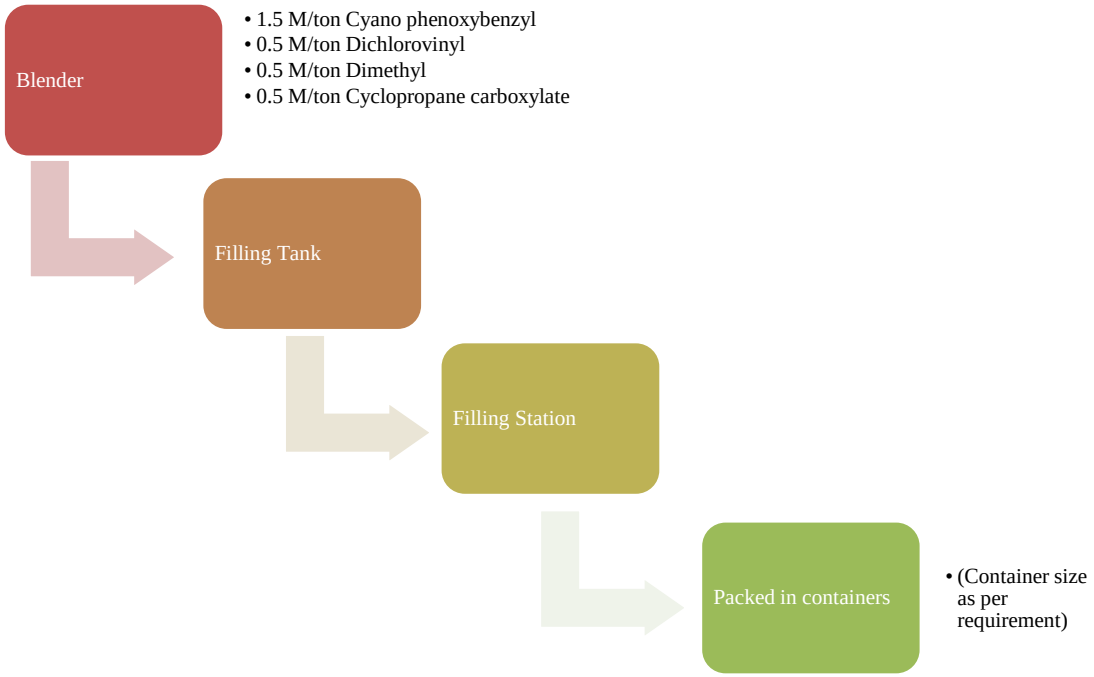
Formulation Process for Lufenuron:

Acarus tritici urea, solvent xylene, emulsifier polyoxyethylene alkyl phenol, thickener polyvinyl alcohol, antifreeze glycol, defoamer organosilicon and water will be blended together to prepare liquid of milky, be 5.08% lufenuron aqueous emulsion.



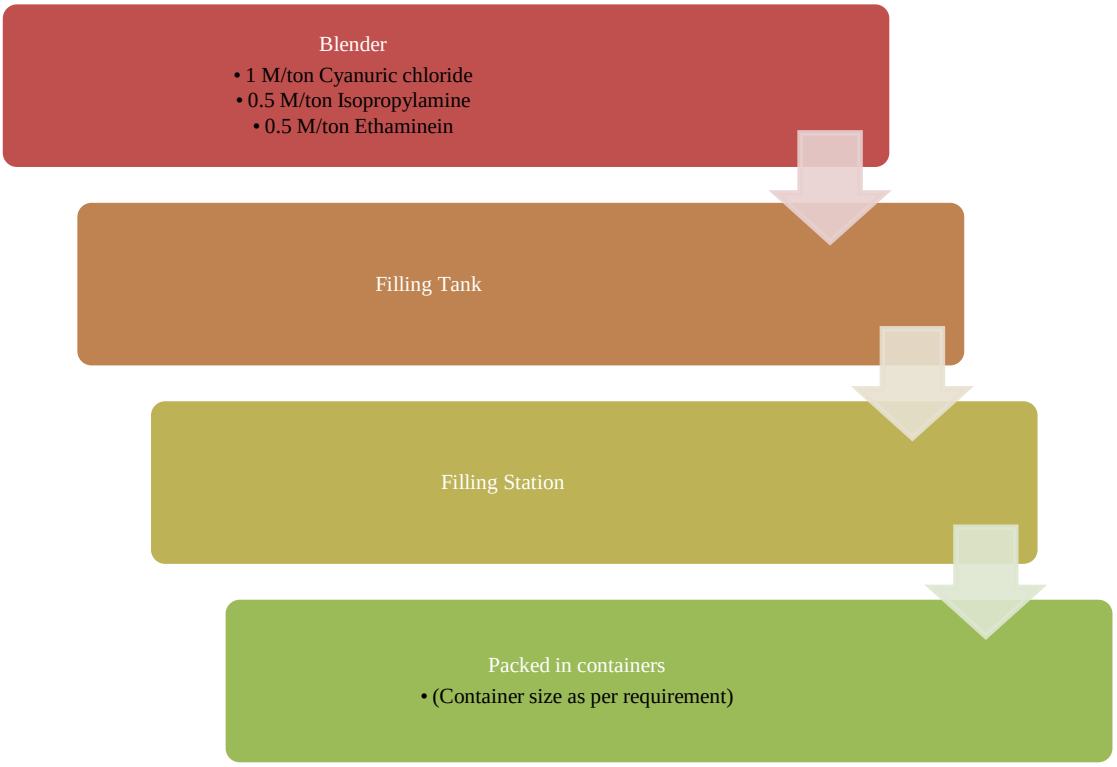
Formulation process of Cypermethrin:

Cyano phenoxybenzyl, Dichlorovinyl, Dimethyl and Cyclopropane carboxylate will be blended together in a mixing tank to get the aforesaid product.



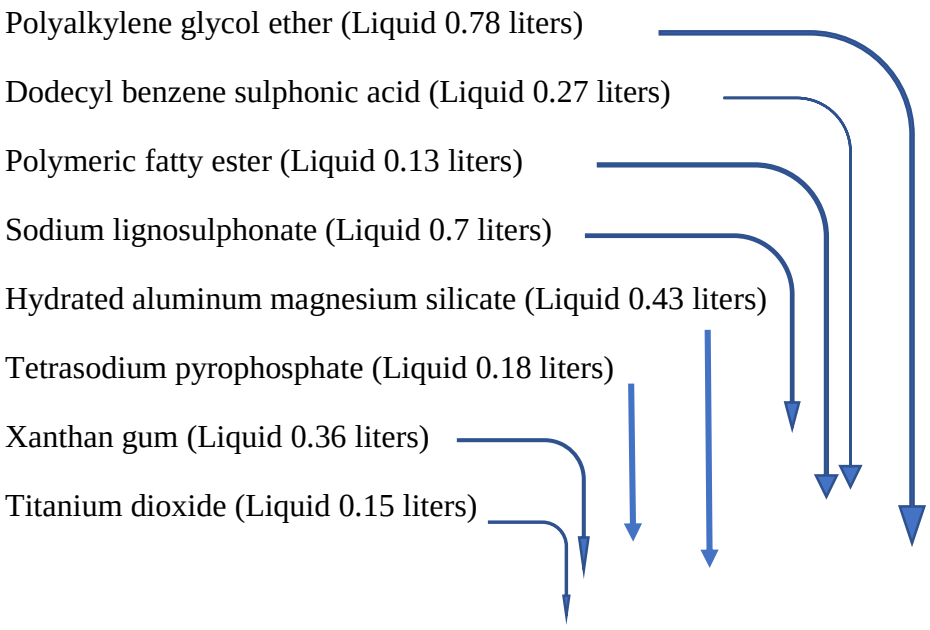
Formulation process of Atrazine

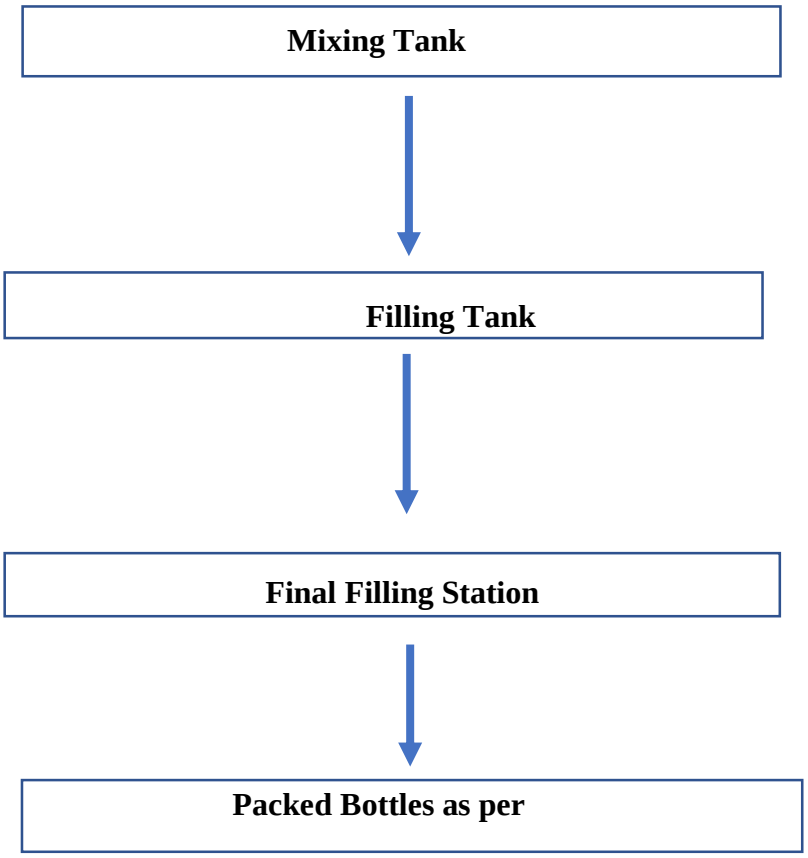
Atrazine will be prepared by blending Cyanuric chloride, Isopropylamine and Ethaminein in a mixing tank, all three chemicals will be added manually in mixing tank where they will be blended together and moved to filling tank.



Manufacturing Process for Lambda-Cyhalothrin:

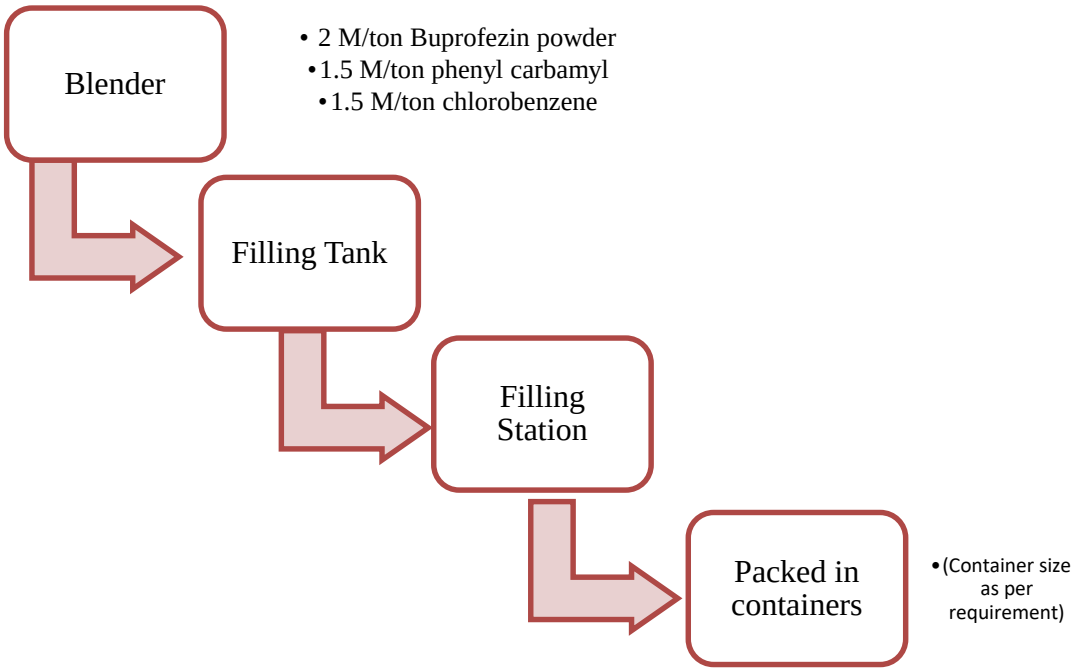
Mixing of Polyalkylene glycol ether: 0.26% w/w, Dodecyl benzene sulphonic acid sodium salt: 0.09% w/w, Polymeric fatty ester: 0.43% w/w, Sodium lignosulphonate: 0.22% w/w, Hydrated aluminum magnesium silicate: 1.44% w/w, Tetrasodium pyrophosphate: 0.06% w/w, Xanthan gum: 0.11% w/w and Titanium dioxide: 0.51% w/w will be blended in a blending tank to prepare Lambda-Cyhalothrin.





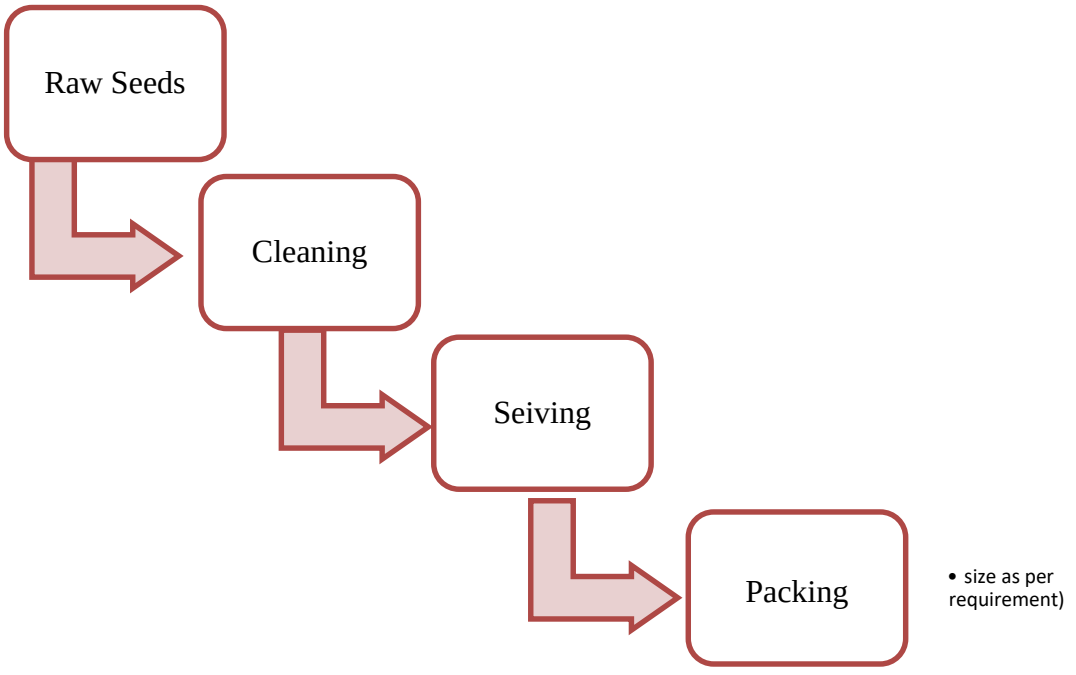
Formulation process of Buprofezin:

The raw materials are mixed in blender in equal quantities until a homogenous mixture is obtained. The final product is transferred to filling station. The last step is packing of product in containers of different sizes as required



Seed Grading

Seeds will be purchase from the market. IST step involves cleaning of seeds. Then transferred to siever Final product will be packed as required size



3.14 Relocation and Rehabilitation Plan

There exists no human settlement 1163 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 proponent. So, no restoration and rehabilitation is 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 surveying the Faisalabad City. The secondary data regarding physical parameters (topography, geology, seismology, and climatology) was obtained by visiting relevant departments and their official websites. The biological parameters (flora and fauna) were also studied. The vegetation was studied by preparing a floristic list based on visual observation. The species were recorded with reference to their historical 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 socio-economic aspects were studied and analyzed by conducting village profile and household surveys.

4.2.1 Social Survey

The purpose of social survey was to record the present condition of the people living in the study area and to assess the expected beneficial impacts due to the installation of the pharmaceutical industry in Faisalabad City which can have an impact on the life of locals, subsistence systems and socio-cultural conditions of the area. Prior to conducting the field surveys, the following steps were taken:

- Clear boundaries of the project area were identified
- The sampling procedure was selected for the social survey in order to draw a representative sample size of the target population and households
- Developed the tools for data collection i.e. questionnaires for the stakeholders' consultation

4.2.2 Sampling Design

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

4.2.3 Data Editing and Analysis

The filled questionnaires and recorded information were edited 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 after the editing of socio-economic information. Analysis of the data and preparation of conclusions in the minimum possible time was done by using statistical techniques of data analysis.

4.3 Baseline Conditions

Baseline conditions refer to the existing physical, environmental and socio-economic status of the study and project area was collected and analyzed. On the basis of baseline information, the project interventions are assessed and mitigation measures are proposed accordingly. The baseline information also helps to indicate the site specific issues to be monitored during the construction of proposed project. The baseline data (physical, biological and socio-economic parameters) related to the project area is described below. Information provided is based on primary and secondary data collected by site visits, desk studies and consultation with locals respectively.

4.4 Physical Environment

This section gives the overview of the physiology, topology, geology, seismology and meteorological conditions of whole city whereas, it gives detailed information about the surface water, ground water and air quality of the control room building. The detail of each parameter is discussed in sub-sections 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, Central Makran, Makran Coastal and Kirthar Ranges	Mainly in Baluchistan, also parts of Sindh and KPK	Between 1,200 to 3,000 m

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

4.4.1 Physiography

Faisalabad is the 3rd largest city of Pakistan and is situated along the banks of River Chenab. The city of Faisalabad is bound by Chiniot and Hafizabad districts on the North and by Sahiwal and Toba Tek Singh on the South, while on East it is surrounded by Nankana Sahib and to the west Jhang is located. On the Northern side Sheikhupura and Lahore are also present and Okara occupies its South-Eastern side.

4.4.2 Topography and Geology

Faisalabad stands in the rolling flat plains of Northeast Punjab, between longitude 73.12600204 East and latitude 31.48099009 north. The City covers an area of approximately 1,230 km^2, while the district covers more than 16,000 km^2. The soil of Faisalabad comprises alluvial deposits mixed with loess having calcareous characteristics, making it very fertile. The topography of the project varies but it is mostly flat.

4.4.3 Seismicity

According to Seismic Zoning of Pakistan, the project area lies in Zone 1 of Modified Mericalli (M.M.) scale and represents minor damage in the past due to the Earthquake. Distant earthquakes may cause damage to structures with fundamental period greater than 1.0 second, corresponds to intensity V and VI of the M.M scale (National Disaster Management Authority). The seismic zoning of Pakistan is given below in Figure 6 below:

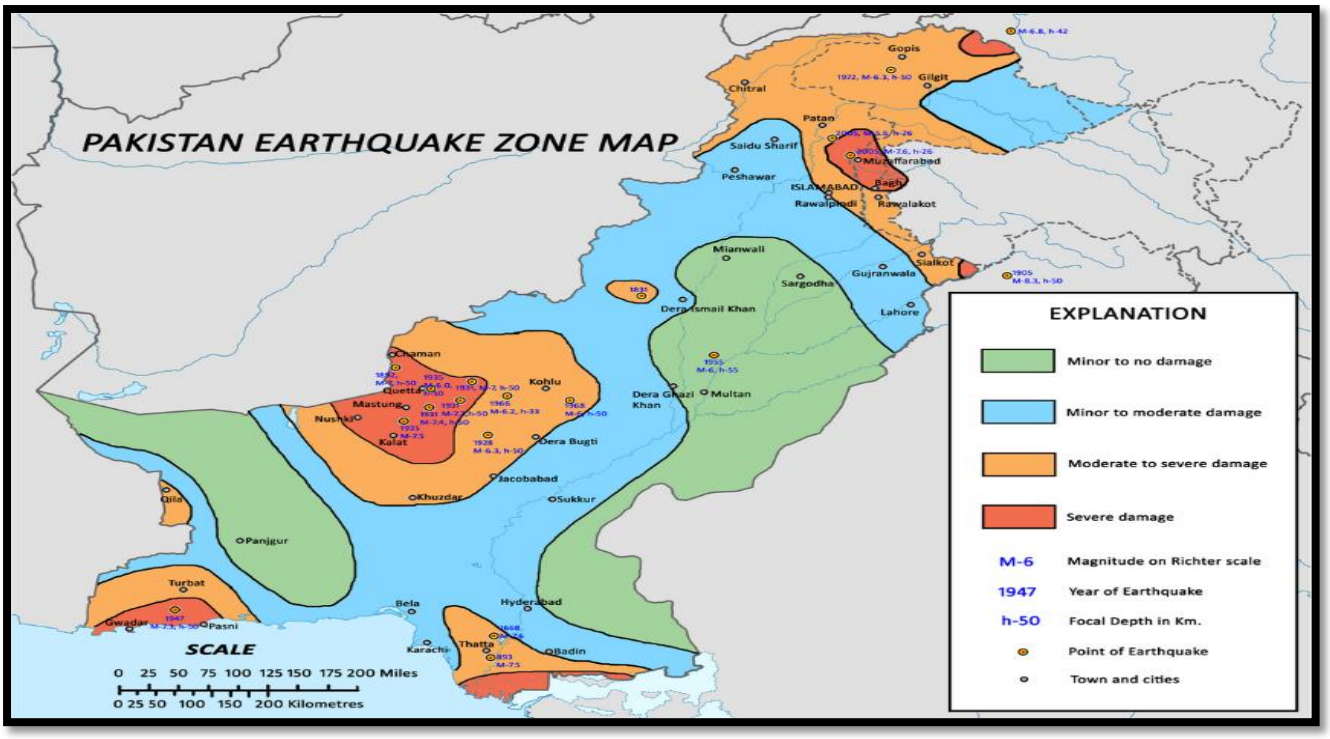


Figure 6: Seismic Zoning of Pakistan

4.4.4 Agriculture and Cropping Pattern

In district Faisalabad, crops that are cropped during various seasons includes; wheat, fodder, sugar-cane, rice and potatoes.

4.4.5 Meteorology

Due to its high evaporation rate, Faisalabad features hot desert-like climatic conditions according to Köppen-Geiger classification. The climate of the district can see extremes, with a summer maximum temperature 44°C and a winter temperature of 4.0°C The mean maximum and minimum temperature in summer are 43.5°C and 18.0°C respectively. In winter it peaks at around 19.4°C and 4.1°C respectively. The summer season starts from April and continues till October. May, June and July are the hottest months. The winter season starts from November and continues till March. December, January and February are the coldest months. "The bulk of monsoon precipitation occurs in July and August, with monthly averages of 115.0 mm and 89.8 mm respectively. Minimum rainfall occurs in the month of November which is 3.0 mm" (PMD).

Table 9 Mean Temperature and Precipitation

Month	Mean Temperature		Precipitation (mm)	Relative Humidity (%)
	Maximum	Minimum		
January	19.4	4.1	11.5	66.0
February	21.9	7.1	20.1	61.2
March	26.7	12.3	25.7	58.2
April	33.5	18.0	16.9	46.5
May	38.4	22.7	16.1	37.5
June	43.5	31.8	27.9	1.7
July	42.1	32.4	115.0	61.5
August	38.1	26.6	89.8	65.9
September	35.7	23.7	28.6	59.9
October	33.0	17.1	3.8	54.7
November	27.2	10.3	3.0	62.7
December	21.4	5.1	8.6	66.5
Annual (Average)	**31.2**	**17.6**	**372.3**	**56.6**

4.4.6 Surface Water Quality

Surface water quality will not be damaged due to construction of the project.

4.5 Biological Environment

The biological environment consists of the flora and fauna present at the study as well as project area. The detail of each parameter is given below.

4.5.1 Flora

Currently, the remnants of the *Tropical Throne Forest* are present at some regions of the City. In Faisalabad the green zones are very less, native species are present but in a scares condition. The ornamental plants will be planted at project site.

4.5.2 Fauna

The fauna consists of mammals, birds, reptiles and amphibians. Currently, the project area is having few species of the fauna such as; Jungle Cat (*Felis chaus*),

Field Mouse (*Mus musculus*), and Soft Furred Rat (*Millardia mettada*). These species are considered as the pests present in the area due to the agricultural activities. Reptiles mainly includes; snake and Tree Lizard (*Calotes versicolor*). Only amphibian reported in the City is Bullfrog (*Hoplobatrachus*). The Birds species includes; Common Crow (*Corvus splendens*), House Sparrow (*Passer domesticus*) and King Crow (*Passer domesticus*).

4.5.3 Endangered Species

There is no floral or faunal species inhabiting the project area that are included in the Red Data Book of IUCN. The populations of birds are reported to be reduced over time due to excessive pesticide sprays in agricultural crops and loss of habitat.

4.5.4 Archaeological Sites or Wetlands

It is envisaged that no building of archaeological, cultural and historical importance is expected to be damaged due to the construction of the project as the project location is in industrial estate. Moreover, there is no wetland or surface water body reported to be affected due to the construction of the proposed project.

4.6 Environmental Monitoring Through Laboratory

M/S SEAL who is EPA certified laboratory, was engaged to carry out environmental monitoring of ambient air quality, ground water quality, noise level and particulate matter concentration in the project area. Laboratory analysis reports of ambient air quality, ambient noise and surface water analysis results are annexed of this EIA Report and the detail information related to the testing results is given below:

4.6.1 Ambient Air Quality

The atmosphere of the Faisalabad City is considered to be un-healthy due to the large number of the industries. The cause of the visual pollution is dust and smoke being generated from industrial activities, brick-kilns and construction related activities. Another reasons for pollution is vehicular movement, existing poor road conditions and passageways huge quantity of suspended particulate matters is released into the environment. It is envisaged that the project will not cause any pollution problem in the area.

The primary source of air pollution at the project sites is the vehicular emissions, industries and the key pollutants likely to be found at project proposed locations are Carbon Monoxide (CO), Oxides of Nitrogen (NOx), Sulphur Dioxide (SO_x), and Particulate Matter (PM). In order to determine the air quality of the area, Laboratory had the requisite air sampling device and expertise for collection of samples. The results of the ambient air quality monitoring showed that all the parameters are within the PEQS limits.

4.6.2 Noise

Noise level of the project area was monitored at project site using digital sound level meter and are attached.

4.6.3 Water Resource

Ground water is the principal source of municipal water supply in Faisalabad City. The City's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area.

4.7 Socio-Economic Environment

Faisalabad is the third-most-populous city in Pakistan, and the second-largest in the eastern province of Punjab. Historically one of the first planned cities within British India, it has long since developed into a cosmopolitan metropolis. The total area of Faisalabad District is 5,856 km^2 while the area controlled by the Faisalabad Development Authority (FDA) is 1,280 km^2 Faisalabad has grown to become a major industrial and distribution center because of its central location in the region and connecting roads, rails, and air transportation. It has been referred to as the "Manchester of Pakistan". Faisalabad's GDP in 2013 was $43 billion (USD). The average annual GDP of Faisalabad is $20.5 billion calculated by averaging GDP projections from 2015 to 2025.

4.7.1 Population

According to census 2017 total population of District Faisalabad is 7873910. In Total population males are 4034515, female is 3838854 and Transgender are 541. An average annual growth rate is 1.97 from 1998 to 2017. Other features are shown below:

Table 10: Demographic Profile of Faisalabad

Sr#	Parameters	Rural	Urban	Total
1	Population	4113582	3760328	7873910
2	Male	2102745	1931770	4034515

3	Female	2010623	1828231	3838854
4	Transgender	214	327	541
5	Household	631434	593832	1225266

4.7.2 Religious Setup

Islam is the common heritage in the region with a 97.22% Muslim majority according to the 1998 Pakistan census report and 2001 population data sheet. Islamic influences are evident in the fundamental values of various inhabitants including; cultural traditions, marriage, education, ceremonies and policies with may reflect stark differences in rural villages as compared to urban areas.

4.7.3 Industrial Setup

Faisalabad contributes over 5% toward Pakistan's annual GDP; therefore, it is often referred to as the "Manchester of Pakistan". Faisalabad's average annual GDP is $20.55 billion (USD) of which 21% comes from agriculture. The surrounding countryside, irrigated by the lower Chenab River, produces agricultural commodities such as cotton, rice, sugarcane, wheat, fruit and vegetables. It is a producer of industrial goods and textile manufacturing including cotton and silk textiles, super phosphates, hosiery, dyes, industrial chemicals, clothing, pulp and paper, printing, agricultural equipment, ghee (clarified butter), and beverages.

The Faisalabad Chamber of Commerce and Industry monitors industrial activity in the city and reports their findings to the Federation of Pakistan Chamber of Commerce and Industry and provincial government. The city has a major dry ports and international airport. Faisalabad is recognized as the center of the textile industry in Pakistan, contributing to half of Pakistan’s total textile shipments. At the end of June 2012, textile mills employed 20% of the nation's workforce, and generated 1.3 trillion rupees ($13.8 billion) in textile products, most of which were exported to the US and Europe. While Punjab's economy is driven primarily by agriculture, the textile industry along with leather products and light engineering goods play an important role, with more than 48,000 industrial units spread across Punjab. In an effort to boost bilateral trade, Romania and Turkey have honorary-consulates in Faisalabad which enable trade links with the city.

4.7.4 Healthcare Facility

Healthcare services are provided to the citizens by both public and private sector hospitals. The government–run hospitals are Allied Hospital, District HQ Hospital, Institute of Child Care, PINUM Cancer Hospital, Faisalabad Institute of Cardiology (FIC) and General Hospitals in Ghulam

Muhammadabad and Samanabad. There are a number of private hospitals, clinics and laboratories in the city, notably Al-Rahmat labs, Mujahid Hospital lab, National Hospital lab & Agha Khan Laboratory.

4.7.5 Educational facilities

Faisalabad has several research and educational institutions, both public and private, such as the University of Agriculture, Government College University, National Textile University, Nuclear Institute for Agriculture and Biology, University of Faisalabad, In 2014, the University of Agriculture ranked 1st in agriculture and 4th overall for universities in Pakistan according to the Higher Education Commission of Pakistan (HEC), and was ranked 142 in the 2013 Top 200 World Universities for agriculture and forestry by Quacquarelli Symonds (QS).

In 2013, Faisalabad's literacy rate of 46% for females was noticeably lower than the 69% for males; rural literacy was 49% compared to 74% in urban areas.

4.7.6 Public Consultation

To study the socio-economic status of the area stakeholders of the various residential area and commercial areas were consulted. In addition, Government Officials were consulted to know their views regarding the commencement of the proposed project. Below is the list of the Government Officials and the local stakeholders consulted for the commencement of the aforesaid project:

Table 11: Views of Participants of Public Sector Stakeholders

S#	Participants	CNIC/Mobile No.
1	Khan Muhammad	35404-3037137-3
2	Muhammad Riaz	35404-4930108-1
3	Naseer Maseeh	35404-8149454-3
4	Naseer Allah Ditta	35404-2675489-1

5	Muhammah Hussain	35404-9874025-7
6	Asif Ali	35404-3742679-5

4.7.7 Civic Amenities

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

4.7.8 Favor for the Project

Respondents were inquired about their views regarding the proposed project. Almost 95% respondents of were in favor of the proposed project commencement.

4.7.9 Common Diseases

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

4.7.10 Community Issues

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

4.8 Quality of Life Values

Respondents were inquired about the quality of life values available in their respective areas during socio-economic survey of the study area. Most of the respondents had the basic amenities to sustain life such as; electricity, water supply services, sewerage collection system, gas and transport facilities. Adequate educational facilities such as Government College University Faisalabad, Agricultural University Faisalabad, National Textile University, Nuclear Institute for Agriculture and Biology, University of Faisalabad. The healthcare facilities include; Allied Hospital, District HQ Hospital, Institute of Child Care, PINUM Cancer Hospital, Faisalabad Institute of Cardiology (FIC). There are a number of private hospitals, clinics and laboratories in the city, notably Al-Rahmat labs, Mujahid Hospital lab, National Hospital Laboratory & Agha Khan Laboratory.

4.9 Environmental Analysis

Environmental parameters such as; ambient noise, ambient air quality and ground water qualities are discussed in the Sections above. The environmental analysis report issue by EPA certified laboratory SEAL Lab is annexed of this EIA Report.

4.10 Suitability of Site:

Comprising all assessment of above baseline data there will be no significant ecological/ environmental impact expected in and around the present selected project site, hence it is suitable for the proposed project.

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	Following will be the responsibilities of the Project Manager • Ensure that the contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment. • Ensure that all stipulations within the EMMP are communicated and adhered to by contractor(s) • 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 • Ensuring project execution within defined budget and timelines • Conducting regular check of the project status and meetings with project team • Provide support and guidance to project team as and when needed • Project Manager is expected to continually monitor and improve the overall performance of their operation

2	HSE Manager	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: • Ensuring that staff are appropriately trained and supervised • Identifying, assessing and managing health and safety risks • Consulting with workers (including staff, affiliates and contractors): i. Health and safety risk assessments ii. Decisions are made about the measures to be taken to eliminate or control these risks iii. Health and safety risk assessments • Implementing health and safety risk management programs relevant to their operations, teaching, research and consulting functions and work environment • Reporting (to the Human Resources Unit), investigating and responding to all hazards, accidents, incidents and taking action to control the risk • Assisting with the development, implementation and maintenance of a return to work program for injured staff. • Be fully conversant with the EIA and conditions of its approval • Be fully conversant with the EMMP • Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance • Convey the contents of this document to the contractor site staff and discuss the contents in detail with the Project Manager and Contractor • Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMMP

		• Take appropriate action if the specifications contained in the EMMP are not followed • Monitor and verify that environmental impacts are kept to a minimum, as far as possible • Review and approve construction methods, with input from the Site Manager, where necessary • Ensure that activities on site comply with all relevant environmental legislation • Compile progress reports on regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post excavation audit • Liaise with the Site Manager regarding the monitoring of the site • Report any non-compliance or remedial measures that need to be applied • 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

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 Hexon Chemicals (Pvt.) Ltd. at the proposed location. Burewali is the nearest community located at 1163 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 agro chemicals formulation 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 agro chemicals formulation plant as the minimum distance between the community and the project area is 1163 Meters (Burewali). No property loss is being envisaged due to the construction of the Hexon Chemicals (Pvt.) Ltd.

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 (Burewali) 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 Hexon 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.



Figure 7 Stakeholder Consultation with Officials

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 analyse 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 tress 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 1.5 km

Concerns

- Workers should be hired from local community
- Proper disposal of solid waste should be practiced
- The provision of fertilizer should be at economical rates for poor farmers
- Indigenous tress around the facility should be planted to control air pollution
- Removal of shrubs and bushes should be avoided to the extent possible







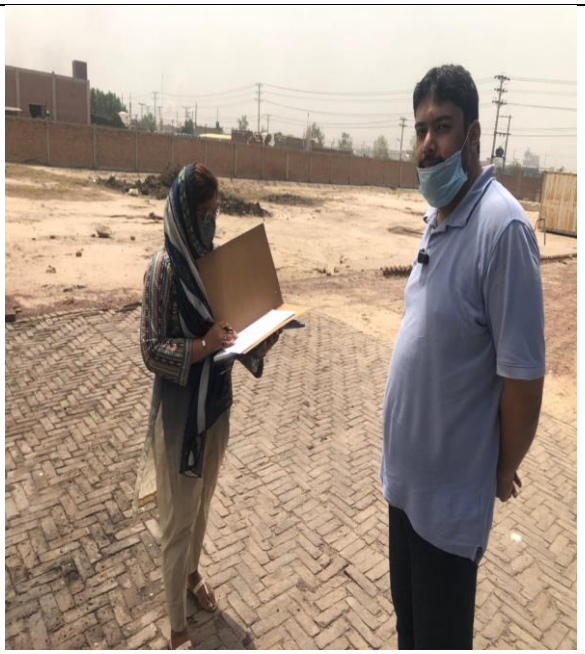


Figure 8: Consultation with General Public

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 Burewali was in favor of the proposed project. They expect that installation of the agro chemicals formulation 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.

SR. NO.	NAME	ID CARD NUMBER	OCCUPATION	CONCERN/VIEWS
1.	Khan Muhammad	35404-3037137-3	Farmer	Positive
2.	Muhammad Riaz	35404-4930108-1	Farmer	Positive
3.	Naseer Maseeh	35404-8149454-3	Farmer	Positive
4.	Naseer Allah Ditta	35404-2675489-1	Shop Owner	Concerned about pollution
5.	Muhammah Hussain	35404-9874025-7	Shop Owner	Concerned about Noise pollution
6.	Asif Ali	35404-3742679-5	Daily Wager	Positive
7.	Muhammad Asif	36303-4107290-1	Daily Wager	Positive
8.	Muhammad Iqbal	36303-1561962-1	Vendor	Positive
9.	Abdul Hameed	36302-0474840-7	Vendor	Positive
10.	Muhammad Imran	42201-3691562-7	Daily Wager	Positive
11.	Muhammad Sabir	36303-9221124-3	Vendor	Concerned air pollution

6 *IMPACT ASSESSMENT METHODOLOGY*

This section discusses the potential environmental impact of Hexon Chemicals formulation and seed processing 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 Agro-Chemicals unit, located in Multan 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 agro chemicals unit 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 Crops stimulator 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 agro chemicals formulation 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 Crops stimulator. The nature of the land is industrial land 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 Crops stimulator 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 agro chemicals formulation:

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 Crops stimulator 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 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 agro chemicals formulation 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:

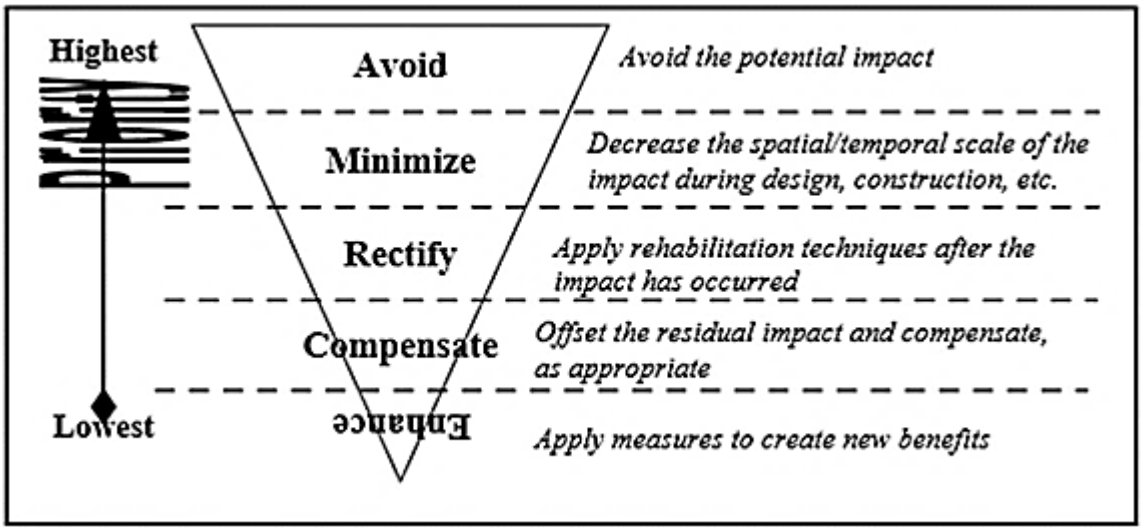


Figure 9: Hierarchy of Mitigations

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 agro chemicals formulation 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 agro chemicals formulation 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 12: Impact Screening Checklist

Sr#	Environmental Component	Impact Characteristics												
		Duration		Location		Frequency		Extent		Significance			Reversibility	
		Long	Short	Direct	Indirect	Cont.	Intermittent	Wide	Local	Large	Moderate	Minor	Rev.	Irrev.
Beneficial Impacts														
1	Employment Opportunity	◙		◙		◙			◙		◙		◙	
2	Availability of Raw-Material	◙		◙		◙			◙		◙		◙	
3	Appreciation in Land Value	◙			◙	◙			◙			◙		◙

4	Energy Availability	◙		◙		◙			◙		◙		◙	
Adverse Impacts														
1	Air Pollution		●	●			●		●			●	●	
2	Wastewater		●	●		●			●			●		●
3	Solid Waste and By-Products	●		●		●			●		●			●
4	Health and Safety		●		●		●		●			●	●	
5	Chemical Hazards		●	●		●			●		●		●	
6	Physical Hazards		●	●			●		●			●		●
7	Security Risks		●		●		●		●		●		●	

b) Project Impact Evaluation Matrix

The Project Impact Evaluation Matrix was developed by placing different environmental parameters that are likely to be affected by 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 13: Impact Evaluation Matrix

Environmental Parameters	**Impact Assessment during operational Phase**
A: Physical	
Land Resources	
Soil Erosion and Contamination	0
Transportation	-1t
Solid Waste and By-Products	-2p
Land Use	NA
Air Resources	
Noise Pollution	-1t
Air Pollution	-2t
Dust Emissions	-1t
Water Resources	
Ground Water	-1p
Surface Water	NA

Wastewater	-2p	
B : Ecological		
Flora		
Tree Cutting	+1p	
Fauna		
Terrestrial Fauna	+1p	
C: Socio-Economic		
Employment Opportunities	+3p	
Land Value Appreciation	+2t	
Availability of Local Raw-Material	+2p	
Economic Uplift	+3p	
D: Hazards		
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 14: Approaches for Mitigation Measures

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

7.3 Expected Positive Impacts

Following are the expected outcome of the establishment of the agro chemicals formulation and seed processing unit:

7.3.1 Increase in Employment Opportunities

Due to the establishment of agro chemicals formulation and seed processing unit in Faisalabad 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 agro chemicals has increased many folds in the country due to the various agricultural innovations. Agricultural sector is the basic department in all the developmental activities of country. Due to the installation of the proposed project agro chemicals products will be added in the existing market which is considered insufficient to fulfill the ever-increasing demand.

7.3.4 Enhance Competitiveness of Domestic fertilizers

The installation of the proposed project will have following benefits:

- ➔ Improve global competitiveness of Pakistan by providing high-quality agro chemicals material to cope with increase in demand of the crop stimulants.
- ➔ Address the aggravated chronic shortage of organic fertilizers used in the agricultural sector

➔ Enhance competitiveness by helping industries located in Lahore, Multan, Faisalabad, Gujranwala and Sheikhupura 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 agro chemicals formulation 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 Design Phase

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

i. Location

The project is proposed to be installed in open area. No residential community is located within 1.16 km vicinity from the project area that would be impacted from the commencement of aforesaid project. There is no human settlement, heritage building, social structure, grassland or preserved area in the project vicinity that could be damaged, dislocated or dismantled due to the project activity in the proposed area. Hence, the impact of location is considered to be in-significant as the project site is away from the surface water body, residential area (Burewali 1163 meters), Shrine (not reported in the study area) and no protected area is reported in 2 km vicinity. The project is being constructed in the industrial open area.

Nature of Impact

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

Mitigation Measures

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

- The wastewater will consist of mainly of the domestic waste (municipal waste), the wastewater generated during processing will be reused in the manufacturing process. And the municipal wastewater will be disposed off by using standard practices of the area.

ii. Designing

The design of the Granulation, Crushing and filtration units will be energy efficient and will cause moderate adverse environmental impacts as compared to the other technologies available in Pakistan. The Proponent intends to reduce the environmental and social up to practically possible safe limit. The Client had adopted SOPs for Emergency Reponses Plan, Fire Fighting Plan and Disaster Management Plan which are explained in sub-sections below.

Nature of Impact

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

Mitigation

Following mitigation measures will be adopted;

- The project will be designed by keeping in mind the principles of energy conservation and sustainable development
- The storage areas will be covered in order to prevent leaching of chemicals
- Municipal wastewater will be managed effectively through settling tanks
- The factory will be installed in an area designated as green space where crops and various native trees will be planted.

iii. Land Use

The project area is being constructed in an open land. There is no settlement, surface water body, grassland or preserved area in the proximity of the project area that could be damaged or dismantled due to the establishment of agro chemicals formulation and seed processing unit. Due to the establishment of this unit the open land will be converted to the built-up land.

Nature of Impact

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

Mitigation

Following mitigations measures will be adopted to reduce the land use impact:

- ★ Unnecessary up-rooting and disturbance to the native vegetation should be avoided up to the extent possible
- ★ The designated green area will be vegetated and native vegetation present on-site will be preserved
- ★ Green area will be defined, and thick trees plantation should be carried out along the boundaries of the project area to decrease the rate of soil erosion
- ★ Preferably trees and other vegetation will be planted extensively so that a buffer zone around project area can be created
- ★ Vegetation will not only enhance the aesthetic outlook of the area but it will also absorb pollution from the atmosphere

iv. Tree Cutting

It is envisaged that few kikar, Safeda and Neem tree along with the wild grass will be uprooted at main project site during the site clearness which impact the ecology of the area.

Nature of Impact

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

Mitigation

Following mitigation measures will be adopted:

- Avoid un-necessary disturbance and removal of the tree
- The designated green area will be vegetated and native vegetation present on-site will be preserved
- Biodiversity at the site will be maintained by transplanting or culturing endangered or threatened plants found in District Faisalabad.
- Green belts are planned in the surroundings
- Native tree plantation should be promoted extensively

7.4.2 Impacts and Mitigations during Construction Phase

Following impacts are anticipated to occur and affect the nearby communities due to the establishment of agro chemicals and seed processing unit:

i. Impacts of Dust and Exhaust Emissions

Air quality is expected to deteriorate locally due to mainly fugitive dust emission and exhaust emission from vehicles, which will have short-term but moderate impacts on local environment. Soil erosion may occur in small areas and they may be prone to open space for wind to pick up dust particles. Air pollutants such as; NOx, SOx and CO emissions may be generated from the working of the construction machinery on-site which includes; Hauling vehicles, loaders, trucks, mixers, etc. This machinery will generate dust, smoke and other potential pollutants in the air. This impact is considered to be negative of minor magnitude. The effect due to construction is however, of temporary nature and will have no permanent impact on environment.

Nature of Impact

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

Mitigation

Dust control measures are important in the project area; as the area is semi-arid having dry soil conditions and its vulnerable to spread by high winds. Following mitigation measures will be adopted to mitigate the anticipated impact:

- Ensure that the trucks carrying the raw material should be covered by tarpaulin to reduce fugitive dust emissions
- Water spraying/sprinkling should be done on the regular basis
- Ensure that all equipment and vehicles, used during the construction phase, are properly tuned and maintained in good working condition, in order to minimize the exhaust emissions and it will be regulated by the concerned authority
- Ensure that high quality fuel having low sulphur contents will be used

- Ensure that dust emission generated due to vehicular movement is minimized by restricted speed limit and vehicular movement impacts which will be minimized through good traffic management at site
- Ensure that dust emission during the construction phase will be minimized by implementing best management practices
- In order to reduce the fugitive dust emissions, avoid excavation activities during the windy days

ii. Soil Erosion and Contamination

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

Nature of Impact

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

Mitigations

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

- Removal of shrubs and bushes should be avoided to the extent possible
- In case of un-avoidable circumstances, the exposed soil will be re-vegetated quickly and compensatory plantation (five trees for each one removed) will be carried out as soon as possible
- Spill prevention and response plan for storage, usage and transfer of fuel should be prepared (if used on site) and implemented
- Workers should be trained on spill prevention and response plan

- Maintenance and washing of vehicles and equipment should be carried out at designated areas
- Any hard surface or tarpaulin should be spread on area to prevent soil contamination
- Regular inspections should be carried out to detect leakages in construction vehicles and equipment
- Machinery involved should be maintained properly to avoid leakages

iii. Socioeconomic Impacts

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

Nature of Impact

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

Mitigation Measures

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

- Good relations with 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
- In the case of not hiring the locals, Contractor will restrict his permanent staff to mix with the locals to avoid any social problems
- The contractor should prefer hiring local labor from adjacent nearby villages

- The contractor will keep the copy of National Identity Card (CNIC) of his employees and will warn the workers not to involve in any anti-social activities otherwise they may face dire consequences
- At the time of hiring the Contractor has to ensure that the workers should be of good repute
- First aid kits having all the necessary first aid stuff will be available at the site
- Routine medical check-ups of all the field staff including unskilled labor needs to be conducted by qualified physician and surgeon
- Training of workers should be carried out for operating various constructional machinery, safety procedures should be adopted, environmental awareness should be carried out, equip all workers with safety boots, helmets, gloves, protective masks and monitoring of their proper and sustained usage will be carried out. In case of accidents, contractor will provide free medical treatment to the community.
- The Contractor will be responsible for the sensitivity towards the local customs and traditions

7.4.3 Impacts and Mitigations during Operational Phase

Following impacts are envisaged due to the establishment of agro chemicals formulation unit:

i Air Emissions

Slight air emissions are expected to be produced during the operational phase. To control air pollutants to intact with environment dry scrubber will be installed. There will be no such odor issue generated during the process activities except ammonia, unlike other malodors, ammonia odor has a low dilution to threshold ratio. Gas ammonia can disperse easily because it is lighter than air. Therefore, ammonia is more regarded as an onsite odor rather than an off-site problem. Air purifiers are will be used to deal with the odor issue. They are usually portable units whose purpose is to provide for clean air to include particulate and odor removal. 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 agro chemicals formulation unit, no significant hazardous solid waste will be generated from the processing activities, the only waste generated would be from municipal source. 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, the water will be reused in the processing of raw materials. Processed water is used for the processing of raw material. It is estimated that 500 liters ($0.5m^{3)}$ of water will be consumed for sanitation purposes for 20 workers.

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

- ✓ 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 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

Tree plantation Intensive tree plantation will be done by proponent. Approximately 1000 trees will be planted to enhance the environment.

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.

Table 15: Environmental Management and Monitoring Plan

Sr. No.	Project Activities	Potential Impacts	Mitigation Measures	Monitoring Measures	Frequency	Responsible Authority	Environmental Budget
Pre-Construction Phase							50,000
1	Site Selection for construction materials	a) Temporary disturbance due to increased traffic b) It may involve tree cutting for placement of construction materials, asphalt and batching plant site. c) Land acquired for construction material that may cause blockage of roads	a) Provision of sign boards and alternative routes b) Batching and crushing plants will be installed in the downwind direction of residential areas	a) Cutting of Trees will be monitored. b) The proponent is the owner of land	--	Proponent, Contractor	

2	Handling of construction material	a) Construction material such as sand, cement may pose health risks. b) Emissions and runoff of cement-contaminated water from batching plant may pollute the nearby area. c) Scattered construction material may obstruct mobility	a) Material will be appropriately covered to prevent dispersal of sand material. b) Implement dust suppression measures for all stockpiles. c) Protective health & safety measures will be adopted. d) Concrete mixing on the ground will not be allowed. e) Emissions from batching plant should be properly	a) Proper covering of construction material will be checked on regular basis b) Wastewater runoff from the construction site to nearby water bodies will be monitored	Weekly	Construction contractor	

			controlled and runoff contaminated water will be collected, stored and disposed of at the designated site. f) Material will be kept aside in designated place without creating disturbance to public mobility				

3	Identification site for Labor Camps/ site offices	a) Generation of solid waste may pose health issues. b) Sanitary problems may arise due to bathing and washing of clothes by labors	a) Proper site will be selected without disturbing environment and to avoid conflict with locals. b) Dustbins should be provided at project site; c) Involvement of local authorities at project level will be ensured d) Designated staff will be hired at project site to collect SW at consecutive/ regular intervals; e) Identification of disposal site for SW with due	Surface water quality of local water bodies will be monitored by examining its various parameters such as pH, DO, TSS, TDS, COD, BOD5, Alkalinity and Turbidity etc by assigned laboratory	--	Consultant	

			involvement of local community f) Ensure the provision of toilets for labors and septic tank for its deposal. Further, site engineer and the project environmentalist will identify the location of wastewater discharges g) Strict instruction will be issued to avoid wastewater discharge into freshwater bodies/lakes.				

			h) Capacity building of labors at the site to follow the moral ethics				
4	Movement of heavy machinery	a) May cause disturbance to infrastructure such as roads, nearby residences etc. through vibration b) May cause noise pollution harmful for nearby residents and labors	a) Noise Monitoring and Mitigation Plan to Limit noisy activities; b) Avoid using heavy equipment	a) Noise level of the proposed project site will be monitored	--	Consultant	

5	Excavation of Earth	a) Change of soil characteristics b) Loss of fertile top layer of soil c) Air quality may also deteriorate d) Generated stockpiles may be a nuisance e) Vibrations may arise due to machinery	a) Water sprinkling must be ensured at regular intervals to avoid dust pollution b) Minimal effort should be taken to disturb top soil cover c) Cover construction materials and stockpiled soils if they are a source of fugitive dust. d) Site should be selected for proper disposal of stockpiles to avoid any disturbance in mobility e) Contractor needs to obtain approval for excavation and for plan of rehabilitating the site after excavation; f) Locations must be identified for transportation or to be reused or dumped of excavated material g) Minimize the amount of land to be disturbed and	a) Ambient air quality will be monitored by examining its various parameters such as CO, NO, NO2, NOX, SOX, H2S etc b) Soil quality will be monitored by examining its various parameters such as soil type, soil erosion, soil color, soil characteristics, pH, porosity,	--	Consultant	

			vegetation to be removed. h) Restore or apply protective covering on disturbed soils as quickly as possible	electrical conductivity, permeability			
6	Public Privacy and Cultural Properties	a) Disturbance to people visiting public properties i.e. mosque, schools, shrines, and graveyards b) Privacy issues due to labour camping	a) There is no cultural heritage and public institutions in the proposed project area to be disturbed b) Capacity building of labours at the site to follow the moral ethics				
Construction Phase							
1	**Land clearing, (Leveling, tree cutting, drainage, etc.) and other off-site sources of materials**	a) Loss of vegetation may occur b) Soil contamination from spills and fuel leaks c) Disposal of cleared debris d) Soil compaction, sediment production, soil erosion and un-stability of the soil e) Noise and vibration would affect wildlife and property of locals f) Disruption and dislocation of migratory birds	a) Clear small areas for active work at a time and minimize the impact on flora at the site. Also, Photographical, and botanical inventory of vegetation will be prepared before clearing the site. b) Clear without destroying large plants and turf where possible and preserve them for replanting in temporary nurseries.	a) Surface water quality of local water bodies will be monitored by examining its various parameters such as pH, DO, TSS, TDS, EC, COD, BOD5, Alkalinity and Turbidity etc. b) Soil quality will be monitored by examining its various parameters	--	Construction Manager	Air Monitoring: 50,000/- Water Quality Monitoring: 50,000/-

		g) Spread of invasive species or loss of indigenous species, ecosystem loss and loss of habitat forever	c) Assure minimum disturbance to native flora during construction especially where the asphalt, batching and crushing plants will be installed. Also, Re-vegetate area with recovered plants and other appropriate local flora				
2	**Handling/ transportation of construction materials**	Soil contamination, toxicity and air pollution are the major impacts which may arise due to mishandling of construction materials.	**a) Prevent dumping as it may be hazardous or proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.** **b) Emergency response plan**	Regular Visual Inspection		Construction Manager	Noise Monitoring: 50,000/-

			must be prepared to address the accidental spillage of fuels and construction materials. **c) Ensure the training of workers in waste management handling procedure.**				
3	**Handling of solid waste**	a) Solid waste may be generated from: i. the active construction sites and, ii. the camp sites b) Solid waste may pose health issues or disturb scenic beauty of the site c) Ban On-site debris burning.	a) Proper storage and site practices to minimize the potential of damage or contamination of construction material. b) Scattered solid waste should be properly managed in order to avoid contamination and provision of enclosed	a) Solid waste generated by the local community should be disposed off properly in dustbins and must be collected on regular basis b) Perform routine site inspection	Bi-Monthly	Regular collection of solid waste will be ensured and checked by, Contractor & Environmental Specialist	50,000/-

		d) Heaps of solid waste may cause disturbance in mobility	bins for general refuse at project site; c) Involvement of local authorities d) Capacity building of site personnel in waste management procedures;				
4	**Health & Safety of Workers at active construction and camp site**	a) Health problems or immediate risk may emerge at construction site: b) Dust particles c) Air and Noise pollution d) Accidental risks	Providing basic medical training & medical service (First Aid Boxes) to workers; b) Personal Protection equipment PPE's (ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines. c) Provision of proper safety signage at sensitive/accident-prone spots; d) Ensure strict use of wearing these protective clothing during work activities; e) Provision of adequate sanitation,	a) Provision of PPEs will be ensured	Weekly	Proponent	Health & Safety: 25,000/- Workers Training: 25,000/-

			washing & cooking facilities including lighting up to satisfaction;				
5	**Tree Plantation Plan**	a) Clearing of vegetation and cutting of tree cover from the site due to construction of unit may have adverse environmental impacts on bio-physical environment	Tree plantation practices will be introduced in case of removal/cutting.	Re-plantation of native floral species will be ensured.	--	Proponent	0.1 million

Category	**Impact**	**Project Activity**	**Monitoring Mechanism**	**Frequency**	**Monitoring Agency**
Operational Phases					
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	Weekly and Annually	Proponent

	Soil Contamination	Implementation of Management Plans	Visual monitoring and regular site inspection	Daily and Annually	Project Manager
Air Resource	Air Emission	Air quality will deteriorate due to transportation related activities	Monitor the emissions as per PEQ standards	Once before start of operation and after that as when required during operational phase	EA**
Ecological Resource	Flora	Uprooting of trees during Construction phase and maintenance of photographic record	Re-vegetation during operation phase	During Baseline Survey, once in a year and after the completion of the Project	Project Manager
Wastewater		Wastewater will be generated mainly from domestic use and cooling tower	Regular testing of the effluents that are being discharged	On the monthly basis	Project Manager
**SW= Solid Waste, **EA= Executive Agency*					

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 16: Roles and Responsibilities

Roles and Responsibilities		
Sr#	**Concerned Persons**	**Duties**
1	The Project Manager	Following will be the responsibilities of the Project Manager • Ensure that the contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment. • Ensure that all stipulations within the EMMP are communicated and adhered to by contractor(s) • 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 • Ensuring project execution within defined budget and timelines • Conducting regular check of the project status and meetings with project team

		• Provide support and guidance to project team as and when needed • Project Manager is expected to continually monitor and improve the overall performance of their operation
2	HSE Manager	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: • Ensuring that staff are appropriately trained and supervised • Identifying, assessing and managing health and safety risks • Consulting with workers (including staff, affiliates and contractors): iv. Health and safety risk assessments v. Decisions are made about the measures to be taken to eliminate or control these risks vi. Health and safety risk assessments • Implementing health and safety risk management programs relevant to their operations, teaching, research and consulting functions and work environment • Reporting (to the Human Resources Unit), investigating and responding to all hazards, accidents, incidents and taking action to control the risk • Assisting with the development, implementation and maintenance of a return to work program for injured staff. • Be fully conversant with the EIA and conditions of its approval • Be fully conversant with the EMMP • Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance

		• Convey the contents of this document to the contractor site staff and discuss the contents in detail with the Project Manager and Contractor • Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMMP • Take appropriate action if the specifications contained in the EMMP are not followed • Monitor and verify that environmental impacts are kept to a minimum, as far as possible • Review and approve construction methods, with input from the Site Manager, where necessary • Ensure that activities on site comply with all relevant environmental legislation • Compile progress reports on regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post excavation audit • Liaise with the Site Manager regarding the monitoring of the site • Report any non-compliance or remedial measures that need to be applied • 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

8.4.2 Proposed Monitoring Program to Assess Performance or Output of EMP

The following environmental issues are considered to warrant specific management actions for the implementation of project. These issues have specific regulatory requirements (contained in the development consent or Environmental Approval) and/or are considered to have the potential to result in a non-compliance with a legislative requirement or generate community complaints.

To manage the adverse environmental impacts on the physical parameters of the environment following management and monitoring plans will be adopted:

Table 17: Air Quality Management and Monitoring Plan

	Air Quality Management and Monitoring Plan			
Potential Impacts	Operational Phase			
	Installation of Dry scrubber			
Mitigation	Installation of dust collection and control equipment to minimize the emissions			
Plan	• Regular sprinkling of water will be done to control the suspended dust particles during the construction phase • The transporting vehicles will be maintained on the regular basis • Enforce strict speed limits to reduce airborne fugitive dust emission from vehicular movement • Minimize the land disturbance as much as possible by re-vegetating disturbed areas as soon as possible • Regular water sprinkling to suppress the fugitive dust emissions during the construction work • Cover dump trucks before travelling on public roads • Train workers to handle loose materials and debris to reduce fugitive emissions • Water sprinkling will be done on the regular basis during the construction phase • Good quality (low sulphur) fuel will be used in the vehicle to ensure less emissions • Visual inspections to detect air pollution generated during the construction phase will be carried out on the regular basis • Indigenous trees around the facility will be planted to control the odour and air pollution • Rehabilitation of areas outside of the site security fence will be undertaken by the successful implementation of the landscaping plan • Tree species *like Dalbergia sissoo, Cassia seamea, Acaccia mangium* and *Peltaphorum* can be planted in areas as they have high growing rate as well they will help in noise, dust and pollution reductions.			
Monitoring	Responsibility	Responsible	Environmental Budget	Monitoring Duration
	• Preparation of required or requested information for submission to the Project Manager including air quality monitoring data	Project Manager/Contractor	50,000/-	As & when required

	• Liaising with the Project Manager with respect to all significant air quality matters			

Table 18: Solid Waste Management and Monitoring Plan

Solid Waste Management and Monitoring Plan	
Potential Impacts	**Operation Phase** No hazardous waste will be generated in the process activity except the municipal waste. In addition, domestic solid waste will be generated .
Mitigation	**Waste Management Plan**
Management Plan	⇨ **Hazardous and non-hazardous waste will be separated prior to the transportation of the waste. As the aforesaid project generates no hazardous waste, no segregation is required.** ⇨ **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.** **General Waste** ⇨ **General waste cannot be recycled or used, it will be stored in appropriate receptacles and picked up as required by a worker and will be disposed of at the designated sites/bins**

	⇨ **The generated waste will be collected by the contractor on the regular basis and will be disposed off by using standard practices** ⇨ **No on-site burning of wastes will be allowed at any time** ⇨ **Tree species like *Dalbergia sissoo, Cassia seamea, Acaccia mangium* and *Peltaphorum* are ideal for bio-reclamation of overburden dumps.** **Green Waste** ⇨ **It will be ensured that minimum green waste will be generated on-site** ⇨ **It will be generated from landscape maintenance activities. It will be reused on-site where possible or disposed off un-contaminated by using the standard practices at the designated sites.** ⇨ **Green waste can be used as the fuel wood by the nearby residents.** ⇨ **No on-site burning of green wastes will be allowed at any time on-site** **Solid Waste** ⇨ **For the collection of the solid waste at site bins will be installed at various positions in the proposed facility** ⇨ **The installed bins will be covered in order to reduce the chances of the disease vector production and ensure the health of the workers** ⇨ **The amount of the solid waste generation will be disposed off by using the standard practices in the area**			
Monitoring	**Responsibility**	**Responsible**	**Environmental Budget**	**Monitoring Duration**
	• **Coordinate the training needs for all employees in environmental awareness training as a legal responsibility**	Project Manager		Visual Monitoring on Regular basis

	• **Waste collection and disposal will be monitored on a regular basis** • **Solid Waste documentation will be completed and available for inspection on request** • **A complaints register will be held, complaints will be investigated and, if appropriate, acted upon**		75,000/-	

Table 19: Wastewater Management and Monitoring Plan

Wastewater Management and Monitoring Plan	
Potential Impacts	**Operation Phase** During the operational phase chances of the groundwater contamination will be quite high if un-treated wastewater will be discharged in the waterways. It is estimated that 0.4m^3 per day of municipal wastewater will be produced. The water will be used for the cooling of the plant and as a result 50% of the water will be loss as a result of evaporation No process wastewater water will be produced that need treatment.
Mitigation	Sanitary wastewater treatment system such as septic tank will be constructed on-site for the disposal of wastewater.
Management Plan	• Monitoring of effluents shall be carried out as per requirement of Self-Monitoring and Reporting Tools (SMART) to ensure compliance with the PEQS

	• There is no surface water body present in the project proximity that could be impacted due to the discharge of the wastewater • The closed system should be installed for the cooling of the plant to ensure the minimal water loss • Good in-house keeping practices should be adopted to ensure water conservation • Closed the taps when water isn't in use • The domestic wastewater will be discharged into the septic tank prior to final disposal in the sewerage line. The design specifications of the septic tank are: • The wastewater after primary treatment will be used for on-site horticultural activities and the excess wastewater will be disposed off in the nearby wastewater drain after necessary approval			
Monitoring	**Responsibility**	**Responsible**	**Environmental Budget**	**Monitoring Duration**
	Monitoring of the safe disposal of the generated wastewater as per Environmental Monitoring of this EMMP	Project Manager	75,000/-	Monthly
	A complaints register will be held, Complaints will be investigated and, if appropriate, acted upon			

Table 20: Transport Code of Conduct

Transport Code of Conduct	
Potential Impacts	**Operation Phase**
	During operational phase, vehicles carrying the raw material may impact the nearby community by the frequent movement. It may generate fugitive dust emissions, noise and may cause social issues.

Mitigation	**Traffic Management Plan**			
Management Plan	The traffic management plan is given below: • Heavy vehicles shall only be to enter and leave the site between during day hours. • The need to ensure that noise levels are kept to a minimum especially through the site and into the relevant zone • Loads entering or leaving site will be suitably covered to ensure loads are secure • Proper maintenance and tuning of the vehicles should be carried out to ensure the minimum emissions • High quality (low sulphur) fuel will be used to keep the emissions in check • Strict speed limits will be enforced to reduce the chances of accidents • A complaints register will be kept, complaints will be investigated and, if appropriate, will be acted upon			
Monitoring	**Responsibility**	**Responsible**	**Environmental Budget**	**Monitoring Duration**
	Informal Observations Report on Compliance	Project Manager	30,000/-	Weekly basis

Table 21: Health and Safety Management and Monitoring Plan

Health and Safety Plan Management and Monitoring Plan		
Physical Hazards	**The health and safety risks to workers include but are not limited to**: • Floor surfaces shall be maintained regularly and kept clean and free of oil spills, other slippery fluids 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	**Environmental Budget**

	• Proper training will be provided to workers entering and working in the confined space of the hazards, protective measures and emergency rescue procedures • Only authorized persons shall be allowed near grinding unit • People working in and around the processing areas shall be provided with suitable PPEs to protect them against molten metal burns, noise and physical hazards • 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 to avoid physical hazards	**25,000/-**
Chemical Hazards	**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 • Chemicals and detergents will be stored properly, and all precautionary measures will be adopted	**25,000/-**

Accidental Spillage		
	Following mitigation measures will be adopted: ⊙ 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	**25000/-**

	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.	
Security Risks	To eliminate the security issues following mitigation measures will be adopted: • 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	**25,000/-**

8.4.3 Biodiversity Management and Monitoring Plans

As far as the management plans are concerned, they will protect the environment and mitigate the adverse impacts but, in order to keep in check the whole biodiversity of the project and study area a bio-diversity plan is required. During construction and operational phase there would be a removal of flora from the designated areas. The biodiversity plan is designed to mitigate the immediate as well as aftereffects. The detailed bio-diversity management plan includes the following sub-plans:

Table 22: Biodiversity and Invasive Plants Management and Monitoring Plan

Procedure for Prevention/ Mitigation of Impact from Invasive Plants	
Potential Impacts	If suitable controls are not adopted invasive species could colonize the site, reducing biodiversity and threatening the ecology of the area. It would largely impact flora and fauna of the area. Although Sheikhupura District is not rich in biodiversity. The remnants of the native vegetation will be at the verge of disturbance and removal.
Management Plan	Following management practices will be adopted:

	• Sowing/planting will be undertaken as soon as possible following the closure of the exhausted pit, to reduce the likelihood of the exposed areas being colonized by invasive and non-native species which are of lower ecological values • Reasonable precautions will be taken during operational phase to avoid the spreading of soil borne pests and diseases, animal and crop diseases and invasive species. • The ecological; verification walkover of the whole site will check the status of known stands of alien/invasive plants and record any new stands
Monitoring	Monitoring will be undertaken by HSE Manager throughout project life.
Emergency Measures	• Environmental Coordinator to be informed immediately if any new stands of alien or invasive weeds are found. • Where invasive species are found, an environmental exclusion zone will be created. This will entail a physical fence and proper signage. • A liaison with local landfills to check the specific arrangements they require for the disposal of constructional waste arising, which may be treated as hazardous waste
Environmental Budget	**100,000/-**

8.4.4 Decommissioning Plans

Following management plans will be adopted to manage habitat during operational as well as at the end of the operational phase to reduce the envisaged impacts. At the end of the operational phase following practices will be adopted to reclaim and restore the site:

Table 23: Habitat Management Plan

Habitat Management Plan	
Potential Impacts	If suitable mitigation was not implemented chance of loss or damage of valuable local habitats could arise. This would reduce local biodiversity and the rate of soil erosion will increase many times.

Management Plan	• If required by the HSE Manager will be constrained to a prescribed working corridor thereby reducing damage to habitats, potential direct mortality and disturbance to species • Existing trees and vegetation will be retained wherever practicable and incorporated with new planting proposals • Vegetation buffer strips will be maintained where practically possible. • Vegetation clearance will involve the removal of the shrubs and grasses be agreed with the HSE Manager and Contractor, if required • An environmentalist will perform a pre-clearance site visit to advise the contractors on which trees can be retained as they are which can be retained with some remedial works and which need to be removed • Where the removal of dead standing is necessary, the material will be relocated into areas of existing and newly created green zone within the limits of the site where practicable. • Sowing/planting will be undertaken as soon as possible to reduce the likelihood of the areas being colonized by invasive species which are of lower ecological value. • During the operational phase, management and maintenance of roadside verges is to be undertaken to maintain and enhance floral diversity • Appropriate management will be undertaken of existing bound habitats such as hedges for the conservation concern for; tree sparrow (Passer montanus), House Sparrows (*Passer domesticus*), House Crow (*Corvus splendens)*, Domestic Pigeon (*Columba livia domestica)*, Parrot (*Psittaciformes*), Quail (Coturnix coturnix), teetar (*Francolinus pondicerianus)*, Dove and Humming Bird. • Planting will be undertaken to enhance biodiversity and conserve the integrity of existing habitats.
	Topsoil Management • Appropriate sediment controls will be installed at the base of stockpiles to prevent soil loss • Weed growth will be monitored and subsequently controlled, if necessary.

	• Prior to re-spreading, weed growth will be scalped from the top of the stockpiles to minimize the transport of weeds into rehabilitated areas Management of Remnant Vegetation • The remnant vegetation present within the consent area will be managed during the life of the project to maintain its ecological values and promote biodiversity • Strategies include management of grazing impacts, weeds, feral animal control, erosion, sediment control and encouragement of natural regeneration • One of the aims of remnant vegetation management is to improve connectivity of remnant vegetation patches within the consent area to provide improved habitat corridor function • Annual inspections of remnant areas will be undertaken by qualified persons to identify any weed or feral animal issues, identify any areas affected by erosion and to assess the extent of natural regeneration occurring. Actions will be taken to address any issues identified Landscape Management • The site is to be maintained in a weed free condition and any newly planted trees or shrubs which die, or are destroyed, within 24 months of mine closure shall be replaced in the appropriate season with plants of the same species • Existing mature trees are to be inspected once annually by a suitably qualified contractor and any arboricultural works are to be carried out accordingly • Shrub bed areas shall be maintained as bare earth and kept free from weed growth, litter and rubbish at all times. Any shrubs overhanging pedestrian routes or adjacent grassed areas are to be pruned back. • Pruning of ornamental shrubs should be done to encourage healthy and bushy growth and promote desirable ornamental features, e.g. flowers, fruit, autumn color, stem color. • Smooth flowing curves of edges with adjacent shrub areas to be left neat and well defined.
Monitoring	Monitoring will be undertaken by the HSE Manager throughout the project life. Monitoring of planting and seeding will be undertaken for 5 years after completion of project.

Emergency Measures	Environmental Coordinator to be informed immediately if any adverse impact to habitat occurs in the project proximity which is set aside for operation of the project
Environmental Budget	**70,000/-**

8.5 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 24: Training and Capacity Building Plan

Training and Capacity Building Plan	
Potential Impacts	**Operation Phase** **During operational phase, nearby society will face problems like:** • Noise Pollution due to processing and movement of vehicles • Disease vector production due to improper management of solid waste • Contamination of ground water if the wastewater is not disposed off properly • HSE issues may arise
Mitigation	**Training and Capacity Building Plan**
Management Plan	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: • Procedures for monitoring water quality parameters and measures to • be adopted for avoiding or minimizing water pollution, particularly from the wastewater effluent generated from municipal uses and in the process activity • Safe solid and process waste disposal practices • Safety measures against hazards for workforce and the local communities arising from the construction activities • Use of safety gadgets by the workforce • Training for the use of PPEs

	Responsibility	Responsible	Environmental Budget	Monitoring Duration
Monitoring	Training of staff, vehicle operators and labour	Project Manager / HSE Manager	20,000/-	1-day training once a year

8.6 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.

8.6.1 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.

8.6.2 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.

8.6.3 Impacts and their Mitigation Summary

Environmental and social impacts have been identified for the process of agro chemicals processing; 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 25: Impacts Summary of agro chemicals processing

Environmental Parameters	Impact Assessment during operational Phase
	Operational
A: Physical	
Land Resources	

Soil Erosion and Contamination	0
Transportation	-1t
Solid Waste and By-Products	-2p
Land Use	NA
Air Resources	
Noise Pollution	-1t
Air Pollution	-1t
Dust Emissions	-1t
Water Resources	
Ground Water	-1p
Surface Water	NA
Wastewater	-2p
B : Ecological	
Flora	
Tree Cutting	+1p
Fauna	
Terrestrial Fauna	+1p
C: Socio-Economic	
Employment Opportunities	+3p

Land Value Appreciation	+2t	
Availability of Local Raw-Material	+2p	
Economic Uplift	+3p	
D: Hazards		
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		

8.7 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.

8.8 Environmental Budget

The environmental budget for the project is PKR 6 lacs which will be used for the control of the air pollution by the installation of dust collection system, 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 60 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.

9 CONCLUSION AND RECOMMENDATIONS

The findings of EIA Report showed that although the agro chemicals and seed processing unit 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 agro chemicals
- 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 agro chemicals 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 agro chemicals processing 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

File Tracking No.

CHECKLIST (EIA)
PAK EPA GUIDELINES FOR PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS, 1997

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3. Name of the organization preparing the report	01		
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