

## GUIDELINES FOR PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS CHECKLIST

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## EXECUTIVE SUMMARY

|                                |                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Title of the Project:</b>   | Tibb e Mashriq Dawakhana                                                                                   |
| <b>Description of project</b>  | Heterogeneous group of products includes:<br>Tablets, Syrups, khamir, safoof prepared from herbal extracts |
| <b>Location of the project</b> | Dad Fattiana Tehsil Chicha Wattni District Sahiwal                                                         |
| <b>Proponent:</b>              | Mr. Maqsood Ahmad                                                                                          |

### Introduction

The proponent intends to install nutraceuticals unit by the title “Tibb e Mashriq Dawakhana” at Dad Fattiana Tehsil Chicha Wattni District Sahiwal over an area of 4 kanal 15 marla. This project specific Environmental Impact Assessment (EIA) presents a detailed account of the foreseeable environmental and social impacts likely to emanate from the installation of nutraceuticals unit. In this pre-feasibility study, all calculations have been based on a production capacity of about up to 250K-300K packs of final products per day. The Environmental Impact Assessment (EIA) report is prepared to assess the potential impacts likely to occur from the project’s entire life cycle on the local environmental quality and communities. The assessment came up with a set of impact mitigation measures for the project to pursue in order to minimize the adverse impacts on the environment and nearby communities.

### Brief Outline of the Project

|                               |                                                                                                            |
|-------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Name of the Project:</b>   | Tibb e Mashriq Dawakhana                                                                                   |
| <b>Proponent:</b>             | Mr. Maqsood Ahmad R/o Basti Saeed Abad Dak khana Khas, Chak # 9/11L, Tehsil Chicha Watni, District Sahiwal |
| <b>Location</b>               | Dad Fattiana Tehsil Chicha Wattni District Sahiwal<br>GPS coordinates:<br><b>30.550257N, 72.788018E</b>    |
| <b>Total Area:</b>            | 4 kanal 15 marla                                                                                           |
| <b>Raw material</b>           | Herbal/plant-based extracts                                                                                |
| <b>Product</b>                | Syrups, tablets, khamir/safoof                                                                             |
| <b>Purpose of the Project</b> | Nutraceuticals unit                                                                                        |
| <b>Capacity of Project:</b>   | 250K-300K packsof final product per day                                                                    |
| <b>Cost of the Project</b>    | 230 million                                                                                                |

|                                      |                                                                                                                                   |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Nature of Area</b>                | Open Area                                                                                                                         |
| <b>Ground Water</b>                  | 100-150ft                                                                                                                         |
| <b>Manpower:</b>                     | Construction: 20-25 Persons                                                                                                       |
|                                      | Operation: 100-200 Persons                                                                                                        |
| <b>Power Source</b>                  | FESCO (WAPDA)+ 2 Standby Generators Of 2.5Megawatt Capacity (1.5+1MW) Source of fuel is Natural Gas                               |
| <b>Water Availability</b>            | Tube Wells of depth> 250ft.                                                                                                       |
| <b>Period of Construction</b>        | Approx. 01 Year                                                                                                                   |
| <b>Assessed Environmental issues</b> | Solid and liquid waste will be environmental issues. So, these wastes should be disposed of as per guidelines of EPA              |
| <b>Solid Waste Management</b>        | Managed as per standard practices of EPA regulations                                                                              |
| <b>Wastewater Management</b>         | Wastewater after primary treatment will be disposed of in wastewater drain                                                        |
| <b>Consultant Name</b>               | Enviro stewards Company (Pvt.) Limited                                                                                            |
| <b>Compliance</b>                    | Punjab Environmental Quality Standard (PEQS 2016) and time to time guidelines by EPA and other enforcement Department / Agencies. |

### Legal and Administrative Framework

The national guidelines and legislations relating to the environment considered for the project include, National Conservation Strategy (1992), National Environment Policy (2005), Pakistan Labor Policy (2010), Punjab Environmental Protection Act (PEPA 1997), amended PEPA, (2000), National Environmental Quality Standards (NEQS), Land Acquisition Act (1894), Cutting of Trees (Prohibition) Act (1975), Punjab Wildlife Act (1974), Punjab Plantation and Maintenance of Trees Act (1974), Antiquities Act (1975) etc.

Current national environmental policy as well as administrative and legal framework of PEPA, 2000 has been reviewed comprehensively which provides an overview of the national policies, laws, guidelines and regulations related to the EIA (Environmental Impact Assessment)

study of the proposed project. Environment related documents have been reviewed including submission of environmental assessment study report to obtain environmental approval was made mandatory by the Pakistan Environmental Protection Ordinance (PEPO), 1983 and the Pakistan Environmental Protection Act (1997). Section 12(1) of the PEPA (1997) stipulates that no project involving construction or any change in the physical environment can be undertaken unless an IEE or an EIA is conducted, and approval (NOC) is received from the relevant provincial environmental agency.

This EIA (Environment Impact Assessment) report has been prepared with due consideration of PEPA, 1997, Punjab Environmental Protection (Amendments) Act, 2012 and all other legal requirements of Pakistan and Punjab Government Including LAA, 1894.

## Criteria for Impacts Characterization

Table 1-1 Criteria for characterization of impacts

| Sr. No . | Impacts Characteristics             | Categories                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Nature of the Impact                | <b>Direct:</b> The environmental parameter is directly changed by the project.<br><b>Indirect:</b> The environmental parameter changes as a result of change in another parameter.                                                                                                                                                                                                                 |
| 2        | Duration of the impact              | <b>Short Term:</b> Lasting only till the duration of the project such as noise from the construction activities.<br><b>Medium Term:</b> Lasting for a period of few months to a year after the project before naturally reverting to the original condition.<br><b>Long Term:</b> Lasting for a period much greater than medium term impacts before naturally reverting to the original condition. |
| 3        | Geographical location of the impact | <b>Local:</b> Within the area of project i.e. operation site and access road.<br><b>Regional:</b> Within the boundaries of the project area.<br><b>National:</b> Within the boundaries of the country.<br><b>Global:</b> Trans-boundary impacts                                                                                                                                                    |
| 4        | Timing                              | Construction and Operation                                                                                                                                                                                                                                                                                                                                                                         |
| 5        | Likelihood of the impact            | <b>High:</b> High likelihood of occurrence during lifetime of operation, Regular/continuous part of operations.<br><b>Moderate:</b> Moderate possibility of occurrence during lifetime of operation, Periodic/occasional part of operations.<br><b>Low:</b> Unlikely to occur during lifetime of operation.                                                                                        |
| 6        | Reversibility of the impact         | <b>Reversible:</b> When a receptor resumes its pre-project condition.<br><b>Irreversible:</b> When a receptor does not or cannot resume its pre-project condition.                                                                                                                                                                                                                                 |
| 7        | Significance of the impact          | <b>Major, Moderate, Minor, Negligible and Beneficial;</b><br>Based on the consequence, likelihood, reversibility, geographical extent, duration, level of public concern and conformance with legislative or statutory requirements.                                                                                                                                                               |
| 8        | Consequence severity of impact      | <b>High:</b> Serious/catastrophic damage to environment<br><b>Medium:</b> Measurable damage to the environment, potential to reduced efficiency                                                                                                                                                                                                                                                    |

## **The major impacts and mitigation measures**

Since that, the project is nutraceuticals unit, for production of nutraceutical products it is therefore likely to produce effects onto the air quality of the project site unless appropriate mitigation measures are employed for balancing out the identified adverse impacts. Innumerable environmental and social impacts are expected during installation and operation, significant ones of which would be:

The major impacts resulting from the proposed activity during construction and operational phases are as follows,

### **Construction Phase**

Anticipated impacts associated with the construction of proposed project include; noise (machinery and vehicular noise), air emissions from earthwork and construction machinery & vehicles, soil contamination due to leakage from or accidents of the construction or transportation vehicles or during on-site refueling, solid waste from construction activities, domestic wastewater and safety of the workers and employment conflicts as the major adverse environmental impacts. Since, the project is to be commenced on a reserved area and no human settlement exists within safe radius of selected site, construction related impacts are not expected to extend to the community. Mitigation measures recommended to be incorporated into the project include; running the construction machines, usage of good quality (low-sulfur) fuels, regular maintenance, tuning and servicing of machinery, usage of emission control devices such as; mufflers and silencers, etc. Moreover, water suppression, covered transportation of construction material will be done in order to control dust emissions. Regular testing for leakage detection will also be ensured. Waste generated during construction activities will be used for flooring, while the solid waste will be managed as per practices in the area. For community safety, irrelevant persons will not be allowed inside the facility. Safety of the workers will be ensured by developing SOPs for all jobs, training the workers to follow SOPs, discouraging any careless attitude of workers and providing the workers with, and encouraging them to use PPEs.

### **Operational Phase**

The impact associated with the operation is the handling, storage, and disposal of waste. It includes; air pollution, storage of waste on-site, noise pollution, safety of the workers, disposal of

ash, etc. Only domestic wastewater will be generated from aforesaid activity. To mitigate the impacts associated with the operation of said facility will be controlled through:

- To control air pollution, wet scrubbers will be installed.
- To treat domestic wastewater, septic tanks will be constructed prior to ultimate disposal in Municipality operated sewer-lines.
- Proper training will be given to the workers for the handling of waste.
- For the disposal of ash landfilling practices or it will be sold to other industries where it can be used in the manufacturing of mortar and bricks.
- Machinery/equipment will be regularly serviced and tuned to mitigate noise at source, noise barriers will block noise propagation and receptors will be protected by the use of PPEs.
- An Emergency Response Plan will also be in place and the workers will be trained and guided about it.

The detailed impacts and mitigation measures during construction & operation of said project is described in sub-sections below:

| Environmental Parameters | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Planning and Designing   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Location                 | <p>Due to the proposed project construction no adverse impact is being envisaged however, following mitigation measures will be adopted:<br/>The selected site is located at proponents owned land and due to establishment of aforesaid project no change in the land use of area is being envisaged.</p> <ul style="list-style-type: none"> <li>• The site is accessible through metaled road network.</li> <li>• The site is owned by the proponent and no dispute is associated.</li> <li>• To control air emission during operational phase, cyclones &amp; wet-scrubber will be installed.</li> <li>• The wastewater generated from the wet-scrubber will be incinerated with the next load of material to be incinerated.</li> </ul> |
| Design                   | <p>This process is employed because of the following reasons:<br/>Local nutraceuticals unit will be installed for the supply of herbal supplements,</p> <ul style="list-style-type: none"> <li>• The imported nutraceuticals unit will meet all the applicable national and international standards.</li> <li>• The proposed project design will follow the principle of sustainable development.</li> <li>• Improved Management and Monitoring Practices will be adopted.</li> <li>• The proponent intends to reduce the environmental and social issues up to practically possible safe limit. The Client had adopted SOPs for</li> </ul>                                                                                                 |

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|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                | <p>Emergency Responses Plan, Fire Fighting Plan and Disaster Management Plan which are explained in sub-sections below.</p> <ul style="list-style-type: none"> <li>• Planning principles and design considerations have been reviewed and incorporated into the site planning process to the extent possible. The concepts considered in the design of the proposed project are:</li> <li>• Procurement of construction materials from approved dealers.</li> <li>• For the protection of workers PPEs (masks) will be provided during construction and operational phase.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Soil Erosion and Contamination | <p>Following measures will be adopted to protect soil from erosion &amp; contamination:</p> <p>During construction phase trees removed from the site during site clearance causing soil exposure will be re-vegetated quickly and compensatory plantation (five trees for each one removed) will be carried out as soon as possible.</p> <ul style="list-style-type: none"> <li>• Native and fast-growing trees will be planted in the designated areas.</li> <li>• Spill prevention and response plan for storage, usage and transfer of fuel should be prepared (if used on site) and implemented.</li> <li>• Workers should be trained on spill prevention and response plan.</li> <li>• Maintenance and washing of vehicles as well as equipment will be carried out at designated areas within the facility.</li> <li>• Any hard surface or tarpaulin should be spread on area to prevent soil contamination.</li> <li>• Regular inspections should be carried out to detect leakages in construction vehicles and equipment.</li> <li>• Machinery involved should be maintained properly to avoid leakages.</li> <li>• The proponent will be required to instruct and train their workforce in the storage and handling of materials that can potentially cause soil contamination.</li> <li>• Solid waste generated during construction will be properly and safely disposed of as per practices of area.</li> </ul> |
| Transportation                 | <p>Following mitigation measures will be adopted:</p> <ul style="list-style-type: none"> <li>• For the transportation of waste closed vehicles will be used.</li> <li>• Only trained workers will be allowed for handling of the waste.</li> <li>• Spill prevention and response plan for storage, usage and transfer of fuel should be prepared (if used on site) and implemented.</li> <li>• Workers should be trained on spill prevention and response plan.</li> <li>• Maintenance and washing of vehicles as well as equipment will be carried out at designated areas within the facility.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Land Use                       | <p>The selected site is located at agricultural land. The land was agricultural but now its barren and there is no agricultural activity going on in the vicinity</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Physical                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Soil Erosion and Contamination | <p>Following measures will be adopted to protection soil from erosion &amp; contamination:</p> <ul style="list-style-type: none"> <li>• During construction phase trees removed from the site during site clearance causing soil exposure will be re-vegetated quickly and compensatory plantation (five trees for each one removed) will be</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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|                 | <p>carried out as soon as possible.</p> <ul style="list-style-type: none"> <li>• Native and fast growing trees will be planted in the designated green areas.</li> <li>• Spill prevention and response plan for storage, usage and transfer of fuel should be prepared (if used on site) and implemented.</li> <li>• Workers should be trained on spill prevention and response plan.</li> <li>• Maintenance and washing of vehicles as well as equipment will be carried out at designated areas within the facility.</li> <li>• Any hard surface or tarpaulin should be spread on area to prevent soil contamination.</li> <li>• Regular inspections should be carried out to detect leakages in construction vehicles and equipment.</li> <li>• Machinery involved should be maintained properly to avoid leakages.</li> <li>• The proponent will be required to instruct and train their workforce in the storage and handling of materials that can potentially cause soil contamination.</li> <li>• Solid waste generated during construction will be properly and safely disposed of as per practices of area.</li> </ul> |
| Transportation  | <p>Following mitigation measures will be adopted:</p> <ul style="list-style-type: none"> <li>• For the transportation of waste closed vehicles will be used.</li> <li>• Only trained workers will be allowed for handling of the waste.</li> <li>• Spill prevention and response plan for storage, usage and transfer of fuel substances should be prepared (if used on site) and implemented.</li> <li>• Workers should be trained on spill prevention and response plan.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Land Use        | <p>The selected site is located within approved &amp; designated zone and due to establishment of aforesaid project no change in the land use of area is being envisaged.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Noise Pollution |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Noise Pollution | <p>Following mitigation measures will be adopted</p> <ul style="list-style-type: none"> <li>• Selection of up to date and well maintained plant or equipment with reduced noise levels ensured by suitable in built damping techniques or with appropriate muffling devices.</li> <li>• Confining noisy work to normal working hours in the day, wherever possible.</li> <li>• Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in its usage.</li> <li>• Use of low noise machinery, or machinery with noise shielding and absorption are the mitigation measures suggested for said project.</li> <li>• Residential area is at safe distance from site as selected site is located in remote area</li> <li>• Proper encasement of noise generating sources will be done to control the noise levels within limits.</li> <li>• A thick greenbelt will be developed all around the plant which will be acting as noise barrier.</li> <li>• The use of concrete and masonry walls &amp; barriers keeping in view the</li> </ul>                                     |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|                 | <p>benefits of stiffness weight &amp; cavity construction &amp; the need to provide well sealed sound attenuating doors &amp; windows.</p> <ul style="list-style-type: none"> <li>• The use of complete or partial enclosures as and if required.</li> <li>• Introduction of control and monitoring rooms having good sound insulation properties.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Air Pollution   | <p>Following mitigation measures will be adopted:</p> <ul style="list-style-type: none"> <li>• Construction material will be covered with tarpaulin in order to reduce dust emissions.</li> <li>• Regular water sprinkling should be carried out during peak construction activity.</li> <li>• Construction workers will be provided with dust masks for protection against the inhalation of dust and they should be trained for its use.</li> <li>• Vehicle speed should be controlled within the prescribed limit.</li> <li>• Emission of exhaust gases from vehicles used for construction should be controlled.</li> <li>• To limit these emissions, the nutraceuticals unit will be properly operated and carefully maintained.</li> <li>• To protect human health, agriculture, and native wildlife and vegetation, stack height will be high enough to reduce ground level concentrations.</li> <li>• In the said unit the gaseous emissions will be controlled by the scrubbing system. Exhaust gas from an nutraceuticals unit can be forced through a wet scrubber to remove toxic gases.</li> <li>• Cyclone and wet scrubber will be imported, and the vendor claimed that it will meet all applicable national and international standards. It will specifically comply with PEQS.</li> <li>• Regular maintenance and monitoring will be carried out to keep the system in-check and to comply with PEQS.</li> <li>• Primary pollutants emitted from a nutraceuticals unit will be monitored on a regular basis by EPA certified laboratory.</li> <li>• Vehicles used for transportation of waste will be regularly serviced and maintained to keep the environmental impact on account of their exhaust emissions to its minimum level.</li> <li>• Native tree would be planted along the boundary of project area to keep environment healthy. For the removal of one tree, 3-5 trees will be planted as compensation measure.</li> </ul> |
| Water resources |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ground Water    | <p>Following mitigation measures will be adopted:</p> <ul style="list-style-type: none"> <li>• Water conservation techniques should be adopted to conserve freshwater.</li> <li>• Labor should be trained to conserve the water.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Surface Water   | <p>No surface water body is located within the vicinity of the project area that could be impacted.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wastewater               | <p>Following mitigation measures need to be adopted:</p> <ul style="list-style-type: none"> <li>• The domestic wastewater will be treated through septic tank prior to disposing off in drains.</li> <li>• Water conservation activities will be adopted for the preservation of water.</li> <li>• Monitoring of effluents shall be carried out as per requirement of Self-Monitoring and Reporting Tools (SMART) to ensure compliance with the PEQS.</li> <li>• It will be ensured that no solid waste should be entered into waste water</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ecological               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Tree Cutting             | <p>Following mitigation measures will be adopted:</p> <ul style="list-style-type: none"> <li>• After the completion of construction phase, tree will be planted in the designated green areas.</li> <li>• For the management of landscape, fast-growing, local and native trees will be planted.</li> <li>• Trees will be planted along the project area boundary.</li> <li>• Unnecessary up-rooting of the trees and plants must be avoided.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Socio-Economic           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Employment Opportunities | <p>Following mitigation measures will be adopted to reduce the socio-economic impact on the community:</p> <ul style="list-style-type: none"> <li>• Good relations with 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.</li> <li>• In the case of not hiring the locals, contractor will restrict his permanent staff to mix with the locals to avoid any social problems.</li> <li>• The contractor should prefer hiring local labor from adjacent community, it may include Dad Fattiana.</li> <li>• 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.</li> <li>• At the time of hiring the Contractor has to ensure that workers should be of good repute.</li> <li>• First aid kits having all the necessary first aid stuff will be available at site.</li> <li>• Routine medical check-ups of all the field staff including unskilled labor needs to be conducted by qualified physician and surgeon.</li> <li>• 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</li> </ul> |

|  |                                                                                                                                                                                                                                                                                                       |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>of their proper and sustained usage will be carried out. In case of accidents, contractor will provide free medical treatment to the community.</p> <ul style="list-style-type: none"><li>• The Contractor will be responsible for sensitivity towards the local customs and traditions.</li></ul> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Recommendations for Mitigation Measures

The intensity and severity of impacts, foreseen due to the construction and operation of the Project vary with change in the nature and magnitude of the impacts as well as depend upon the baseline environmental conditions of the area. The mitigation measures during the construction phase will require implementation of EMMP in letter and spirit. Other mitigations to reduce the adverse environmental impact will be:

- The adverse environmental impacts will be significantly minimized by adopting best management and monitoring practices as well as by implementation of EMMP effectively.
- It is also recommended that the Proponent should obtain an Environmental Approval (NOC) from the Punjab-EPA before proceeding further into the construction and operational activities.

### Proposed Monitoring

An environmental management and monitoring plan provides a delivery mechanism to address the potential environmental impacts of a Project during its construction and operational phases, to enhance project benefits, and to introduce health and safety standards of good practice to be adopted for the project.

This process requires proper monitoring to report any performance or any mitigation measurement during the construction and operational phases. The proponent will ensure the proper implementation of mitigation measures for the concerned operation and maintenance phase through adequate monitoring. The proposed management and monitoring plan for proposed project is given below:

**Table 1-2 Proposed management and monitoring plan**

| Sr. No.                                   | Category       | Impact                 | Project Activity                                                                             | Monitoring Mechanism                                                   | Frequency                      | Monitoring Authority |
|-------------------------------------------|----------------|------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------|----------------------|
| <b>Construction and Operational Phase</b> |                |                        |                                                                                              |                                                                        |                                |                      |
| 1                                         | Land Resource  | Solid waste            | Construction activities, at site camps etc.                                                  | Record keeping and timely transfer of solid waste to the disposal site | Daily                          | EMC                  |
| 2                                         | Air Resource   | Air emissions and dust | Air quality will deteriorate due to transportation construction activities and animal wastes | Monitor the emissions as per standards                                 | Once before construction phase | EMC                  |
| 3                                         | Water Resource | Water pollution        | Water quality will deteriorate due to transportation and construction activities             | Water testing as per PEQS                                              | As required                    | EMC                  |
| 4                                         | Biological     | Flora                  | Uprooting of trees during construction                                                       | Re-vegetation                                                          | After construction phase       | EMC                  |

### Conclusions and Recommendations

The major positive impacts of the Project include job opportunities and new business opportunities. The Project will raise the people's income, enhance social infrastructure, and improve socioeconomic conditions in the area. The Project is expected to stimulate greatly the local economies around the Project area and to benefit people who have a low standard of living.

Negligible to low negative impacts can be foreseen during Project implementation including Air Quality, Noise, Biodiversity and Dust. Mitigation measures will be implemented to minimize environmental impacts. All the impacts can be managed cost effectively. Careful mitigation and monitoring, specific selection criteria and assessment procedures for subprojects have been specified to ensure that minimal impacts take place.

It is recommended that the proponent should obtain an environmental approval (No Objection Certificate) from the Punjab-EPA before proceeding further into the construction activities as per regulatory requirements.

## 1. INTRODUCTION

### 1.1 General

***Nutraceutical is defined as any substance that is a food or part of food and provides medical or health benefits including prevention and treatment of diseases (Deflice, 1994).***

Nutraceuticals are a group of products that are more than food but less than pharmaceuticals. Unfortunately, there is still no internationally accepted definition of these products therefore their judgment varies country by country. In most countries nutraceuticals are taken as part of dietary supplements. Frequency of nutraceuticals use is 50%–70% in developed countries' population and this number is increasing by the age. Ladies use more nutraceuticals than men. From a safety point of view nutraceuticals are trusted products even if they are not approved by authorities like pharmaceuticals. With a lot of nutraceuticals clinical studies have been carried out and results originating from these trials support their effectiveness as well as their general safety. Nutraceuticals represent however a certain risk if they were to be used without medical control as interactions with medication can be harmful, especially in vulnerable (old, very young, chronically sick) populations. Examples from fish oil preparations, prebiotics.

The importance of nutraceuticals is expanding globally in terms of scientific services, legal aspects, and marketing strategies for health promotion, reduction of disease, and health care costs. Due to its geographical position and cultural heritage, the Turkish perspective on nutraceuticals has been influenced by Europe (especially for regulations), Asia, the Middle East, and Africa, where unique endemic flora, compromised genetic resources for potential sources of nutraceuticals, habitual consumption of probiotics, and the wisdom of ethnopharmacology have been introduced over centuries. An increasing nutritional interest in promoting good health and life expectancy created a growing segment of the food industry.

The proponent established contact with the Environmental Protection Agency (EPA), Government of Punjab for the grant of environmental approval before the start of the project. This requirement is under the regulation of Review of IEE and EIA Regulations 2000. According to the above-mentioned list this project falls in the category of the projects requiring EIA.

The proponent established contact with the Environmental Protection Agency (EPA), Government of Punjab for the grant of environmental approval before the start of the project. This requirement is under the regulation of Review of IEE and EIA Regulations 2000. According to the above-mentioned list this project falls in the category of the projects requiring EIA.

This EIA report has been prepared following the format conforming to the "Guidelines for the preparation and review of Environmental Reports, October 1997 " approved by the Government of Pakistan. The other relevant regulations and guidelines considered while preparing this EIA report include:

- Guidelines for the preparation and review of Environmental Reports.
- Policy and Procedures for filing, review and approval of environmental assessments.
- Detailed sectoral guidelines.
- Guidelines for sensitive and critical areas.
- Guidelines for public participation.

## 1.2 Consultant Details

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

**Table 2-1 Consultant Details**

| Sr No.      | Consultant Details |                                                                             |
|-------------|--------------------|-----------------------------------------------------------------------------|
| 1           | Consultant         | Enviro Stewards Company (Pvt) Limited                                       |
| 2           | Address            | 40/8 New Civil Lines Regency Road Behind State Bank of Pakistan Faisalabad. |
| 3           | Contact No.        | 041-2619600                                                                 |
| Team leader |                    |                                                                             |
| 1           | Name               | Miss Sara Fatima                                                            |
| 2           | Designation        | Senior Environmentalist                                                     |
| 3           | Contact No.        | +92-301-1198600                                                             |

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

**Table 2-2 List of Experts**

| Sr. #                          | Name                      | Qualification                          |
|--------------------------------|---------------------------|----------------------------------------|
| <b>Team Leader</b>             |                           |                                        |
| 1                              | Miss. Sara Fatima         | M.Phil. Environmental Sciences         |
| <b>Environmental Scientist</b> |                           |                                        |
| 3                              | Mr. Zia ur Rehman Farooqi | Ph.D. Environmental Sciences (Scholar) |
| 4                              | Hafiz Zeeshan Safder      | M.Sc. Analytical Chemistry             |
| 5                              | Mr. Saffi Ahmed           | M.Phil. Environmental Sciences         |
| <b>Environmental Engineers</b> |                           |                                        |
| 7                              | Miss Misbah Ali           | B.Sc. Environmental Engineering        |
| 8                              | Engr. Muhammad Bilal      | B.Sc. Environmental Engineering        |
| <b>Sociologist</b>             |                           |                                        |
| 9                              | Qazi Muhammad Ahmed Raza  | M.Phil Sociology                       |

### 1.3 Purpose of the report, identification of the project and the proponent

#### 1.3.1 Purpose of the report

This report has been prepared to conform to the requirements of the Punjab Environmental Protection (Amendment) Act 2012 (PEPA), which states that:

***“No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof.”***

The proponent feels its social, moral and legal obligation to protect the environment. It is in this context that the company initiated the process of gaining Environmental Approval from the EPA, Government of Punjab. Accordingly, it on its own approached EPA for guidance in this regard. According to the direction of the EPA, as detailed in the preceding para under "Introduction" this Environment Impact Assessment (EIA) is being submitted for issuance of the

said Environmental Approval in compliance with the Punjab Environmental Protection Act - 1997 (Amended 2012) Section 12.

The proponent affirms that environmental management order will prevail both during construction and regular operation in accordance with the Punjab Environment Quality Standards (PEQS).

The (Environment Impact Assessment) EIA report takes into account socio economic, physical, and environmental, land use, forestry, crops, water bodies, biodiversity (flora and fauna), heritage, and other relevant aspects associated with the project itself and the area around the project. The report also describes mitigation measures that will be adopted to undo environmental impacts on any segment of the environment i.e. human health and environmental health around the project site both during construction and normal operation of the project. The report provides relevant information, as required under the officially approved format, to help the decision makers (EPA Punjab in the Present case) before issuing the desired environmental approval.

#### **1.4 Identification of proponent**

The proposed project of nutraceuticals unit M/S “Tibb e Mashriq Dawakhana.” is owned by Mr. Maqsood Ahmad S/o Khair ud Din.

**Contact Person:** Mr. Maqsood Ahmad S/o Khair ud Din.

#### **1.5 Nature and size of the project**

The proposed project is an nutraceuticals unit with capacity of about 250K-300K packs of final products per day. The project will spread over an area of 4 kanal & 15 marla. As a result of the project, around 10-15 persons will get jobs during the construction phase and another around 60-65 persons will be engaged during the operation phase of the project.

#### **1.6 Location**

The project site is located at Dad Fattiana Tehsil Chicha Wattni District Sahiwal.

There are no places of historical importance such as ancient monuments, forts, sculpture, etc. and there are no other sensitive land uses such as archeological sites, national parks or wildlife reserves found in or around the project site.

### **1.7. Extent of the EIA study, scope of the study, magnitude of the efforts**

This Environment Impact Assessment (EIA) study has been accomplished following the requirements serial 2.3 of the "Guidelines for the preparation and review of Environmental Reports, October 1997". In compliance of PEPA, 1997(amended 2012) requirements, an EIA report has been prepared by the team of environmental experts. This document covers all environmental impacts, due to the proposed project, in and around the project area comprising the physical, ecological and socio-economic aspects together with identification of the potential positive and negative impacts. Any developmental activities outside the project area like rehabilitation of the road and establishment of the other factories outside the project vicinity have not been covered under this EIA (Environment Impact Assessment) study.

The EIA (Environment Impact Assessment) report covers the examination of the physical, biological and environmental socioeconomic impact of the following:

- Construction activities including the leveling and marking of land division.
- Relevant off-site construction activities like construction of access road.

## 2 POLICY, LEGISLATION, LEGAL & ADMINISTRATIVE FRAMEWORK

### 2.1 General

This section deals with the current policy as well as legal and administrative framework related to carrying out Environmental Impact Assessment (EIA) of various projects. A number of laws exist in Pakistan, containing a number of clauses concerning protection of the environment. Like other Projects, this project is also required to go through an Environmental Assessment for getting a NOC under Section 12 of the Punjab Environmental Protection Act – 1997 (Amended 2012).

#### Screening

The project is the establishment of nutraceuticals facility and falls under **Schedule II** (list of projects requiring an EIA), **Category B (Manufacturing & Processing) and sub sector 2** (Chemical manufacturing unit including pharmaceuticals and cosmetics) of the IEE / EIA Regulations 2000 made under section 12 of Punjab Environment Protection Act 1997 (Amended 2012). The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project.

### 2.2 Existing Regulation and Framework

This EIA study has been carried out in the light of the policy guidelines for the preparation of IEE/EIA Reports under the procedure and practices formulated by the Provincial Environmental Protection Agency (EPA).

### 2.3 Relevant Legal / Institutional Framework

The applicable laws for the environmental study of the project are briefly given below. The proponent of the project will abide by the applicable laws and regulations.

#### 2.3.1 National Conservation Strategy, 1992

On March 1, 1992, the Cabinet of Pakistan approved the National Conservation Strategy. It describes the stark reality of the country's deteriorating resource base and its implications for

what is still largely a natural resource-based economy. It sets forth the beginnings of a plan to integrate environmental concerns into virtually every aspect of Pakistani economic life. The strategy has three overriding objectives: conservation of natural resources, sustainable development, and improved efficiency in the use and management of resources.

### **2.3.2 PEPO, 1983 and PEPA 1997 (Amended 2012)**

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO), which was replaced by the Pakistan Environmental Protection Act (PEPA) 1997, through an Act of Parliament. Now the PEPA 1997 has been replaced by Punjab Environmental Protection Act 1997 (Amended 2012) on 18<sup>th</sup> April 2012.

Under Sec. 8 of Environment Protection Ordinance (EPO) 1983, it was necessary to carry out EIA/IEE for all development projects, but there were no EIA/IEE regulations under that ordinance.

Under section 12 of the Punjab Environmental Protection Act, 1997 (Amended 2012) it is mandatory to take an Environmental Approval Environmental Protection Agency for commencement of any construction of project.

### **2.3.3 National Environmental Policy 2005**

The Government of Pakistan (GOP) has notified National Environmental Policy 2005, for different projects/aspects in which guidelines/priorities have been given to undertake the projects having significant environmental impacts.

### **2.3.4 Review of EIA and IEE Regulations, 2000**

The GOP has issued Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, to review the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Reports.

### **2.3.5 Guidelines for the Preparation and Review of Environmental Reports, 1997**

The GOP has also framed guidelines for the preparation and review of IEE/EIA of projects in various developmental sectors.

### **2.3.6 National Environmental Quality Standards (NEQS)**

According to Punjab Environmental Protection Act, 1997 (Amended 2012), National Environmental Quality Standards (NEQS) were established for municipal and industrial effluents and air emissions.

### **2.3.7 Guidelines for Sensitive and Critical Areas**

GOP has issued Guidelines for Sensitive and Critical Areas in October 1997. The objective of the guideline is to provide guidance to project proponents and other stakeholders in the environmental assessment process, so that the projects are planned and sited in a way that protects the values of sensitive and critical areas.

### **2.3.8 Policy and procedures for the Filing, Review and Approval of Environmental Assessments, November-1997**

Environmental Assessment is the Primary means of managing the approval of new development proposals in Pakistan. Environmental Assessment allows for the systematic examination of proposals, clear procedures which provide for the interests of relevant Government Departments and other stakeholders to carefully consider.

### **2.3.9 Guidelines for Public Consultation, Pakistan Environmental Protection Agency October 1997**

This guideline is part of a package of regulations and guidelines which include:

- Punjab Environmental Protection Act, 1997 (Amended 2012)
- Policy and Procedures for filing, review and approval of environmental assessments
- Guidelines for the preparation and review of Environmental Reports
- Guidelines for sensitive and critical areas
- National Environmental Quality Standards (NEQS)
- Detailed sectoral guidelines

### **2.3.10 Punjab Wildlife Protection Act, 1974**

This act was framed in 1974 by the Province Punjab and is about of protection and conservation of Wildlife.

### 2.3.11 Forest Act, 1927

This act was framed in 1927. The Forest Act, 1927 is still the basic charter for the forest departments in Pakistan. This law empowers provincial governments to manage forest areas.

### 2.3.12 Explosive Act, 1884

This act deals with explosives in prohibiting either absolutely or subject to conditions, the manufacture, possession or importation of any explosive which is so dangerous in character that, in the opinion of the appropriate Government, it is expedient for public safety to issue the notification.

### 2.3.13 Punjab Local Government Ordinance, 2001

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. Under the Ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate schemes for improving the environment.

### 2.3.14 Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 268 to 291 are about offences affecting public health. The offences relating to public health safety and environment are as under;

**Sec 268:** Public Nuisance

**Sec 269:** Negligent act likely to spread infection of disease dangerous to life:

**Sec 270:** Malignant act likely to spread infection of disease dangerous to life:

**Sec 278:** Making atmosphere noxious to health:

**Sec 284:** Negligent conduct with respect to poisonous substance:

**Sec. 290:** Punishment for public nuisance in cases not otherwise provided for:

**Sec. 291:** Continuance of nuisance after injunction to discontinue

### **2.3.15 Punjab Land Use Rules 2009**

In January 2009 the Punjab Government notified “Punjab Land Use Rules 2009” for the clarification of Lahore Master Plan. In these rules permissible land use according to area type is defined.

### **2.3.16 Antiquities Act 1975**

The law relates to protection of Antiquities, monuments, National & International heritage. The compliance of this Act is mandatory for the Installation of Generators. Under section 22 of the Act no development plan or scheme or new construction can be done within distance of 200ft from the boundary of the monuments/ National Heritage. There is no historical Site or monuments in the proximity of the project.

### **2.3.17 Solid Waste Management Rules 2005**

The Solid Waste Management Department, CDGF has notified these rules for proper waste management.

### **2.3.18 Labor Laws**

The labor laws apply on child labor and measuring instruments.

### **2.3.19 Safety & Civil Defense Laws**

The civil defense laws provide details about safety, fire protection and civil defense.

### **2.3.20 Guidelines for Critical and Sensitive Area**

These guidelines have been prepared under section 12 of Punjab Environmental Protection Act 1997 (Amended 2012) for protection and safety of critical and sensitive localities.

### 3 SCOPING

#### 3.1. Spatial and temporal boundaries of Environmental Assessment

Due to installation of current project land use will change from open land to nutraceuticals unit of M/s Tibb e Mashriq Dawakhana. Within radius of 5-km no industries and residential areas can be seen in below fig but current project will be installed by adopting proper mitigation measures to avoid disturbance to local community. In current project significant emissions will be observed because in nutraceuticals unit manufacturing will be done and wastewater will be treated before disposal to ensure PEQS. Natural gas generators will be used as backup source aNo environmental sensitive area is present within safe distance that could be impacted due to current project installation.

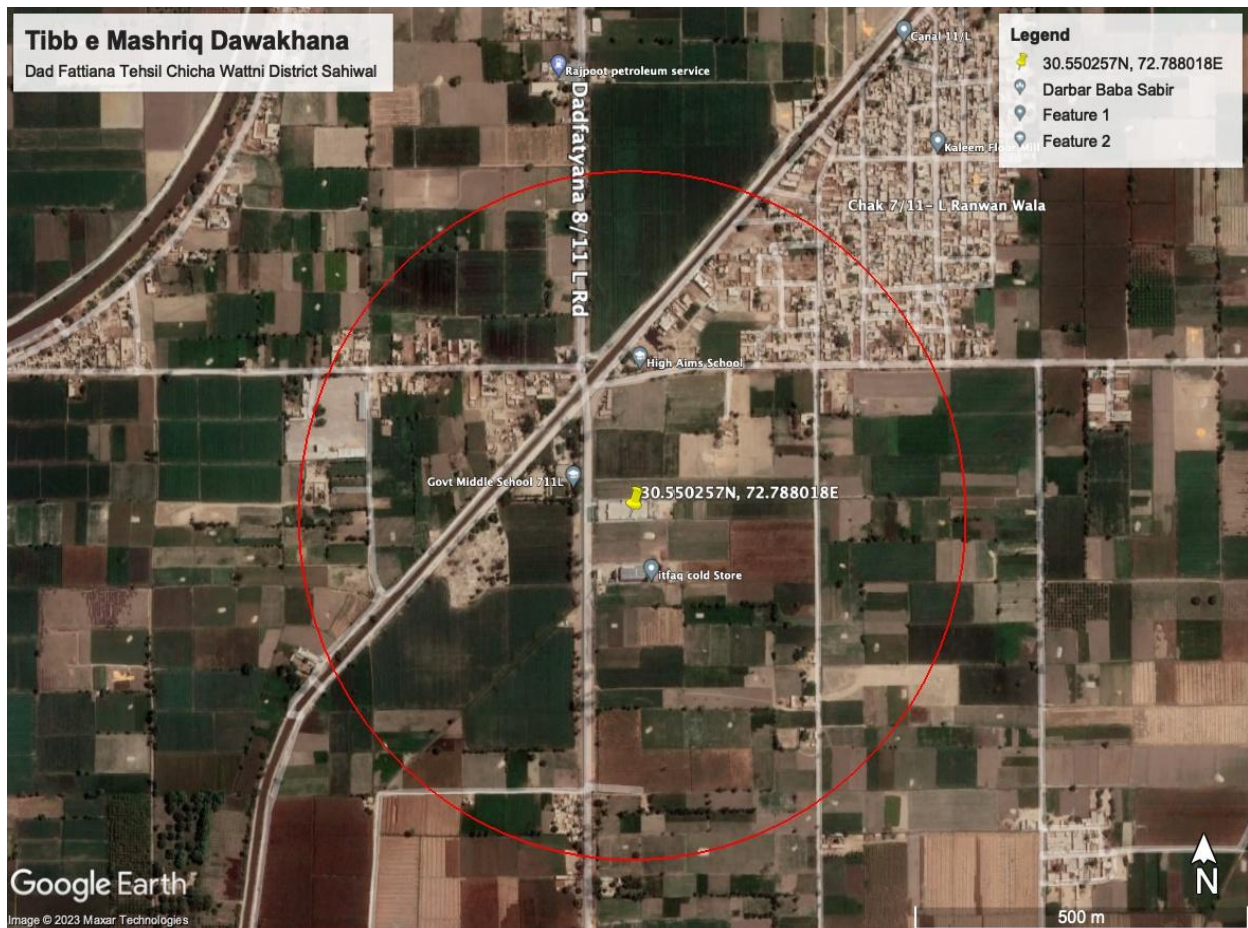


Figure 1-5KM Radius project Site

### **3.2. Important issues and concerns raised during consultation**

During consultation it was observed that maximum of people was in favor of project and following issues and concerns were raised. In chapter 10 Stakeholder Consultation it is mentioned in detail

### **3.3. During survey following concerns of the local community, Government Departments and Environmental Practitioners and experts were noted:**

- Air pollution should be controlled effectively.
- Raw materials should be stored and handled properly only authorized persons should be allowed near the storage area.
- Locals should be preferred for the job opportunities.
- Wastewater should be treated prior to final disposal.
- Solid waste collection should be managed properly by adopting the standard practices of the area.
- Cleanliness of the area should be ensured.
- An effective EMMP should be designed and enforced with truespirit.
- Health of the workers should be ensured.
- Plantation should be carried out at extensive scale.
- Noisy activities should be confined.
- Indigenous tress around the facility should be planted to control air pollution.
- Tree cutting should be avoided to the extent possible.

### **3.4. Significant impacts and factors to be determined**

Main impacts and factors to be determined are

- Occupational Health and safety
- Site Security
- Traffic Management
- Hygiene management
- Community impacts
- Control Air emissions
- Job opportunities for locals
- Confined noisy activities

- Resource conservation
- Avoid excessive water consumption
- Energy efficient techniques must be adopted
- Proper site restoration after construction
- Tree plantation at designated green areas
- Emergency preparedness

## 4 PROJECT DESCRIPTION

### 4.1 Type and category of the project

The capital cost of the project is PKR 230 million. The project will spread over an area of 4 kanals 15 marla. The proposed project is an nutraceuticals unit with capacity of 250-300K packs per day. As a result of the project, around 10-15 persons will get jobs during the construction phase and another around 60-65 persons will be engaged during the production phase of the project.

The project is the establishment of nutraceutical facility and falls under **Schedule II** (list of projects requiring an EIA), **Category B (Manufacturing & Processing) and sub sector 2** (Chemical manufacturing unit including pharmaceuticals and cosmetics) of the IEE / EIA Regulations 2000 made under section 12 of Punjab Environment Protection Act 1997 (Amended 2012). The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project.

### 4.2 Objectives of the project

- To meet the demand of nutraceuticals in the area
- To provide the people an alternative/better source of medicines
- To ensure public health improvement
- To improve the socio-economic value of the area

### 4.3 Alternatives considered, and reasons for their rejection.

#### ALTERNATIVES CONSIDERED REALISTICALLY

Alternatives are recommended and examined to determine the best method of achieving project objectives, while minimizing environmental impacts (WB December 1996). The discussion and analysis of alternatives in an Environmental Impact Assessment (EIA) study should consider other practicable strategies that will promote the elimination of negative environmental impacts identified.

This section covers the project alternatives which were examined for the proposed project of Nutraceutical unit in Sahiwal. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment and health & safety. It outlines the following options that were considered for this project:

- **Site Alternative their selection and rejection criteria**
- **Design/technology alternatives, their selection and rejection criteria**
- **Environmental Alternatives, their selection and rejection criteria**
- **Economic Alternatives, their selection and rejection criteria**

#### **Site Alternative their selection and rejection criteria**

The selected site for nutraceutical project is located at industrial area. The area is developed as an industrial and many industries are in operation in project proximity. The selected project site is ideal from the point of view of compatibility with other land use of the area. The site is also spacious enough to accommodate the proposed facility and its infrastructure. Due to existing infrastructure and its strategic location, it is our considered view that the selected site is ideal and suitable for the proposed development. Additionally, the piece of land is owned by Proponent.

#### **Design/technology alternatives, their selection and rejection criteria**

For installation of nutraceutical project state of art technology will be selected to avoid emissions. Proponent is doing heavy investment for this project so latest/state of art technology will be preferred to ensure good quality products.

#### **Environmental Alternatives, their selection and rejection criteria**

After completion of construction, proper landscaping will be done. Trees of all recommended species will be planted. Green belts and many medium sized plants will be planted as well. Moreover, the proponent is very concerned and conscious about the quality and equally about the environmental protection and resource conservation.

#### **Economic Alternatives, their selection and rejection criteria**

- Currently selected technology and design is economically efficient.

- Tree plantation will be done that will reduce temperature of the area and act as noise barrier.
- Building design will be such that maximum use of day light and LED lights will be installed to minimize electricity consumption.

#### 4.4 Location of the Project Site

The location of the proposed project is Dad Fattiana Tehsil Chicha Wattni District Sahiwal and goggle map is given below:

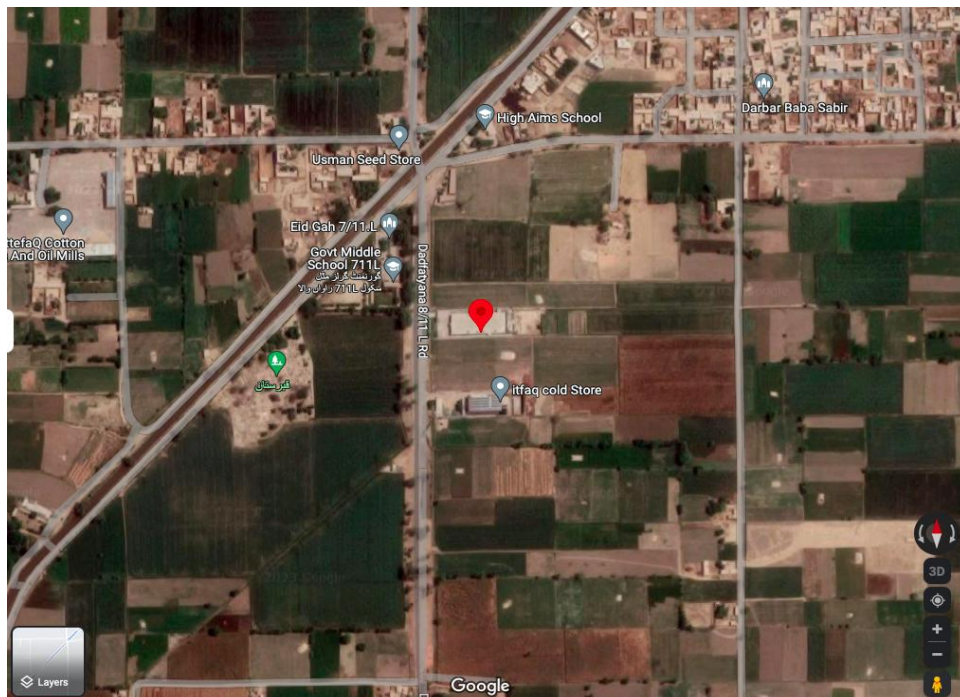


Figure 2 Current Location of the Project Site

#### 4.5 Layout Plan

The project layout plan is attached in the file and Google earth map of the Project area is given below. On google map, the coordinates of the project site are **30.550257N, 72.788018E**.

#### 4.6 Land use of the site

Land selected for the project is agricultural in nature. Due to business point of view, the proponent intends to install nutraceuticals facility at the site as there is high demand for herbal supplements in the vicinity. All the land surrounded by the selected site is also owned by the

proponent so there will be no issue if he wants to extend the business in future. Proper measures will be taken to mitigate and manage all the problems caused to the environment.

#### 4.7 Consultant Details

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

| Sr No.      | Consultant Details |                                                                             |
|-------------|--------------------|-----------------------------------------------------------------------------|
| 1           | Consultant         | Enviro Stewards Company (Pvt.) Limited                                      |
| 2           | Address            | 40/8 New Civil Lines Regency Road Behind State Bank of Pakistan Faisalabad. |
| 3           | Contact No.        | 041-2619600                                                                 |
| Team leader |                    |                                                                             |
| 1           | Name               | Miss Sara Fatima                                                            |
| 2           | Designation        | Senior Environmentalist                                                     |
| 3           | Contact No.        | +92-301-1198600                                                             |

#### 4.8 Magnitude & Cost of the project

The capital cost of the project is PKR 230 million. The project will spread over an area of 4 kanal 15 marla out of which some area will be covered some will be open. The schedule of area will be as follows;

**Table 4-1Area Breakdown of the Project**

| Section wise schedule of manufacturing area |            |
|---------------------------------------------|------------|
| Cooking Room                                | 464 Sq.Ft  |
| Syrup & Packing                             | 1026 Sq.Ft |
| Tablet                                      | 912 Sq.Ft  |
| Capsule                                     | 297 Sq.Ft  |

|                            |                  |
|----------------------------|------------------|
| Khamira & Safoof           | 286 Sq.Ft        |
| Oil                        | 314 Sq.Ft        |
| <b>Nutraceutical block</b> |                  |
| Sachet                     | 314 Sq.Ft.       |
| Creem & ointment           | 286 Sq.Ft.       |
| Packing hall               | 343 Sq.Ft.       |
| <b>General Block</b>       |                  |
| Raw material store         | 1287 Sq.Ft.      |
| Packing material store     | 858 Sq.Ft.       |
| Finished goods store       | 1430 Sq.Ft.      |
| Changing room              | 689 Sq.Ft.       |
| <b>Labs</b>                |                  |
| Micro lab.                 | 400 Sq.Ft.       |
| Q.C lab                    | 572 Sq.Ft.       |
| Pharmacognosy lab          | 188 Sq.Ft.       |
| Total covered area         | 14138 Sq.Ft.     |
| <b>Details of Area</b>     |                  |
| Other covered area         | 4472 Sq.Ft.      |
| Mosque & guard room        | 453 Sq.Ft.       |
| Total area of plot         | 4 kanal 15 marla |

As a result of the project, around 10-15 persons will get jobs during the construction phase and another around 80-90 persons will be engaged during the operation phase of the project. The cost breakdown is given below:

**Table 4-2 Cost Breakdown of the Project**

| Features                                                                                                 | Cost in PKR |
|----------------------------------------------------------------------------------------------------------|-------------|
| 1. Land cost                                                                                             | 180 million |
| 2. Infrastructure development sewerage lines, water supply, boundary walls, electric supply, roads etc.: | 30 million  |
| 3. Solid waste management:                                                                               | 05 million  |
| 4. Landscaping, Green belts development, Parks                                                           | 01 million  |
| 5. WWTP:                                                                                                 | 04 million  |
| Total Cost                                                                                               | 230 million |

## 4.9 Vegetative Features of Land

Vegetation at the site is dry deciduous scrub type and includes shrubs and herbs. Some of the vegetation found on the site involves Kikkar and Gandibooti.

## 4.10 Plantation Plan

Approximately 1000 plants will be planted in and around the project vicinity to enhance the landscape beauty and to make the ambient air quality better. These plants will include ornamental plants as well. But most trees will be shade providing.

## 4.11 Proposed schedule for implementation (Tentative)

Project schedule (tentative) is described here under;

**Stage I:** The clearing of land, preparation of land for construction activity.

**Stage II:** During this phase machinery will be brought to the site and installed.

**Stage III:** In this phase all the outstanding activities will be completed, construction activities will be initiated.

**Stage IV:** after completing construction, employees will be hired and staff will be assigned their respective work. The operation activities will be initiated.

The proponent intends to complete the construction process in 2 and half months approximately.

Table 1-Schedule of Implementation

| Activities                             | Times Frame |  |           |  |           |  |           |  |           |  |
|----------------------------------------|-------------|--|-----------|--|-----------|--|-----------|--|-----------|--|
|                                        | Four Week   |  | Four Week |  | Four Week |  | Four Week |  | Four Week |  |
| Preliminary Phase (Land Acquiring etc) |             |  |           |  |           |  |           |  |           |  |
| Design Phase                           |             |  |           |  |           |  |           |  |           |  |
| Pre-Construction                       |             |  |           |  |           |  |           |  |           |  |

## 4.12 Road Access

### Figure 3 Road Access Map

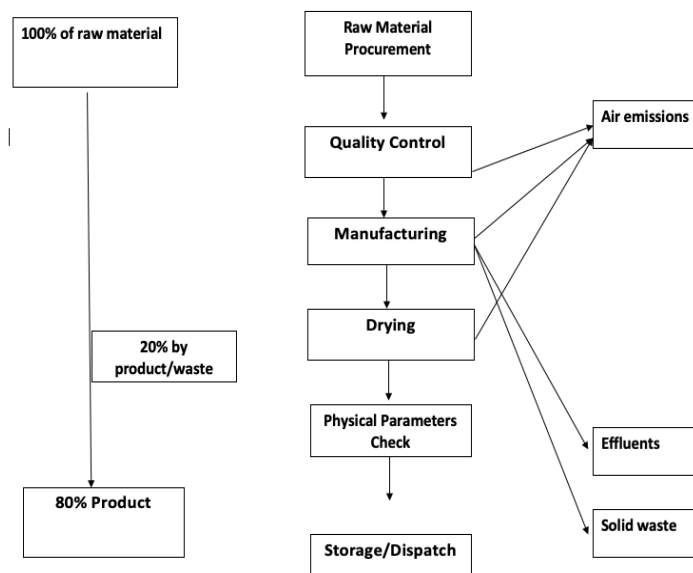
### 4.13 Description of the project

**Description of each product has been given with details in the following.**

**Raw materials:** Herbal Extracts/Essences

**Final products:** Syrups, tablets, khamir/safoof

### Mass Balance Details of input, output/products



## Process Description of Khamira & Safoof Manufacturing

### I. Arrival of Raw Material

A **standardized** herbal **extract** is an herb **extract** that has one or more components present in a specific, guaranteed amount, usually expressed as a percentage. The intention behind the **standardization** of herbs is to guarantee that the consumer is getting a product in which the chemistry is consistent from batch to batch.

Raw material including extracts from various products will be stored in the warehouse. These will be imported from various countries. These include various extracts like vitamins, multivitamins, and minerals. The ultimate raw material from this is garlic, ginger, Glycyrrhiza.

### II. Dispensing

These standardized extracts will be checked in the quality lab, where these products are processed into various quantities of the products. Products will have different doses of the standardized extracts.

The SOPs for the dispensing are following. The procedure is as follows,

The material to be dispensed as per manual calculation and system generated SAP pre dispensing sheet, duly signed and checked by Q.A production person and store person. The full batch once dispensed in dispensing area is transferred to the day store to warehouse. The dispensed material container will be labeled as per Batch size, Batch weight, Mfg Date, Sign & Date.

### **III. Sieving**

A sieve analysis (or gradation test) is a practice or procedure used in civil engineering and chemical engineering to assess the particle size distribution (also called *gradation*) of a granular material by allowing the material to pass through a series of sieves of progressively smaller mesh size and weighing the amount of material that is stopped by each sieve as a fraction of the whole mass.

The size distribution is often of critical importance to the way the material performs in use. A sieve analysis can be performed on any type of non-organic or organic granular materials including sands, crushed rock, clays, granite, feldspars, coal, soil, a wide range of manufactured powders, grain and seeds, down to a minimum size depending on the exact method. Being such a simple technique of particle sizing, it is probably the most common.

### **IV. Mixing**

In industrial process engineering, mixing is a unit operation that involves manipulation of a heterogeneous physical system with the intent to make it more homogeneous. Familiar examples include pumping of the water in a swimming pool to homogenize the water temperature, and the stirring of pancake batter to eliminate lumps (deagglomeration).

### **V. Filling and Sealing**

Fillers (or filling machines) are used for packaging, mainly for final product into the packaging. These are used to fill either a bottle or sachet, depending on the product. Sealers are used to seal the product in to the packaging.

### **VI. Packing**

The final products of sachet will be packaged into cartons of bulk. It's mostly done mechanically or manually.

## VII. Transfer to Finished Goods Store

Using loaders, the cartons will be transferred to the store for storage.

### Process Description of Tablet Manufacturing

#### I. Arrival of Raw Material

A **standardized** herbal **extract** is an herb **extract** that has one or more components present in a specific, guaranteed amount, usually expressed as a percentage. The intention behind the **standardization** of herbs is to guarantee that the consumer is getting a product in which the chemistry is consistent from batch to batch.

Raw material including extracts from various products will be stored in the warehouse. These will be imported from various countries. These include various extracts like vitamins, multivitamins, and minerals. The ultimate raw material from this is garlic, ginger, Glycyrrhiza.

#### II. Dispensing

These standardized extracts will be checked in the quality lab, where these products are processed into various quantities of the products. Products will have different doses of the standardized extracts.

The SOPs for the dispensing are following. The procedure is as follows,

The material to be dispensed as per manual calculation and system generated SAP pre dispensing sheet, duly signed and checked by Q.A production person and store person. The full batch once dispensed in dispensing area is transferred to the day store to warehouse. The dispensed material container will be labeled as per Batch size, Batch weight, Mfg Date, Sign & Date.

After dispensing there will be two processes for tablet manufacturing.

- Direct Mixing
- Wet granulation

## **Direct Mixing**

### **I. Sieving**

A sieve analysis (or gradation test) is a practice or procedure used in chemical engineering to assess the particle size distribution (also called *gradation*) of a granular material by allowing the material to pass through a series of sieves of progressively smaller mesh size and weighing the amount of material that is stopped by each sieve as a fraction of the whole mass.

The size distribution is often of critical importance to the way the material performs in use. A sieve analysis can be performed on any type of non-organic or organic granular materials including sands, crushed rock, clays, granite, feldspars, coal, soil, a wide range of manufactured powders, grain and seeds, down to a minimum size depending on the exact method. Being such a simple technique of particle sizing, it is probably the most common.

### **II. Mixing**

In industrial process engineering, mixing is a unit operation that involves manipulation of a heterogeneous physical system with the intent to make it more homogeneous. Familiar examples include pumping of the water in a swimming pool to homogenize the water temperature, and the stirring of pancake batter to eliminate lumps (deagglomeration).

### **III. Filling and Sealing**

Fillers (or filling machines) are used for packaging, mainly for final product into the packaging. These are used to fill either a bottle or sachet, depending on the product. Sealers are used to seal the product in to the packaging.

### **IV. Packing**

The final products of sachet will be packaged into cartons of bulk. It's mostly done mechanically or manually.

### **V. Transfer to Finished Goods Store**

Using loaders the cartons will be transferred to the store for storage.

## **Wet granulation**

Wet granulation involves the massing of a mix of dry primary powder particles using a granulating fluid (the process of adding a liquid solution to powders). The fluid contains a solvent which must be volatile so that it can be removed by drying and be non-toxic. Typical liquids include water, ethanol, and isopropanol, either alone or in combination. The granulation liquid may be used alone or, more usually, as a solvent containing a dissolved adhesive (also referred to as a binder or binding agent) which is used to ensure particle adhesion once the granule is dry. The density of each granule is increased by increasing the amount of binding solution as well as the mechanical action of the mixer. Therefore, controlling the amounts of solution, binder, and mechanical action allows one to control the strength and density of the granule.

### **I. Binders**

In wet-granulation process, binders promote size enlargement to produce granules and thus improve flowability of the blend during the manufacturing process.

**Natural Polymers:** Starch, Pregelatinized Starch

**Synthetic polymers:** PVP, Methyl cellulose, HPMC

**New Natural and Synthetic binders:** Khaya gum, Leucaena leucocephala seed gum, Anacardium occidentale gum. Gellan gum, Combination of detarium gum and veegum.

### **II. Drying**

The granulated mixer will be dried after binding properly. This drying process is done by Tray Drying Ovens (several hours). Older technology (like baker's ovens) with a lot of manual manipulation -liquid can only be lost from the upper surface of the granule packed in the tray.

### **III. Sizing**

Wet Milling - directly after the mixer granulator and before the dryer  
Dry Milling - directly after the dryer

The mills used are to break down lumps or agglomerates by screening and not for high This helps to give a more uniform granule size A typical mill for wet or dry milling would be a Comil. The impeller blade is not in contact with the screen but it "pushes" the granule through when it rotates.

#### **IV. Granule Lubrication**

After drying and before compression a lubricant is added, and the granule is blended for a short time (the lubrication blend). The lubricant forms low strength bonds on the surface for the granules which helps flow and prevents the granules sticking to the compression punches, -It also helps prevent the tablet sticking in the die and assists in tablet ejection. The most common lubricant is Magnesium stearate.

#### **V. Filling and Sealing**

Fillers (or filling machines) are used for packaging, mainly for final product into the packaging. These are used to fill either a bottle or sachet, depending on the product. Sealers are used to seal the product in to the packaging.

#### **VI. Packing**

The final products of sachet will be packaged into cartons of bulk. It's mostly done mechanically or manually.

#### **VII. Transfer to Finished Goods Store**

Using loaders, the cartons will be transferred to the store for storage.

### **Process Description of Capsule**

#### **I. Gelatin Preparation**

A concentrated solution of gelatin is prepared by dissolving the gelatin in demineralized water which has been heated to 60–70°C in jacketed pressure vessels. This solution contains 30 – 40% w/w of gelatin and is highly viscous, which causes bubbles because of air entrapment. The presence of these bubbles in the final solution would yield capsules of inconsistent weight and

would also become problematic during capsule filling and upon storage. To remove the air bubbles, a vacuum is applied to the solution; the duration of this process varies with batch size.

### **I. Arrival of Raw Material**

A standardized herbal extract is an herb extract that has one or more components present in a specific, guaranteed amount, usually expressed as a percentage. The intention behind the standardization of herbs is to guarantee that the consumer is getting a product in which the chemistry is consistent from batch to batch.

Raw material including extracts from various products will be stored in the warehouse. These will be imported from various countries. These include various extracts like vitamins, multivitamins, and minerals. The ultimate raw material from this is garlic, ginger, Glycyrrhiza.

### **II. Dispensing**

These standardized extracts will be checked in the quality lab, where these products are processed into various quantities of the products. Products will have different doses of the standardized extracts.

The SOPs for the dispensing are following. The procedure is as follows,

The material to be dispensed as per manual calculation and system generated SAP pre dispensing sheet, duly signed and checked by Q.A production person and store person. The full batch once dispensed in dispensing area is transferred to the day store to warehouse. The dispensed material container will be labeled as per Batch size, Batch weight, Mfg Date, Sign & Date.

### **III. Sieving**

A sieve analysis (or gradation test) is a practice or procedure used in civil engineering and chemical engineering to assess the particle size distribution (also called *gradation*) of a granular material by allowing the material to pass through a series of sieves of progressively smaller mesh size and weighing the amount of material that is stopped by each sieve as a fraction of the whole mass.

The size distribution is often of critical importance to the way the material performs in use. A sieve analysis can be performed on any type of non-organic or organic granular materials including sands, crushed rock, clays, granite, feldspars, coal, soil, a wide range of manufactured

powders, grain, and seeds, down to a minimum size depending on the exact method. Being such a simple technique of particle sizing, it is probably the most common.

#### **IV. Mixing**

In industrial process engineering, mixing is a unit operation that involves manipulation of a heterogeneous physical system with the intent to make it more homogeneous. Familiar examples include pumping of the water in a swimming pool to homogenize the water temperature, and the stirring of pancake batter to eliminate lumps (deagglomeration).

#### **V. Filling and Sealing**

Fillers (or filling machines) are used for packaging, mainly for final product into the packaging. These are used to fill either a bottle or sachet, depending on the product. Sealers are used to seal the product in to the packaging.

#### **VI. Packing**

The final products of sachet will be packaged into cartons of bulk. It's mostly done mechanically or manually.

#### **VII. Transfer to Finished Goods Store**

Using loaders, the cartons will be transferred to the store for storage.

### **Process Description of Syrup manufacturing**

#### **I. Dispensing**

These standardized extracts will be checked in the quality lab, where these products are processed into various quantities of the products. Products will have different doses of the standardized extracts.

The SOPs for the dispensing are following. The procedure is as follows,

The material to be dispensed as per manual calculation and system generated SAP pre dispensing sheet, duly signed and checked by Q.A production person and store person. The full batch once dispensed in dispensing area is transferred to the day store to warehouse. The dispensed material container will be labeled as per Batch size, Batch weight, Mfg Date, Sign & Date.

## II. Filtration

**Filtration** is the **process** in which solid particles in a liquid or gaseous fluid are removed using a filter medium that permits the fluid to pass through but retains the solid particles. ... In some **processes** used in the production of chemicals, both the fluid **filtrate** and the solid filter cake are recovered.

## III. Bulk Syrup Preparation

Syrup will be manufactured in bulk. After filtration bulk syrup material will be allowed to cool. The material from tanks will be transferred to the processing machine, where it will be filtered again for the solid particles.

## IV. Filling of syrup and Sealing of Bottles

The final product of syrup will be filled in syrup bottles mechanically. The bottles will be sealed later for final storage I storeroom.

### List of machinery

#### 4.14. List of machinery

Following machines will be used for the veterinary medicines manufacturing unit.

Table 2-List of Machinery

### WAREHOUSE

| Sr. # | Name of Machinery & Equipment | Specification      | Qty. |
|-------|-------------------------------|--------------------|------|
| 1.    | Digital Weighing Balance      | Weigh up to 250 kg | 04   |
| 2.    | Digital Weighing Balance      | Weigh up to 500g   | 02   |
| 3.    | Dispensing booth              | -                  | 02   |
| 4.    | Sampling booth                | -                  | 01   |

### DRY/POWDER SECTION

| Sr. # | Name of Machinery & Equipment    | Specification | Qty. |
|-------|----------------------------------|---------------|------|
| 1.    | Filling Machine with Accessories | Automatic     | 02   |

|    |                |        |    |
|----|----------------|--------|----|
| 2. | Cone Mixer     | 100 kg | 01 |
| 3. | De-humidifier  | 5 L/hr | 04 |
| 4. | Dry granulator | -      | 01 |
| 5. | Tray dryer     | 100 kg | 01 |

### **ORAL/INJECTABLE LIQUID SECTION**

| Sr. # | Name of Machinery & Equipment       | Specification          | Qty. |
|-------|-------------------------------------|------------------------|------|
| 1.    | SS Double Jacket Tank with mixer    | 500Liter               | 01   |
| 2.    | SS Formulation Tank with silver san | 1000 Liter             | 01   |
| 3.    | SS Formulation Tank with silver san | 500 Liter              | 02   |
| 4.    | SS Formulation Tank                 | 100 Liter              | 04   |
| 5.    | SS Storage Tank with mixer          | 1000 Liter             | 01   |
| 6.    | SS Filling tank                     | 500 Liter              | 01   |
| 7.    | SS Filtration Assembly              | -                      | 01   |
| 8.    | SS Syrup Filling Line               | Automatic<br>6- Nozzle | 01   |
| 9.    | SS Doze Filling                     | 2- Nozzle              | 02   |
| 10.   | Labeling Machine                    | Semi-automatic         | 02   |
| 11.   | Colloidal Mill                      | 25 Liter               | 01   |
| 12.   | Transfer Pump                       | -                      | 10   |
| 13.   | Reverse Osmosis & Deionizer Plant   | 2500 Liter/hr          | 01   |

### **HVAC SYSTEM**

| Sr. # | Name of Machinery & Equipment | Specification | Qty. |
|-------|-------------------------------|---------------|------|
| 1.    | HVAC                          | -             | 25   |

### **QUALITY CONTROL LABORATORY**

| Sr. # | Name of Machinery & Equipment   | Specification | Qty. |
|-------|---------------------------------|---------------|------|
| 1.    | Hot Plate Magnetic Stirrer      | -             | 01   |
| 2.    | Melting Point Apparatus Digital | -             | 01   |
| 3.    | Drying Oven                     | 50 Liter      | 01   |
| 4.    | Water Distiller                 | 5 Liter       | 01   |
| 5.    | Stability Chamber               | -             | 01   |
| 6.    | Conductivity meter + TDS meter  | -             | 01   |
| 7.    | Ultrasonic Bath                 | 5 Liters      | 01   |
| 8.    | Water Bath                      | 6 Wholes      | 01   |
| 9.    | Dissolution Apparatus           | 6 Vessels     | 01   |
| 10.   | Disintegrator                   | 2 stations    | 01   |
| 11.   | Friabilator                     | Single Drum   | 01   |
| 12.   | Hardness Tester                 | Semi-Auto     | 01   |
| 13.   | Vacuum Desiccators              | -             | 01   |
| 14.   | Polarimeter                     | -             | 01   |
| 15.   | Heating Mantle                  | 1Lit Flask    | 01   |
| 16.   | Centrifuge                      | 6 wholes      | 01   |
| 17.   | Digital Balance                 | -             | 03   |
| 18.   | Analytical Balance              | -             | 03   |
| 19.   | Muffle Furnace                  | Temp. 1100°C  | 01   |
| 20.   | Viscometer                      | -             | 01   |
| 21.   | Moisture Analyzer               | -             | 01   |
| 22.   | pH Balance Bench Top            | -             | 01   |
| 23.   | Vacuum Pump                     | -             | 01   |
| 24.   | Micrometer                      | -             | 01   |

|     |                                            |                   |    |
|-----|--------------------------------------------|-------------------|----|
| 25. | Vernier Calliper                           | -                 | 01 |
| 26. | Sonicator                                  | 2.5 Liter         | 01 |
| 27. | Thin layer Chromatography                  | -                 | 01 |
| 28. | UV Spectrophotometer                       | Split Double Beam | 02 |
| 29. | High Pressure Liquid Chromatography (HPLC) | Gradient          | 02 |
| 30. | Gas chromatography                         | -                 | 01 |
| 31. | Atomic absorption                          | -                 | 01 |

### **LAB**

| Sr. # | Name of Machinery & Equipment | Specification | Qty. |
|-------|-------------------------------|---------------|------|
| 1.    | Hot Incubator                 | -             | 01   |
| 2.    | Cool Incubator                | -             | 01   |
| 3.    | Colony Counter                | Digital       | 01   |
| 4.    | Autoclave                     | -             | 01   |
| 5.    | Vortex Shaker                 | -             | 01   |
| 6.    | Laminar Air Flow Hood         | -             | 01   |
| 7.    | Manometer                     | -             | 01   |

#### **4.1.5. Details of restoration and rehabilitation at the end of the project life**

The estimated life of the project is about 25 years approximately. Much before the project approaches the end of its first life cycle it will be completely renovated; refurbished and even new/latest art of the equipment will replace the older one. All civil structures and related infrastructures will be extensively renovated.

All activities will be carried out in accordance with prevailing environmental management laws and controls so as to avoid any damage to any segment of environment or human health around the project site. Rehabilitation would not be required as such at current project site,

however, restoration plans to be practiced during different phases of the project at various levels are illustrated hereunder:

#### **4.16. Government approvals and leases:**

As the approval from Environmental Protection Agency (EPA), Government of Punjab, and Lahore is mandatory before the start of construction of the project in compliance with Section-12 of the Punjab Environmental Protection (Amendment) Act 2012, therefore, this EIA report has been prepared to submit in EPA Punjab

## 5. DESCRIPTION OF THE ENVIRONMENT

An environmental baseline study is intended to establish a data base against which potential impacts can be predicted and managed subsequently. The EIA of the proposed project covers a comprehensive description of the project area, including regional resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project.

A site visit was conducted to survey the field area for collection of relevant data. Interviews were conducted with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project. Various Governmental and Non-Governmental Organizations (NGOs) were also visited for the collection of relevant data and their views on the proposed project were recorded for incorporation into the EIA report. The environmental impacts of any activity or process will be assessed on the basis of deviation from the baseline or normal situation. The following components form part of the baseline:

- i. **Physical Environment**
- ii. **Ecological Environment**
- iii. **Socioeconomic Environment**

### 5.1. Physical Environment

This part examines the physical resources such as topography, soil, climate, surface and ground water resources and quality, ambient air quality and geology of not only the project site but also the city as a whole to assess whether the project under assessment can or does have any impacts on any of these parameters. The description of physical environment of Sahiwal and the project site is presented in the following sub sections.

#### 5.1.1. Geological Formation

Sahiwal – Montgomery – is a division in Punjab, Pakistan. It is the administrative center of Sahiwal District and Sahiwal Division. It is the 21st largest city of Pakistan by population. Sahiwal is approximately 180 km from the major city Lahore and 100 km from Faisalabad and lies between Lahore and Multan.

### 5.1.2. Topography

Sahiwal Division is in the southeast of Punjab. From Multan Division it lies between 30-40 north latitude and 73-06 longitude. It is 500 ft (150 m) above sea level. It forms a parallelogram lying NE-SW along the River Ravi. It is 100 km from east to west and 45 km from the north-western boundary of the Division of Sahiwal, Division Faisalabad, District Toba Tek Singh. The dry River Khushak Bias separates it from the district Pakpattan. Okara District is east of the division. District Khanewal and District Vehari form boundaries with the division.

### 5.1.3. Geology and Soil

The soil in Sahiwal is fertile. The vegetation is short and scrubby. The land supports grasses, shrubs and some forests. Alluvial deposits in Sahiwal are remarkable structural features of Sahiwal Tehsils. No visible signs of soil contamination were observed at the project location during the site visits. There is no sign of soil erosion or landslide anywhere within 500 m of the project site.



Figure 4 Soils of Sahiwal

#### 5.1.4. Seismicity

Seismic Zoning Map of Pakistan showing Project site area is presented as Figure indicating zones according to the Building Code of Pakistan - 2007. The project area falls in Seismic Zone 2A zone according to the Seismic Zoning Map of Pakistan.

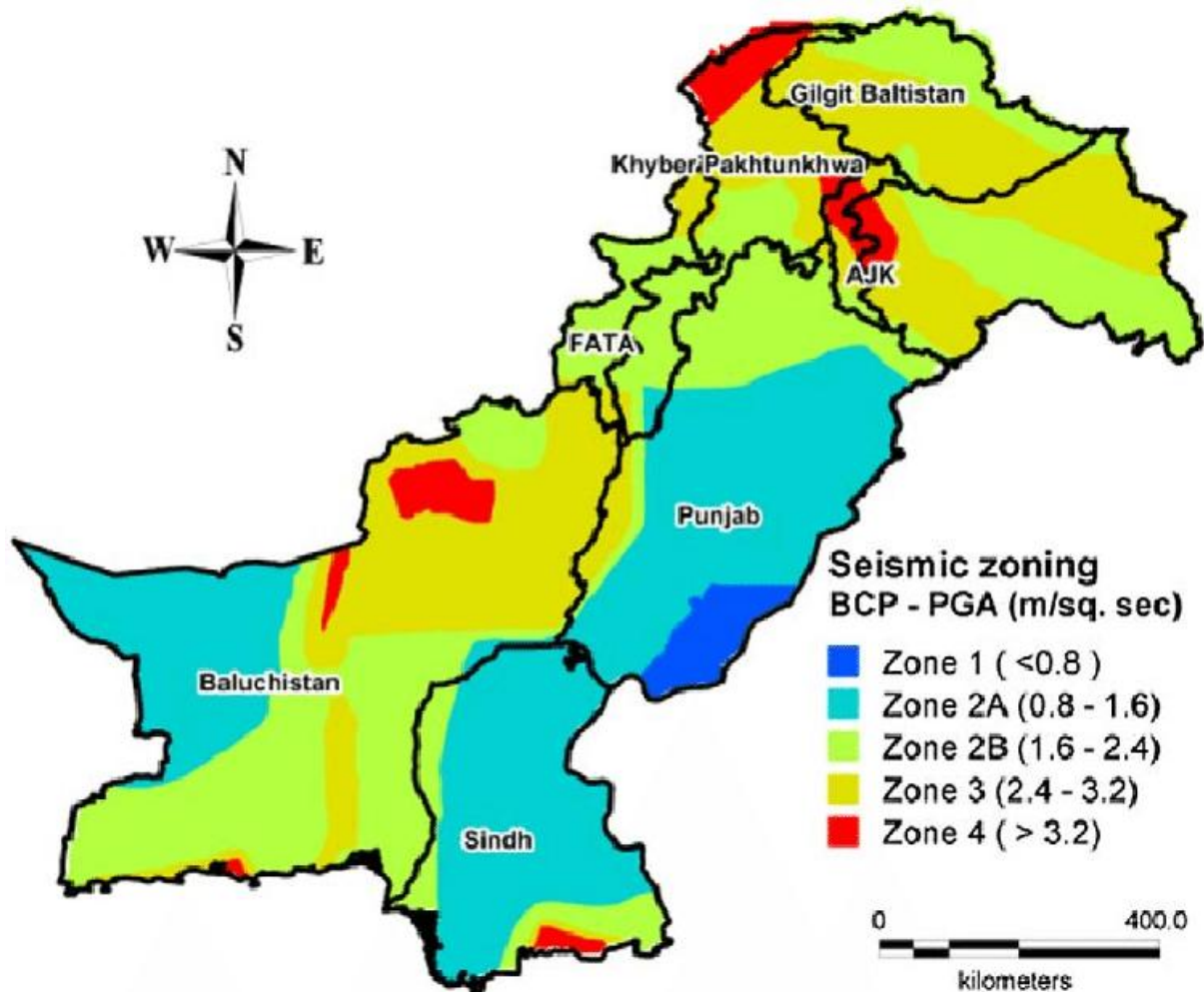


Figure 5 Seismic Zoning Map of Pakistan

#### 5.1.5 Climate

Seasonal climate conditions inter alia other environmental issues must be considered for the design and execution of a Project. The climate was an influencing factor affecting the construction of road and other engineering structure are the mean physical and chemical conditions including air, temperature, precipitation, humidity and evaporation. However to determine the overall effect of the climatic stresses, daily and seasonal temperature changes, site attitude, direct solar radiation, and precipitation must be considered.

The climate of Sahiwal is semiarid. It is intermediate between a Desert climate (BW) and a Humid subtropical climate. The summer season is lengthy which begins in April and continues till October for about seven months. The hottest months are May, June and July. The mean maximum and minimum temperatures during this period are 42 and 29 degree centigrade respectively. The winter is pleasant. The coldest months are December, January and February. During this period the mean maximum and mean minimum temperatures are 21 and 5 degree centigrade respectively. Most of the rain falls during monsoon season from July to September. Winter rain is very scarce. Annual rainfall is about 349 mm.

**Table 5-1 Climate of Sahiwal (District Sahiwal, 2000)**

| Month       | Mean temperature.<br>Max (Celsius) | Mean temperature<br>min (Celsius) | Precipitation<br>(%) | Relative<br>humidity (%) |
|-------------|------------------------------------|-----------------------------------|----------------------|--------------------------|
| January     | 19.7                               | 5.0                               | 33.8                 | 66.2                     |
| February    | 21.6                               | 7.7                               | 50.0                 | 60.0                     |
| March       | 26.0                               | 12.5                              | 60.5                 | 53.8                     |
| April       | 33.0                               | 17.7                              | 36.5                 | 41.8                     |
| May         | 38.1                               | 22.0                              | 31.8                 | 32.5                     |
| June        | 40.5                               | 25.8                              | 51.6                 | 37.8                     |
| July        | 35.7                               | 25.8                              | 23.3                 | 67.8                     |
| August      | 34.4                               | 25.3                              | 22.2                 | 70.8                     |
| September   | 35.0                               | 23.0                              | 77.7                 | 65.5                     |
| October     | 33.1                               | 16.6                              | 12.2                 | 55.6                     |
| November    | 27.8                               | 9.9                               | 9.9                  | 62.7                     |
| December    | 21.5                               | 5.7                               | 30.4                 | 68.9                     |
| Annual mean | 30.6                               | 16.4                              | 36.6                 | 56.4                     |

Sahiwal shows no prevailing wind directions in the mornings. Wind direction is evenly distributed throughout the year. In the late afternoon, winds are mainly from southwest, except in July and August when southeastern winds dominate.

#### 5.1.6. Hydrology and Drainage

Most of the water available for use is ground water. Water for irrigation is available by link canals. There are no surface water resources like canal or ponds, near the project area. The area surrounding the project site is poorly drained.

Ground water is the principal source of municipal water supply Bhutto Nagar Sahiwal. This is also the case in the immediate vicinity of the site. The City's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area. Groundwater is pumped from 60-65 ft feet and is generally good for direct consumption.

#### 5.1.7. Land Use

The dominant land use is agricultural land in 300 m radius. **Figure 8** shows the land use pattern of the Project Area.



Figure 6 Dominant Land use of Project Area

#### 5.1.8. Noise Levels

Noise is described as an unwanted sound emitted from un-avoidable sources of anthropogenic activities. Daily based natural induced sources of noise are rare to none but human induced noise sources are plenty and un-avoidable. Physically, there is no distinction between sound and noise. Sound is a sensory.

The perception and the complex pattern of sound waves is labeled noise, music, speech, low altitude aero plane flying etc. The noise pollution in the project area is source of pollution

and nuisance. Among eight noise measurement locations in the cities, the study says, on average, the noise level ranged from 57-60 dB (A) in and around the project site.

### 5.1.9. Ambient Air Quality

Atmospheric pollution means the imbalance in the normal air chemistry. It can occur due to the addition of a new chemical into atmosphere or by the change in concentration of the chemicals already existing in the atmosphere. Atmospheric pollution particularly in urban area has a strong impact upon daily life. The reasons of such changes can both be natural as well as anthropogenic. Ambient air quality is a key to measure the concentration of the various chemicals in atmosphere; especially of the chemicals which pose detrimental effects on health, safety and environment, to have a comparison with their safe concentrations, as established in WHO Standards and NAAQS.

Table 5-2 Ambient Air Quality Monitoring Data

| Parameters           | CO                | SO <sub>2</sub>   | NO <sub>2</sub>   | PM <sub>10</sub>  | SPM               | O <sub>3</sub>    |
|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Unit                 | mg/m <sup>3</sup> | µg/m <sup>3</sup> | µg/m <sup>3</sup> | µg/m <sup>3</sup> | µg/m <sup>3</sup> | µg/m <sup>3</sup> |
| <b>Proposed Site</b> | 0.1               | 35.46             | 16.98             | 33.89             | 195               | 41.51             |
| <b>NEQS</b>          | 5                 | 120               | 80                | 150               | 500               | 130               |

### 5.1.10. Surface Water and Ground Water

There are no surface water resources like canal or ponds, near the project area. The area surrounding the project site is poorly drained.

Ground water is the principal source of municipal water supply Bhutto Nagar Sahiwal. This is also the case in the immediate vicinity of the site. The City's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area. Groundwater is pumped from 60-65 ft feet and is generally good for direct consumption.

## 5.2. Ecological Environment

Sahiwal is enriched with the presence of natural flora and fauna; although with the growing population and development activities, the presence of some has been somewhat affected. There are however no significant or well-shaped trees and shrubs on the project site. There are some trees only along the main roads.

### 5.2.1. Forestry

Archaeologists suggest that the forests have been present in Sahiwal area since the times of the Indus Valley civilization. Sculptures, stamps and seals depicting the animals such as bull, elephant, zebra and rhinoceros have been found. These are the animals of a humid subtropical climate.

### 5.2.2. Wildlife/Birds/Mammals

Snakes, mammals, lizards, siisies, doves are seen in this area. Mammals present in and around the Project Area include – Wild boar (C), Golden Jackal (C), Red fox (C) and Fruit bats (C).

**Note:** T= Threatened, V= Vulnerable, R= Rare, C= Common.

**Reptiles:** Reptiles present in and around the Project Area – Russell’s viper, Indian Cobra, pit viper and Saw scalded viper.

**Birds:** Due to the agricultural land in and around the project area commonly found birds species are;

**Table 5-3 Scientific Names of Birds in Project Site**

| Common English name | Scientific name              |
|---------------------|------------------------------|
| Peregrine Falcon    | <i>Falco peregrinus</i>      |
| Kestrel             | <i>Falco tinnunculus</i>     |
| Indian sparrow      | <i>Passer domesticus</i>     |
| Crow                | <i>Corvus brachyrhynchos</i> |
| Kingfisher          | <i>Alcedinidae</i>           |
| Owl                 | <i>Bubo virginianus</i>      |



Figure 7 Common Birds in Sahiwal area

### 5.2.3. Fauna

The Sahiwal cattle breed, a dairy breed of Zebu or "humped cattle" is grown in the region. This cattle breed is tick resistant, heat tolerant and resistant to external and internal parasites. Due to their heat tolerance and high milk production, Sahiwal cattle are grown in other Asian countries, African nations such as Kenya, Burundi, Somalia, Sierra Leone and Nigeria and Caribbean nations such as Jamaica, and Guyana.

Other livestock types that are grown in Sahiwal include sheep, and goat. Fish and poultry are also in abundant. The Nili-Ravi is a breed of domestic water buffalo native to the Sahiwal area.

### 5.2.4. Flora

Vegetation of the area is dry deciduous scrub type. The stocking on the whole is poor. The southern slopes are often devoid of vegetation. While northern slopes carry some minor vegetation. With the shifting of capital and urbanization of the tract, the majority of original vegetation of the tract was removed and replaced by commercial and residential shrubs. Grasses are abundant, like *Aristida depressa* (Lamb), *Cymbopogon Jawarnica* (khawi) etc.



Figure 8 Common Trees in Sahiwal Area

Table 5-4 Type of Flora in the Project Area

| Types of trees | Species name              |
|----------------|---------------------------|
| Peepal         | <u>Sacred fig</u>         |
| Bakain         | <u>Melia azedarach</u>    |
| Peelu          | <u>Salvadora persica</u>  |
| Safaidda       | <u>Eucalyptus</u>         |
| Bargad         | <u>Banyan</u>             |
| Neem           | <u>Azadirachta indica</u> |
| Kikar or Babul | <u>Acacia nilotica</u>    |
| Shisham        | <u>Dalbergia sissoo</u>   |
| Okaan          | <u>Tecomella undulata</u> |
| Jundi          | <u>Prosopis cineraria</u> |

Table 5-5 Type of Shrubs and Herbs in the Project Area

| Local Name  | Scientific Name          |
|-------------|--------------------------|
| Gandi Booti | Parthenium heterophyllum |
| Bhang       | Cannabis sativa          |
| Phog        | Calligonum polygonoides  |
| Bhekar      | Adiantum vasica          |
| Malla       | Zizyphus nummularia      |
| Nara        | Arrundodonax             |

### 5.3. Socio Economic Assessment

Social change is the consequence of almost any intrusion into the community life of any society. The intrusion can be in the form of any developmental projects or nonspecific, less tangible forms such as increased exposure to other cultures, technological changes and so on. Community, with special reference to environment and conservation of natural resources.

### **5.3.1. Demographic Profile**

The population of Sahiwal is approximately 6,271,247 according to the 1998 census which includes many people who come from Punjab villages looking for work in the city. The population density was 608 people per square kilometer. Forty-seven percent were female. Seventy-five percent lived in an urban environment. The urban literacy rate was 60.7 percent. The rural literacy rate was 33.8 percent

### **5.3.2. Languages and Major Casts**

Punjabi, and Urdu are spoken in the city. Main castes are chishti, Rehmani, LAK, Chadhar, Jatt, Tagga, Ansari, Butt, Dulu, Sayal, Kamboh, Bhadru, Mughal, Dogar, Sanpal, Gujjar, Arain, Rajput, Tajra, Hiraj and Shaikh Awan.

### **5.3.3. Religion**

The population of Sahiwal is over 99% Muslim.

### **5.3.4. Dress**

Majority of the people wear Qameez and Shalwar. English dress, shirt and Trousers are also common in Sahiwal as well like other big cities of Pakistan.

## **5.4. Quality of Life Values**

### **5.4.1. Health Facilities**

Medical facilities are readily accessible in city in a 100 kilometer radius, being the district headquarters and due to its importance as a military headquarters. Care hospital and Shah Hospital are the main hospitals in the area.

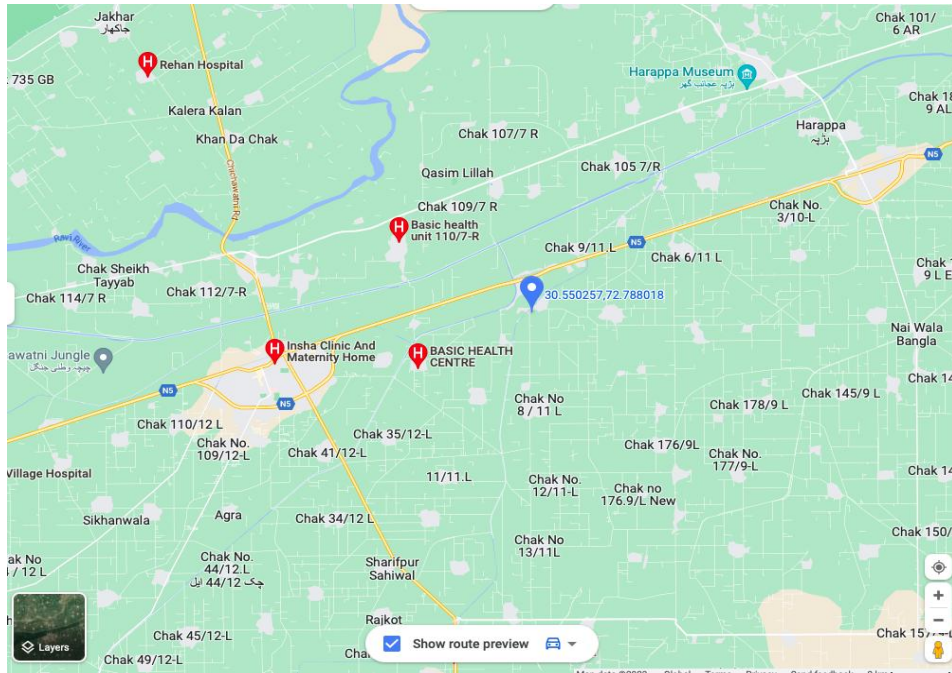


Figure 9-Nearby Hospitals

#### 5.4.2. Customs

The peoples are very much concerned about castes and beliefs, visiting shrines is very common among them.

#### 5.4.3. Electric Supply

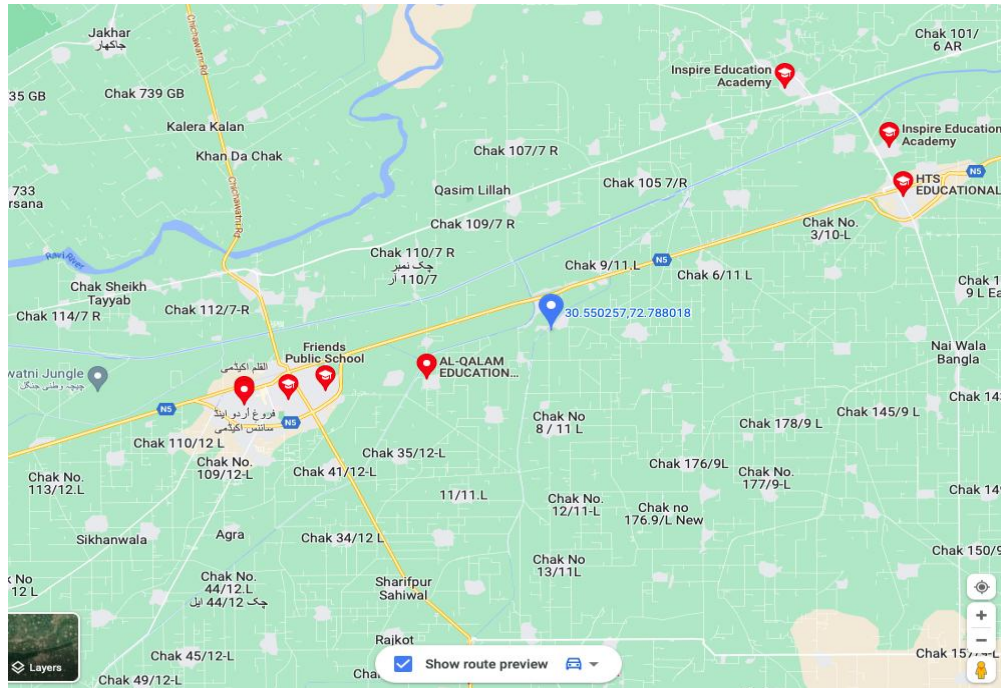
WAPDA power supply will be available at the site of 250 KV.

#### 5.4.4. Telephone Facilities

Both Landline and Cellular telephone facilities are present in the project area.

#### 5.4.5. Educational Facilities

No educational facility is present in the vicinity of the project area. Most of the educational institutes are far away from the project site.



### Figure 10-Nearby educational institutes

#### 5.4.6. Agriculture

Major crops of the town are wheat, grain, peas, barley are the important crops of Rabi season, while Kharif crops are cotton, sugarcane, potato, bajra, oil seeds which are shipped by rail and road to other parts of the country.

#### 5.4.7. Site of Physical, Cultural Heritage

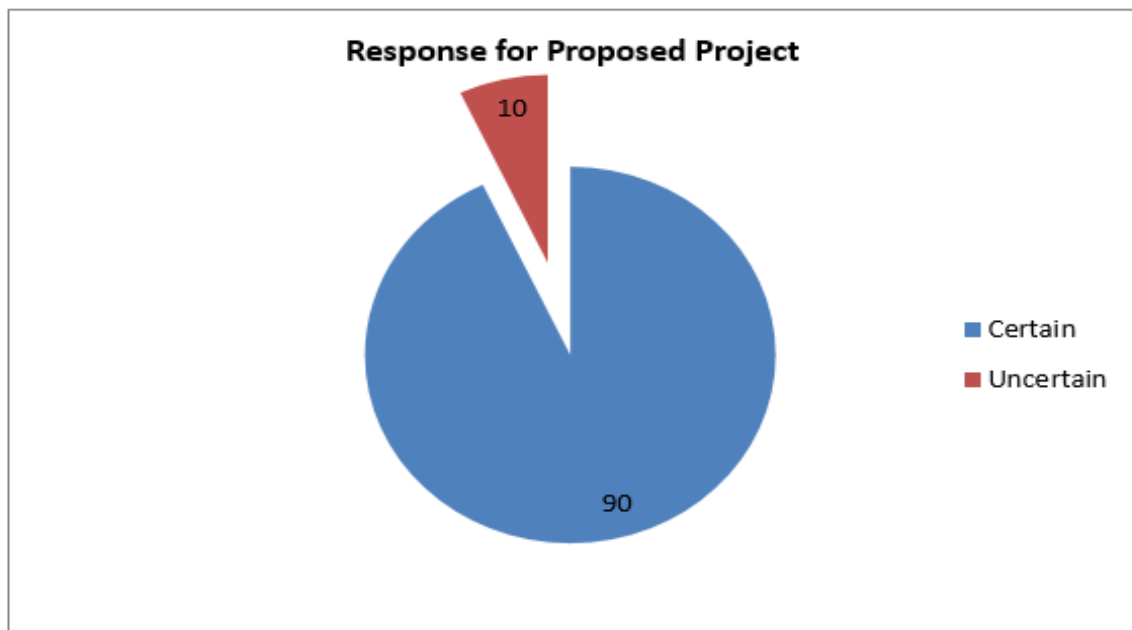
There are no documented or protected sites of archaeological, cultural, historical & religious significance in the project area. No visible signs were observed of such sites while conducting the field work.

## 5.5. Site Suitability

As the site is not surrounded by other housing schemes and residential areas and no relocation is required for establishment of current project. The site do not fall in environmental sensitive area and all commodities are at a suitable distance from project site as they will not impacted by the construction activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation is required for the development of above-said project.

## Project Response

90% of the respondents were of the opinion that this project should be implemented. In their opinion, construction of the project will create labor opportunities for locals and it will help to improve economic conditions of area. Construction of the nutraceuticals unit will also provide better socio economic enhancement to the people. The respondents also provided the mitigation measures like certified contractor must be hired, proper plantation should be done, proper procedures should be followed etc. They said, if mitigation measures will be implemented, they would have no objection.



**Figure 1: Percentage of people in favour or against the project**

## 6. IMPACT ASSESSMENT METHODOLOGY

This section discusses the potential environmental impact for the installation of nutraceuticals unit by M/s Tibb e Mashriq Dawakhana. The impacts may include; soil contamination, water resources depletion, biological resources disturbance and socio-economic impacts and, where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in this Section is based on potential impacts on overall environmental receptors within the project area.

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

In the sub-sections below the impacts assessment methodology for the operation of above stated project at Dad Fattiana Tehsil Chicha Wattni District Sahiwal has been defined. It includes the magnitude, the extent of the impact and the nature of the anticipated impact that is likely to be occurred from the proposed project activity.

### 6.2. Methodology

This Section discusses the project's potential environmental impact of establishment of nutraceuticals unit. The adverse impact may occur on; the area's geomorphology, soil, water resources, air resource, biological resources and socio-economic condition and where applicable, identifies mitigation measures that will reduce significantly, if not

eliminate, its adverse impact. The assessment carried out in the sub-sections below is based on potential impacts on overall environmental receptors within the project area. Impacts are evaluated on the basis of magnitude, immediacy and sustainability.

### 6.3. Evaluation of the Residual Impacts

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

It can be concluded in view of these reasons that the selected site is best suited for the project and the technology adopted for the production of passenger vehicles. The said project will not pose any adverse impact or threat on any component of the environment. The impact assessment criteria are given below along with their impacts:

Table 6-1 Impact Significance Criteria

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

Table 6-2 Impact Matrix Checklist for Designing Phase

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

Table 6-3 Impact Matrix Checklist for Construction Phase

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

Table 6-4 Impact Matrix Checklist for Operational Phase

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

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

##### **Methodology for Impact Evaluation**

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

An Impact Screening Checklist

Project Impact Evaluation Matrix

Following is given a brief description of assessment tools:

##### **a. Impact Screening Checklist**

The impact screening checklist is developed to screen out potentially insignificant environmental and social impacts from potentially significant adverse environmental and social impacts during planning & designing, construction and operational phases of the project. The objective of impact screening process is to assess the significance of issues related to the air, water, noise, soil, transportation, civil work, communication, the hazards and external constraints. The beneficial and adverse impacts of project during planning & designing, construction and operational phases are identified based on their duration, location, frequency, extent, significance and reversibility. The impact of each activity on various environmental parameters is given below:

Table 6-5 Characteristics of Impacts

| 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               | ☑                      |       | ☑        |          | ☑         |              |        | ☑     |              | ☑        |       | ☑             |        |
| 2                  | Sold in the market       | ☑                      |       | ☑        |          | ☑         |              |        | ☑     |              | ☑        |       | ☑             |        |
| 3                  | Appreciation in Land     | ☑                      |       |          | ☑        | ☑         |              |        | ☑     |              |          | ☑     |               | ☑      |
| 4                  | Tree Plantation          | ☑                      |       | ☑        |          | ☑         |              |        | ☑     |              | ☑        |       | ☑             |        |
| Adverse Impacts    |                          |                        |       |          |          |           |              |        |       |              |          |       |               |        |
| 1                  | Air Pollution            |                        | ●     | ●        |          |           | ●            |        | ●     |              |          | ●     | ●             |        |
| 2                  | Wastewater               |                        | ●     |          | ●        | ●         |              |        | ●     |              |          | ●     |               | ●      |
| 3                  | Solid Waste & By-product | ●                      |       | ●        |          | ●         |              |        | ●     |              | ●        |       |               | ●      |
| 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, socio-economic environment and hazards. For assessment of associated impact risk assessment methodology was used. Moreover, the risk assessment was done on the basis of project phases (planning & designing, construction and operation). A Project Impact Evaluation Matrix is attached as **Table 16** below:

Table 3-6 Impact Evaluation Matrix

| Environmental Parameters          | Impact Assessment during Different Phases |             |
|-----------------------------------|-------------------------------------------|-------------|
|                                   | Construction                              | Operational |
| <b>Planning and Designing</b>     |                                           |             |
| i. Location                       | +2p                                       | +2p         |
| ii. Design                        | +1p                                       | +1p         |
| <b>A : Physical</b>               |                                           |             |
| <b>1. Land Resources</b>          |                                           |             |
| i. Soil Erosion and Contamination | -2t                                       | -2p         |
| ii. Transportation                | -1t                                       | -1t         |
| iii. Solid Waste and By-Products  | -2t                                       | -2p         |
| iv. Land Use                      | NA                                        | NA          |
| <b>2. Air Resources</b>           |                                           |             |
| i. Noise Pollution                | -1t                                       | -1t         |
| ii. Air Pollution                 | -1t                                       | -1t         |
| iii. Dust Emissions               | -1t                                       | NA          |
| <b>3. Water Resources</b>         |                                           |             |
| i. Ground Water                   | -1p                                       | -2p         |
| ii. Surface Water                 | 0                                         | NA          |
| iii. Wastewater                   | -1p                                       | -2p         |
| <b>B : Ecological</b>             |                                           |             |
| <b>Flora</b>                      |                                           |             |
| i. Tree Cutting                   | -1p                                       | +1p         |

## 7. SCREENING OF IMPACTS AND MITIGATION MEASURES

This chapter provides a review of the potential impacts that could occur as a result of the project activities. These impacts could be both positive and negative in nature and have been classified accordingly by a thorough review of the construction and operational phases of the project. This assessment numerates the magnitude of these impacts with the aid of environmental matrices and also presents effective mitigation measures to counter their adverse nature.

### 1.1. Purpose of Environmental Mitigation Measures

For the project to be running successfully and compliance with environmental regulations mitigation of impacts caused by the project is required. The purpose of the need of mitigation can be answered by various questions as follows:

#### 1. What is the problem?

When the resources of the environment are being used ruthlessly, it results in degradation of the environment to the extent that the environment loses its resilience and the carrying capacity reduces the resources found and the recovery process is too slow or nearly no recovery is possible.

#### 2. When will the problem occur and when should it be addressed?

The problems that would occur fall within the project premises, and near the boundaries of the project location. The impacts would range up to the distance where project related activities are performed or up-to the geographical zone where the effects spread. Impacts would show their presence soon after the project development starts.

#### 3. Where the problem should be addressed?

The problems should be addressed where they originated. That is at the project location.

#### 4. How should the problem be addressed?

Problems can be addressed by using environmentally friendly practices. Such practices can be followed by following mitigation plans.

## 1.2. Impact Assessment Methodology

Potential impacts from the project activities were identified by a thorough review of the project activities, study of surrounding environment, review of literature, from previous similar studies and expert judgment.

Once the potential impacts had been identified, the assessment of each potential impact follows these steps:

### 1.2.1. Characterization of environmental impacts:

Primarily, anticipated impacts have been categorized as direct, indirect and induced impacts. These groups of impacts can be further broken down according to their nature into:

- Positive and negative impacts;
- Minor, major and moderate impacts;
- Local and widespread impacts;
- Temporary and permanent impacts;
- Short- and long-term impacts and
- Reversible and Irreversible impacts

The following scale has been used for the evaluation of potential impacts on different environmental settings:

- **Prediction of the magnitude of the potential impacts:**

This step refers to the description, quantitatively (where possible) or qualitatively, of the anticipated impacts of the project. This may be achieved through the use of models or comparison with other similar activities. The predicted level of impact magnitude may be due to uncertainties in the baseline conditions, the proposed activities, external developments, or the prediction model.

- **Identification of the mitigation measures:**

If it is determined that the predicted impact is significant when compared with the Criteria for Determining Significance, suitable mitigation measures are identified. There is a range of mitigation measures that can be applied to reduce impacts.

- **Evaluation of the residual impacts:**

Incorporation of the suggested mitigation measures reduces the adverse impact of the project and brings it within the acceptable limit. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied. These impacts are referred to as residual impacts.

### **1.3. Impacts Significance:**

The impacts significance has been described in detail in the checklist made for the impacts assessment and analysis on three different environments (i.e. physical, ecological and socio-economic). The further detail is given here under:

#### **1.3.1. Ecological importance:**

- **Potential issues:**

Impacts on wildlife may arise from the following project activities:

- Noise generated from project activities;
- Air pollution due to emissions
- Movement of personnel and vehicles;
- Clearing of vegetation;
- Waste water from scrubbers

Likely impacts of these activities can include:

- Temporary migration of mammals and bird from the area;

#### **Assessment of potential impacts:**

Wildlife may be disturbed due to sensory disturbance from earthwork, construction; movement of vehicles and crew personnel. This can possibly result in changes in distribution and abundance.

- **Mitigation measures:**

The following mitigation measures will reduce the adverse impact on the wildlife of the project area:

- Vegetation loss will be kept to an absolute minimum. Cutting of large trees will be avoided;
- Fires in the open will not be allowed;
- A 'no-hunting, no-trapping, no-harassing' policy will be strictly enforced, unless threatening to human life.
- Uncontrolled discharge of waste of any kind will not take place in the area;
- Discharging firearms will be explicitly prohibited;
- General awareness of the crew will be enhanced regarding the wildlife, through environmental training, notice board postings, tool box talks etc.;
- The project staff will be educated and instructed to avoid killing. Feeding or harassment of wildlife will not be allowed;
- Physical disturbance to areas outside the work corridors will be avoided;
- The total duration of activities will be minimized by good management;
- Food wastes will not be disposed-off in the open;
- Movement of all project personnel will be restricted to work areas and
- Night travelling will be kept to a minimum.

**Residual impact:**

Once the mitigation measures given above are implemented, it is expected that the project will have lesser significant impacts on the area's wildlife.

**1.3.2. Social importance:**

● **Potential impacts:**

Potential sources of positive and negative impacts on local communities can include:

- Safety and security
- Mobility and operation
- Project and Community Interface
- Cultural and religious sites
- Archaeological Sites
- Local Economy
- Local Employment
- **Assessment of potential impacts:**

**Increase in Employment Opportunities** Due to installation of aforesaid project, the employment opportunity will be slightly enhanced. During construction phase, 15-20 workers will be hired from local community include; skilled and un-skilled workers. During operational phase, approximately 12-15 persons will be required. It will include hiring of technical and non-technical staff. Locals will also have the opportunity to diversify their income by being employed. Hence, there will be an increased employment opportunity for the local people which will have a positive impact on the socio-economic status of the area.

**Tree Plantation** At the end of the construction phase, 3-5 times of removed trees or as per condition by EPA mentioned in said case Environmental Approval/NOC will be planted in the designated green areas, this will enhance the aesthetic beauty of the area.

- **Mitigation measures:**

The following mitigation measures will be implemented:

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

- The project is located at adequate distance from the various sensitive receptors.
- The site is accessible through metaled road network;
- The selected site is located at remote area away from residents and due to establishment of aforesaid project no change in the land use of area is being envisaged.
- The site is owned by the proponent and no dispute is associated.
- To control air emission during operational phase, wet-scrubber will be installed.
- The generated solid waste will be collected by contractor, and it will be disposed off through the standard practices of area. It is envisaged that no mitigation measures will required as the proposed project will not have any adverse impacts on its surroundings due to significant distances from sensitive receptors.

**Environmental standards:**

All the impacts have been assessed and incorporated in accordance with the Punjab Environmental Quality Standards (PEQS), 2016. All the parameters measured for drinking water, ambient air, noise is within the permissible limits of PEQS.

**1.4. Anticipated Environmental Impacts related to Project Location**

Since the project aims at installation of nutraceuticals unit, it may affect the water body, air quality of the project location. Solid waste products may affect the aesthetics of the area.

**Mitigation**

Plantation will be done around the project location to minimize the effect of vegetation removal. Proper waste management will be done to avoid any solid waste pollution.

**1.5. Anticipated Environmental Impacts related to Project Design**

All the process will be fully controlled so impact due to design will be negligible.

**1.6. Anticipated Environmental Impacts during Pre-Construction Phase**

The impacts have been identified using matrix method. Major impacts which have been taken into account while evaluating any environmental impacts caused due proposed project location and design are as under:

**1.6.1. Impact due to Change of Land Use Pattern:****Impacts**

As the proponent of the proposed project intends to install nutraceuticals unit on agricultural land of his own therefore, there is not any kind of issue regarding the possession or change in land use pattern. Land will be cleared and waste management facility will be established. Before that there is no agricultural activity going on in the area as land is turning barren and less fertile.

**Mitigations**

Clearing land for proposed project will cause high carbon dioxide in the environment. This will be mitigated by planting trees on the boundary of the project side and other areas.

**1.6.2. Impacts due to project location:**

The project site is located in an open area. There is no residential area present within the region of influence of the project site. There is no site of archeological importance present in the vicinity of the proposed nutraceuticals unit. In view of these findings, there is no sensitive receptor present in the vicinity of the project site. Hence, there is no significant environmental problem seen due to project location.

**1.6.3. Impacts due to infrastructure:****Impacts**

The project site has proper access to the main road and there is availability of infrastructure like electricity, water supply, drainage system, etc.

**Mitigations**

No mitigation is required.

**1.6.4. Impacts related to the project design:**

The operations of the nutraceutical's facility will be well planned and managed. The machinery/nutraceuticals unit used will be well designed before its use. All the design parameters will be monitored during the operation. Hence, no environmental problem has been seen related to the design of the nutraceutical's unit.

- The nutraceuticals unit will meet all the applicable national and international standards.
- Wet scrubber will be installed to control anticipated air pollution.
- The wastewater generated from domestic waste will be managed by septic tank primarily and then dispose off later.
- The proposed project design will follow the principle of sustainable development.
- Improved Management and Monitoring Practices will be adopted.
- The Proponent intends to reduce the environmental and social issues up to practically possible safe limit. The Client had adopted SOPs for Emergency Responses Plan, Fire Fighting Plan and Disaster Management Plan which are explained in sub-sections below.

- Planning principles and design considerations have been reviewed and incorporated into the site planning process to the extent possible. The concepts considered in the design of the proposed project are:
- Augmentation in adequacy of sanitation conditions at the user end enhancing the efficiency of existing infrastructure.

#### **7.4.4. Safety of infrastructure:**

##### **Impacts**

As we already mentioned the project area is an isolated area, consequently, the building structures have been designed in accordance with the requirement of seismic factor as well as after due consideration given to other structural design parameters.

##### **Mitigations**

No mitigation is required.

#### **7.4.5. Transportation:**

##### **Impacts**

There is only one entrance and one exit point provided at the proposed site and the same shall be used in future. Hence, traffic patterns of the area will not be disturbed. Also there is not much traffic in the vicinity. This project is located far from the commercial areas.

##### **Mitigations**

No mitigation is required.

#### **7.4.6. Wastewater drainage:**

##### **Impact**

The development of infrastructure like road network, security wall or any other buffer zone, etc. shall not restrict the natural drainage ways and even alterations in drainage pattern of the project design and construction features shall be implemented after the approval from the EPA and TMA.

##### **Mitigations**

Municipal wastewater drainage will be properly handled. After primary treatment in the sedimentation tank, the wastewater will be used for watering the plantation and trees on the project site. Punjab Hospital Waste & Management Rules (PHWMR), 2014 & Punjab

Environmental Quality Standards (PEQS) will be compliance for waste management and disposal.

#### **7.4.7. Water availability:**

##### **Impact**

Ground water will be because for the water requirement. But due to increasing demand of water nearby water resources may be affected, however the impact shall be lesser in magnitude.

##### **Mitigations**

Water will be handled with great care. Pipes and containers will be used for further usage of water. Water will be saved at maximum possibility during construction.

### **7.5. Anticipated Environmental Impacts during Construction Phase**

Environmental impacts due to project construction are as under:

#### **7.5.1. Air quality:**

##### **Impacts**

Due to the construction activities like excavation, clearing, leveling, compaction, etc., dust will be raised and also due to slightly increased traffic, slightly emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO and SPM are inevitable.

Uncovered vehicles for transportation of building materials as well as their storage, especially gravel, sand and cement on the construction site can lead to chance dispersal of materials during heavy rains or high winds during dry periods. This could have a negative impact on the workers of the nearby industries and the passers away. Also, the mixing of raw materials and blistering will generate solid waste composting of chemicals and when exposed to air can affect the environment and air as well.

##### **Mitigations**

Spray by water trucks to minimize the dust of construction areas and exposed terrain should be done regularly. The construction machinery and equipment must be kept maintained on a regular basis. Tuning of vehicles should be made mandatory to reduce emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO and PM<sub>10</sub>.

Vehicles or trucks carrying cement, sand, aggregate and other materials shall be kept covered

with sheets to help contain construction materials being transported within the body of each carrier.

#### **7.4.2. Noise:**

##### **Impact**

During construction process compaction, blistering and mixing of raw material machinery granulation Process, use of heavy machinery for clearing of the site and trolleys and trucks used for the transportation of construction materials will create some noise and vibration as well.

##### **Mitigations**

Engines of vehicles visiting the project site should be properly tuned-up. Truck/tractor drivers should be instructed not to play loud music and stop use of horn. Noise control measures should be taken such as provision of silencers on the heavy construction vehicles. The green zone of plants will also help decrease sound levels.

#### **7.4.3. Health and safety:**

##### **Impacts**

Possibility of health and safety hazard of workers is always present during construction phases like laying of pipes, installation of scaffolding and machines installations. To avoid cuts and damages to the skin during sterilization, packaging of the medicines certain medical facilities must be present at the site during construction.

##### **Mitigations**

To handle emergency medical situations, first aid facilities have already been made available for the workers at the site. Avoid all possible injuries during construction of the project. The contractor will ensure the availability of transport and driver to handle any emergency condition during construction activities at the project site. Safety equipment like belts, gloves and helmets should be strictly used by the labor at the work site. Implement training programs that support the achievement of the unit's staff and personnel's competency in relation to health, safety and environment. Introduce methodology of motivating good safety and environmental performance. Wearing of personal protective equipment should be made mandatory. The supervisory staff and workers to the extent possible must.

Follow the messages and instructions displayed on HSE notice boards installed in the premises

of the site.

- Be aware of emergency escape routes.
- Promptly report all accidents to the concerned environmental manager.
- Not smoke or produce flame in No Smoking Areas.

#### **7.4.4. Construction waste disposal:**

##### **Impacts**

Disposal of construction debris produce shall be properly disposing of otherwise it would have negative impacts on the site and surrounding area. Material including concrete waste, wood, steel, plastics sheets, etc., may result in the drainage blockage.

##### **Mitigation**

A site waste management plan should be made the responsibility of the building contractor to provide for the designation of appropriate waste storage area on the site and a schedule for the timely collection and removal of construction debris to an approved dump site. The wastes should be properly segregated and separated to encourage recycling of some useful waste materials.

#### **7.4.5. Change in drainage pattern:**

##### **Impacts**

Excavation activities required for infrastructure installation (lying of water/sewage pipes, electrical cables, etc.) may adversely impact the existing drainage patterns in the area. Loss of topsoil due to soil erosion may remain a problem during clearing and construction phases of the project.

##### **Mitigation**

Site clearing activities should be conducted in stages to minimize the area of exposed soil at any given time.

#### **7.4.6. Flora & fauna:**

##### **Impacts**

Previously, no plants or trees existed on the project site. Hence, no negative impact on the

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ecological environment will take place on account of cutting of any trees in the project area and clearing of vegetation from the site.

### **Mitigation**

In order to reduce construction impacts on surroundings and workers, a tree plantation program has been designed by the project proponent as it would help in cleaning the environment during operational life of the project too. The landscape plan would assure that designated trees are planted and that areas suitable for planting are identified and landscaped using majorly local trees and shrub species used for feeding by local bird species.

#### **7.4.7. Socio-economic environment**

### **Impacts**

A number of categories of employees will be required during the construction phase. This will include skilled and unskilled laborers, engineers, contractors and a small number of other professionals. These levels of short-term employment would have a positive impact on the local economy and on regional unemployment.

### **Mitigation**

Strong and comprehensive plantation plans also lessen the fear of the local people towards environmental issues. Sustainable development approaches through conservation of natural resources would be the best strategy to compensate for negative socio-environmental impacts. Environmental aspects of the project should be well taken care of through the implementation of the Environmental Management and Monitoring Plan (EMMP) as recommended in this report. Socially responsible attitude of the project management towards local people and resources can make project people friendly.

## **7.5. Anticipated Environmental Impacts during Operation Phase:**

After completion of construction phase and unit will be fall in operational stage, following impacts are foreseen:

### **7.5.1. Air quality**

### **Impacts**

Air emissions will be generated from the operation of nutraceuticals unit. These emissions may have a major impact on the local and regional air quality if not controlled properly.

### **Mitigation**

Following mitigation measures will be adopted,

- Vehicles used for transportation of waste will be regularly serviced and maintained in order to keep the environmental impact on account of their exhaust emissions to its minimum level.
- Native tree would be planted along the boundary of project area to keep environment healthy. For the removal of one tree, 3-5 trees will be planted as compensation measure.

#### **7.5.2. Waste management**

The waste from the proposed project after operation will be mostly recyclable waste, which include packaging material, plastics, woods, worn-out electrical products.

This storage facility would help:

- To prevent scavenging of waste
- Scattering of waste with wind
- Nuisance from smell and odor
- Protect the waste from sunlight and rain

### **Mitigation**

- For the collection & disposal of waste closed vehicles will be used.
- The workers must wear personal protective equipment like; face mask, gloves, safety suits and safety shoes before entering the yellow room.
- Good housekeeping will be ensured within the facility.
- Record of all waste generated during the project activity should be maintained on the regular basis. Quantity of the waste disposed will be logged on a waste tracking register.

#### **7.5.3. Noise:**

### **Impacts**

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The noise pollution will be slightly higher than the construction phase and thus may have impacts on immediate surroundings.

### **Mitigation**

- Proper encasement of noise generating sources will be done to control the noise levels within limits.
- A thick greenbelt will be developed all around the plant which will be acting as noise barrier.
- The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows.
- The use of complete or partial enclosures as and if required.
- Introduction of control and monitoring rooms having good sound insulation properties.
- All the workers will be provided with ear plugs. All the transporters will be visited to carry out regular maintenance of their vehicles

#### **7.5.4. Traffic:**

### **Impacts**

During the operation phase, 2 vehicles per day and only 2 staff vehicles per day at all shall visit the site. The movement of heavy trucks will have only a minor impact on the traffic on road in front of the project. This minor negative impact shall also be temporary in nature.

### **Mitigation**

Vehicles carrying waste will be covered with trampoline sheets to avoid pollution.

#### **7.5.5. Health & Safety:**

### **Chemical Impacts**

No chemicals are used on the nutraceuticals hence no mitigation required.

### **Fire Fighting:**

Product does not burn. Where fire is involved, use any firefighting agent appropriate for surrounding material; use water spray to cool fire-exposed surfaces.

**Handling and Storage:**

Use proper equipment for transporting raw material. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure.

**Personal Protective Equipment:**

Protective suits and heavy boots will be used by the workers to avoid any incident.

**Gloves** Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Washing of overall and gloves after every handling will be maintained.

**Clothing** Bodysuits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

**Footwear** Impervious boots of chemically resistant material should be worn at all times

**Handling & Storage**

Handle in accordance with good industrial hygiene and safety practice. Protection against fire and explosion: Take precautionary measures against static discharges. Avoid all sources of ignition: heat, sparks, and open flame.

**7.5.6. Groundwater table:**

The proposed project shall not have any significant or direct impacts on the ground water quality as the waste water generated is treated initially in septic tanks. The sewage effluents may cause groundwater pollution.

**Mitigation**

Internal sewerage system lines will be properly sealed, and joints would be water tight to reduce/minimize groundwater percolation.

**7.5.7. Flora & Fauna:****Impacts**

Excessive plantation has been done at the site. The massive tree rising along walls, rare end, vacant spaces available near the parking area and other places will act as a buffer zone. The plantation process to be started at construction stage shall be kept continued during the operation

phase of the project too. This will also make the air cleaner due to the production of pure oxygen and by adsorbing particulates from the air. This will also cause the reduction of sound level produced due to different activities.

### **Mitigation**

The process of plantation should be kept continuous throughout project life.

## **7.6. Potential environmental enhancement measures:**

- All vehicles used in the installation of machinery will be regularly inspected and maintained.
- Waste will be transported to and from the project site according to best management practices.
- Proper cross ventilation and proper height shall be provided to avoid suffocation. Similarly, proper lighting and spacing shall also be provided.
- Extensive plantation will be ensured in and around the project area to enhance the environmental quality.
- The labor force will be trained to use personal protective equipment's (PPEs) to avoid any accident at site.
- The vehicles used for transportation of material will be properly designed, covered and cleaned to avoid any risk while departing to and from the project site.
- No structural changes shall be made in the project after grant of relevant NOCs.
- Arrangements for chilled water shall be made at all times depending upon the weather conditions.
- Environmental Management and Monitoring Plan (EMMP) will be strictly operational throughout the project life. All monitored data will be reported to the EPA Punjab, Lahore for scrutiny at their end.
- Punjab Hospital Waste & Management Rules (PHWMR), 2014 & Punjab Environmental Quality Standards (PEQS) will be compliance for waste management and disposal.

## **7.7. Environmental Estimates:**

### **7.7.1. Water balance**

- **Quantification of ground wastewater:**

The quantity of municipal wastewater generated is given as below:

**Table 6-1 Quantification of Municipal Wastewater**

| Quantification of Municipal Wastewater |            |                        |
|----------------------------------------|------------|------------------------|
| No of persons                          | 12         | persons                |
| Per capita water consumption           | 50         | lit/c-d                |
| Average water demand                   | 0.75       | m <sup>3</sup> /d      |
| Safety Factor                          | 1.5        | m <sup>3</sup> /d      |
| Average water Demand                   | 2.25       | m <sup>3</sup> /d      |
| <b>Wastewater generation</b>           | <b>1.8</b> | <b>m<sup>3</sup>/d</b> |

*\* These calculations were according to Operational time (9 hours) and proposed numbers of staff 18 with the water demand of 80 gallons/capita/day (WASA Guidelines), thus all calculations have been made based on it.*

- **Quantification of process wastewater:**

During operation the total quantity of waste water generated is 400 meter<sup>3</sup> per day. Further, the proposed project as planned by its owners will utilize potable drinking water as already provided by the water filtration plant. To fulfill water requirements during the operation phase currently, 01 ground water fetching motor will be installed on the project site.

- **Sources of water:**

Groundwater will be used for the whole project operation.

- **Final disposal of wastewater:**

After primary treatment wastewater will be reused in the nutraceutical's unit. Municipal wastewater will be treated in ETP first and then used for plantation around the project. Monitoring of effluents shall be carried out as per requirement of Self- Monitoring and Reporting Tools (SMART) to ensure compliance with the PEQS. Water conservation activities will be adopted.

It will be ensured that no solid waste will be entered in the wastewater

- **Solid waste disposal**

Domestic solid waste will be produced because of nutraceuticals unit operation. The waste will be collected, segregated for recycling, and then managed as per EPA regulations by EPA certified vendors.

## **8. ENVIRONMENTAL MANAGEMENT & MONITORING PLAN (EMMP)**

A comprehensive management plan is necessary to implement the recommendations and suggestions for environmental protection included in chapter 8.

The objective of the Environmental Management and Monitoring Plan (EMMP) is to address all the major environmental issues and provide a framework for the implementation of the proposed mitigation measures during the construction and operational phases of the project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA report are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies.

The implementation of EMMP should be carefully coordinated with the design and construction program of the project to ensure that relevant mitigation measures are implemented at the appropriate stage and that adequate resources are properly allocated to achieve the desired results. This EMMP has been prepared to satisfy the requirements of the Pakistan Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Review Procedures, 2000.

For effective environmental management, the management of the project should assign the necessary responsibilities to its Health, Safety and Environment team, which should be responsible for environmental monitoring of the project.

### **8.1. Objectives of EMMP**

The EMMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. The EMMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project proponent for the implementation of EMMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project.

- Outlining mitigation measures required for avoiding or minimizing potential impacts assessed in the (Environment Impact Assessment) EIA report.
- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the (Environment Impact Assessment) EIA report.
- Defining the requirements for communication, documentation, training and monitoring, management and implementation of the mitigation measures.

## 8.2. Environment Management Team

A complete environment management team has been designed for the implementation of the EMP monitoring and to check the output of the proposed EMP.

**Environment Management Team**

| Sr.# | Managers                | Responsibilities                                                                                                                                                                                                                                                                                                                                   |
|------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.   | <b>Contract Manager</b> | <ul style="list-style-type: none"> <li>• Implementation of EMP</li> <li>• Environmental issues identification during pre-construction phase.</li> <li>• Communication EMP to all employees.</li> </ul>                                                                                                                                             |
| 2.   | <b>Contractor</b>       | <ul style="list-style-type: none"> <li>• Ensure that the control measures identified</li> </ul>                                                                                                                                                                                                                                                    |
|      |                         | <ul style="list-style-type: none"> <li>• Environmental surveys are implemented as they are relevant to their work/visit.</li> <li>• Ensure that the project management team is notified of any non-conformance of control measures or environmental incident where the environment has been put at risk.</li> </ul>                                |
| 3.   | <b>Site Manager</b>     | <ul style="list-style-type: none"> <li>• Ensure site material and safe handling of raw material and final product.</li> <li>• Controlled access arrangement to avoid hazards.</li> <li>• Emergency egress arrangements to avoid any unfortunate incident.</li> <li>• First aid facilities/services should be readily available on-site.</li> </ul> |
| 4.   | <b>Site HSE Advisor</b> | <ul style="list-style-type: none"> <li>• Ensure good standards of workmanship</li> <li>• Engaged health and safety to devise site waste management plan to be followed and implemented.</li> <li>• Daily checks &amp; weekly checks.</li> <li>• Regular consultation with workers.</li> </ul>                                                      |
| 5.   | <b>Site Environment</b> | <ul style="list-style-type: none"> <li>• According to legislation and consent develop EMP.</li> </ul>                                                                                                                                                                                                                                              |

|    |                               |                                                                                                                                                                                                                                                                                       |
|----|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <b>Advisor</b>                | <ul style="list-style-type: none"> <li>• Ensure application of EMP.</li> <li>• Carry out regular site inspection.</li> </ul>                                                                                                                                                          |
| 6. | <b>Public Contact Officer</b> | <ul style="list-style-type: none"> <li>• First point of contact for members of the public.</li> <li>• Arrange and manage public forums.</li> <li>• Maintain relation with stakeholders.</li> <li>• Door to door surveys as appropriate.</li> <li>• Coordination with work.</li> </ul> |

## 8.2. Environmental management and monitoring plan:

The Environmental Management and Monitoring Plan (EMMP) will be used as a management and monitoring tool for implementation of the mitigation measures identified in the (Environment Impact Assessment) EIA report.

The EMMP matrix lists down:

- The required mitigation measures recommended in the EIA (Environment Impact Assessment) report.
- The person/organization directly responsible for adhering to or executing the required mitigation measures and monitoring adherence to the mitigation measures.
- The parameters, which will be monitored to ensure compliance with the mitigation measures.
- The timing at which the mitigation or monitoring has to be carried out.
- Project proponents will hold primary and overall responsibility for ensuring full implementation of the EMMP.

## 8.3. Proposed EMMP for reporting and reviewing procedures for construction phase

The EMMP during construction phase includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Waste management & monitoring plan
- Health and safety management & monitoring plan
- Energy management & monitoring plan

- Water management & monitoring plan

#### **8.4. Proposed EMMP reporting & reviewing procedures for Operational Phase**

The EMMP during operational phase includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Waste management & monitoring plan
- Health and safety management & monitoring plan
- Energy management & monitoring plan
- Water Impacts & mitigation summary:

The following table contains summary of impacts and mitigation measures thereof: **Table 8-2**

### Impacts & Mitigation Summary

| S. #. | Impact                                                                                                                                                                               | Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                 | Responsibility  |                              |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------|
|       |                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementati on | Monitoring                   |
| A.    | Construction Stage                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                              |
| 1.    | Air Quality                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                              |
|       | Dust, SO <sub>2</sub> , NO <sub>x</sub> & CO emissions from trucks, cause health issues to workers.                                                                                  | Spray by water trucks to minimize the dust.<br>Maintenance of construction machinery should be made mandatory to reduce emissions.<br>Haul-trucks carrying earth, sand, aggregate and other materials will be kept covered with tarpaulin to reduce dust pollution.                                                                                                                                                                                | Contractor      | Proponent through Consultant |
| 2.    | Noise                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                              |
|       | The impact of noise generated during construction.                                                                                                                                   | Engines of vehicles visiting project site should be properly tuned-up.<br>The green zone of plants will also help decrease sound levels.                                                                                                                                                                                                                                                                                                           | Contractor      | Proponent through Consultant |
| 3.    | Occupation, Health and Safety                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                              |
|       | There will always be the possibility regarding hazard to health and safety of workers to occur during construction stage of the building, lying of piles, and machines installation. | First aid facilities should be readily available for the workers at the site.<br>The contractor will ensure the availability of transport and driver to handle any misshape which may occur.<br>Relevant safety devices like belts, gloves and testers should be strictly used by the Labor force at the work site.<br>Implement training programs that support the achievement of the unit’s staff and personnel’s competency in relation to HSE. | Contractor      | Proponent through Consultant |
| 4.    | Disposal of Construction Debris                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                              |
|       | Each phase of the development shall produce solid waste, disposal of which, if not managed properly could have                                                                       | A site waste management plan should be made the responsibility of the contractor.<br>The wastes should be properly segregated and separated to                                                                                                                                                                                                                                                                                                     | Contractor      | Proponent through Consultant |

|    |                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                              |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------------|
|    | negative impacts on the site and surrounding area.                                                                                                                  | encourage recycling of some useful waste materials.<br>Train or educate the involved stakeholders on the importance and means of waste management and handling.                                                                                                                                                                                                                                                    |            |                              |
| 5. | Garbage Disposal                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                              |
|    | Lack of proper disposal system of solid waste may leads to different disease.                                                                                       | Arrangements should be made for regular garbage collection and removal from the construction site.                                                                                                                                                                                                                                                                                                                 | Contractor | Proponent through Consultant |
| 6. | Soil Erosion and Change in Drainage Pattern                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                              |
|    | Lack of proper drainage ways could result in localized pooling and flooding providing ideal conditions for the proliferations of nuisance pests such as mosquitoes. | Site clearing activities should be conducted in stages to minimize the area of exposed soil at any given time.<br>Exposed soil should be seeded with grass or other appropriate cover as soon as possible to minimize soil erosion.<br>Monitoring and maintaining proper storm water drainage systems during heavy rains.                                                                                          | Contractor | Proponent through Consultant |
| 7. | Ground Water Quality                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                              |
|    | No appreciable impacts on the ground water quality are anticipated.                                                                                                 | Avoid accidental spills through good work practice.                                                                                                                                                                                                                                                                                                                                                                | Contractor | Proponent through Consultant |
| 8. | Soil Contamination                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                              |
|    | Any improper storage or handling of flammable materials including paints, fuels, solvents, oil, cement, etc. would result in soil contamination.                    | The contractor should be required to impart proper training to their workforce in the storage and handling of obnoxious materials.<br>Soil contamination by asphalt and other obnoxious materials must be minimized by placing all containers in caissons or dumped into pits lined with impervious liners.<br>Proper drainage facility should be provided to avoid the water and chemical accumulation as it is a | Contractor | Proponent through Consultant |
| 9. | Flora & Fauna                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                              |
|    | No negative impact on the ecological environment will take place on account of cutting of any trees in the project                                                  | Trees and ornamental plants shall be planted along the project boundary which increase the aesthetic value of the site and will combat pollution.                                                                                                                                                                                                                                                                  | Contractor | Proponent through Consultant |

|     |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |     |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----|
|     | area and clearing of vegetation from the site.                                                                                                                                                                                                                                         | Landscaping is deemed to be a powerful mitigation activity with a positive impact.                                                                                                                                                                                                                                                                                                                                                                               |                        |     |
| 10. | Socio-Economic Environment                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |     |
|     | A number of categories of employees will be required during the construction phase. This would have a positive impact on the local economy and on regional unemployment.                                                                                                               | Socially responsible attitude of the project management towards local people and resources can make project people friendly. Awareness and educational programs introduced by the project management or e area can reduce the fear among the people regarding non-local people.                                                                                                                                                                                  | Contractor & Proponent | SIE |
| B.  | Operational Stage                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |     |
| 11. | Air Quality                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |     |
|     | The slightly increased traffic as a result of project operation will not result in the significant increase in concentrations of emissions of flue gases as the number of visiting vehicles shall be only 2 per week for transportation of materials and 4 vehicles for staff per day. | Proper maintenance and tuning of the vehicles done by the proponent.<br>Trucks carrying waste will be covered with traupline sheets to avoid pollution.                                                                                                                                                                                                                                                                                                          | Proponent              | EPA |
| 12. | Noise Quality                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |     |
|     | No significant impact on the environment and people of the area.                                                                                                                                                                                                                       | No Mitigations required except for keeping maintenance of vehicles.<br>Padding of noise producing machinery will be done<br>Green belt and thick plantation around the project will be done.                                                                                                                                                                                                                                                                     | Proponent              | EPA |
| 13. | Occupation, Health and Safety                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |     |
|     | There will always be the possibility regarding hazards to health and safety of workers to occur during the operational phase of the project.<br>. The noise levels may have negatively impacted the workers and any visitors.                                                          | The workers working on nutraceuticals facility must wear personal protection equipment.<br>Irrelevant workers and visitors shall be directed not to enter in the High Noise Zone while workers performing duties permanently in such areas or those relevant persons who would be on visit must wear personal protective equipment.<br>Plantation of trees along the boundary walls will help in reducing the noise levels to sufficient extent. Noise absorbing | Proponent              | EPA |

|     |                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                           |           |     |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|
|     |                                                                                                                                                                                                                                               | <p>paint should be used on indoor walls to minimize its impacts on the outer environment.</p> <p>All the machinery should be properly tuned up and regular maintenance and periodic monitoring must be done. Strict rules should be made by the project administration to control speeds of vehicles.</p> |           |     |
| 14. | Solid Waste                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                           |           |     |
|     | <p>The solid/chemical waste may negatively impact the site, the workers, the visitors and the factory surrounding in different ways including aesthetically, occupationally as well as from health, safety and environment point of view.</p> | <p>There will be no solid waste from the nutraceutical's facility, except recyclable materials.</p>                                                                                                                                                                                                       | Proponent | EPA |
| 15. | Wastewater Quality                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                           |           |     |
|     | <p>The sewage effluents, other equipment washing water, etc. shall be discharged after primary treatment into the tank.</p>                                                                                                                   | <p>The system for the primary treatment of the sewage effluent should be appropriately installed and maintained.</p>                                                                                                                                                                                      | Proponent | EPA |
| 14. | Flora & Fauna                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                           |           |     |
|     | <p>Excessive plantation shall be done on the walls. This will act as a buffer zone and also bring healthy change in the environment during the operational phase of the project.</p>                                                          | <p>The process of plantation should be kept sustainable throughout project life.</p>                                                                                                                                                                                                                      | Proponent | EPA |
| 15. | Socio-economic Environment                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                           |           |     |
|     | <p>A number of employees will be required in the operational phase and this would have a positive impact on the local economy and on regional unemployment.</p>                                                                               | <p>The management of the project can capitalize the positive attitude of people of the study area towards this project by offering them maximum employment opportunities.</p> <p>Measurements and steps should be taken to keep undisturbed the privacy of adjoining work places.</p>                     | Proponent | EPA |

## 8.5. Table -Proposed Monitoring & Training of Workers:

| Category                                 | Impact             | Project Activity                                                 | Monitoring Mechanism                                                                                                       | Frequency                                                                       | Monitoring Agency               |
|------------------------------------------|--------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------|
| Construction and Operation Phases        |                    |                                                                  |                                                                                                                            |                                                                                 |                                 |
| Land Resource                            | Solid Waste        | Implementation of SW* Management System                          | Record keeping and timely transfer of SW from bins to the disposal site for nutraceuticals                                 | Daily                                                                           | Manager HSE / Project Proponent |
|                                          | Soil Contamination | Implementation of Management Plans                               | Visual monitoring and complete soil analysis                                                                               | Daily and annually                                                              |                                 |
| Air Resource                             | Air Emission       | Dust emissions during construction and operation.                | Monitoring of the emissions as per applicable standards<br>Water sprinkling will be done regularly to avoid dust emissions | Once before start of operation and after that as when required during operation |                                 |
|                                          | Dust               |                                                                  |                                                                                                                            |                                                                                 |                                 |
| Ecological                               | Flora              | Uprooting of trees                                               | Inventory of uprooted                                                                                                      | During Baseline                                                                 |                                 |
| Resource                                 |                    | during construction phase and maintenance of photographic record | trees and vegetation during operation phase                                                                                | Survey, once in a year and after the completion of the Project                  |                                 |
| Noise                                    |                    | Plant operation & material transportation                        | As per applicable standards                                                                                                | Fortnightly                                                                     |                                 |
| *SW= Solid Waste, **EA= Executive Agency |                    |                                                                  |                                                                                                                            |                                                                                 |                                 |

One of the most important mechanisms for the enhancement of the project's overall environmental performance will be the implementation of a program of environmental training for the project personnel and the Contractor's team. Environmental training will form part of the ongoing environmental management of the project. It will help to ensure that Proponent's environmental policies and principles are followed. The Contractor will be expected to implement a formalized training program as to the extent feasible, building on the recommendations supplied in the Environment impact Assessment (EIA).

Suggested components of an environmental training program may be as follows:

- Promotion of environmental protection measures in company literature, broadsheets, posters, project updates, etc.
- Provision of guidance notes on environmental protection to Contractor/s.
- Clear signs at worksites highlighting prohibited activities (discarding of wastes, smoking).
- Clear signs indicating sanitary disposal areas, safe drinking water sources, etc.

Adoption of these measures should help Proponent and the Contractor to achieve a high level of environmental awareness in the project team, which should, in turn, promote sound environmental management during project lifespan.

The Table 7-14 provides a summary of various aspects of the environmental and social training.

#### **8.5.1. Training schedule:**

A training log will be maintained by the management of the project and contractors. The training log will include:

- Topic
- Date, time and location
- Trainer
- Participants

**Table 8-4 Training Content**

| Participants                                          | Date, Time & Location | Training Topics                                                                                                                                                                                                                | Schedule             | Responsible Authority |
|-------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|
| Staff of Tibb e Mashriq Dawakahana and the contractor | As specified          | ? Introduction to project EIA and EMMP<br>? EMMP communication, documentation, monitoring and reporting requirements                                                                                                           | Every month          | Project Manager       |
| All site personnel                                    | As specified          | ? Site induction training on HSE system and requirements at Incinerating Site<br>? Environmental sensitivities of the project area<br>? Communication of environmental problems to corresponding officials<br>? Waste disposal | After every week     | Project Manager       |
| Drivers                                               | As specified          | ? Road safety<br>? Road restrictions<br>? Vehicle restrictions<br>? Waste disposal<br>? Defensive driving                                                                                                                      | After every 3 months | Project Manager       |
| Camp Staff                                            | As specified          | ? Camp operations<br>? Waste disposal<br>? Good housekeeping                                                                                                                                                                   | Monthly              | Project Manager       |

**Table 8-5 Restoration, Quantified Rehabilitation & Replacement**

| QUANTIFIED REHABILITATION PLAN OF TIBBE MASHRIQ DAWAKHANA |                                                                                           |                                                                                                 |            |                                                                                                                                                                        |      |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Activity                                                  | Aspect                                                                                    | Impact                                                                                          | Magnitude  | Mitigation                                                                                                                                                             | Cost |
| operation                                                 | removal of vegetation                                                                     | loss of flora                                                                                   | negligible | 1000-1500 plants of native species will be planted as mentioned in report, adequate budget is also allocated for tree plantation as mentioned in environmental budget. | 1Lac |
| operation                                                 | Machinery maintenance, lubrication, monitoring and inspection                             | Workers safety risk                                                                             | neutral    | Workers will be strictly ordered to use PPE's                                                                                                                          | 5k   |
| construction                                              | Fire                                                                                      | damage to property and workers                                                                  | negligible | Fire extinguisher will be installed at the project site cause there is no visible cause of explosion/ fire hazard                                                      | 10k  |
| operation                                                 | Utility services (restoration & up gradation of electricity, gas, communication networks) | Probability of residential discomfort, low, infrastructure                                      | neutral    | Inspection of electricity poles, wires, gas pipelines periodically                                                                                                     | 10k  |
| operation                                                 | up gradation of firefighting arrangements                                                 | Damaged infrastructure may cause serious accidents or inability to manage even normal accidents | neutral    | Periodical inspection & management of firefighting tools                                                                                                               | 25k  |

## 8.6. Equipment Maintenance Details

The proposed project is the installation of nutraceuticals unit at Sahiwal. Actions necessary for retaining or restoring a piece of equipment, machine, or system to the specified operable condition to achieve its maximum useful life.

All tools, equipment and vehicles must be properly maintained so that workers are not endangered. Construction regulations require inspections of vehicles, tools, machines and equipment before use. We must always be aware that maintenance tasks themselves are potentially hazardous and can result in injury.

The successful maintenance program is:

- well organized and scheduled,
- controls hazards,
- defines operational procedures, and
- Trains key personnel.

The degree of detail to include in your company's program regarding equipment maintenance will depend on the kinds of tools/equipment used. Some construction equipment (cranes) has very specific inspection and maintenance requirements. Passenger Vehicles (company trucks, cars and vans) may require only basic maintenance. Power Tools should be maintained in good working order. This may be limited to ensuring that blades/bits are replaced when needed and that guard or other safety devices are operable, and any damaged electrical cords/plugs are repaired or replaced. Damaged or defective equipment/tools should be tagged and removed from service.

## **Environmental Monitoring**

Environmental monitoring can be categorized into two types:

- Compliance Monitoring
- Effects Monitoring

8.6.1. The environmental monitoring will be conducted according to SMART rules and EPA regulation.

### **8.6.2. Compliance Monitoring**

Compliance monitoring will be carried out to ensure compliance with the requirements of the EIA and EMMP. The project staff and contractors will carry out the inspections on a routine basis. This will also include the routine monitoring at the project site as specified in EMMP.

### **8.6.3. Effects Monitoring**

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

#### 8.6.4. Monitoring components

Baseline environmental monitoring will be carried out for the following essential parameters.

- Noise Levels
- Ambient Particulate Matter
- Ambient Air Gases
- Ground Water
- Wastewater
- Soil Contamination
- Solid Waste
- Stack Emissions
- Vehicular Monitoring
- Flora & Fauna
- Health & Safety
- Machinery maintenance

#### 8.7. Communication and Documentation

For effective monitoring, management and documentation of the environmental performance during the operation, environmental matters will be discussed during meetings held on-site. Environmental concerns raised during the meetings will be mitigated after discussions between the management of the project and the contractors. Any issues that require attention of higher management will be communicated to them for action. The management of the project and its contractors will ensure that the communication and documentation requirements specified in the EMMP are fulfilled during the project.

##### 8.7.1. Audits

The management of the project and its contractor and subcontractors will carry out periodic audits/inspections of all project activities regarding their effects on the surrounding environment. The contractors will take account of any recommendations relating to the operation arising during the monitoring, with the prior consent of the proponent.

- **External audit**
- **Internal audit**

## 8.8. Changing in Planning Design

For construction of nutraceuticals unit in Sahiwal, there is no endangered and threatened species has been reported in the project & study area. Moreover, there is no human settlement or infrastructure present on-site that will be dislocated or dismantled due to the construction of proposed facility. Hence, there is no need to change the location of the said project. For the management of waste, complete plan is being adopted. This technology is adopted because of the following reasons:

- Local nutraceuticals unit will be installed for the supply of herbal supplement.
- The nutraceuticals unit will meet all the applicable national and international standards.

### a. Compensation in Money Terms

Due to the construction of said project at selected site location, vegetation will be removed from site during site clearance. No Impact on the geography/landscape of the area is being envisaged. However, there is no protected or environmentally sensitive area present within 3.0 km vicinity of said project that could be impacted due to implementation of said project. 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 measure.

**b. Replacement/Relocation/Rehabilitation** The proposed project will be constructed at Dad Fattiana Tehsil Chicha Wattni District Sahiwal and there is no sensitive area, human population or preserved natural resource which could be impacted due to the commencement of aforesaid project as it is in commercial area. No replacement, relocation and rehabilitation will required for the commencement of the aforesaid project.

## 8.9. Change Management Plan

The EIA report recognizes that changes in the operations or the EMMP may be required during the operation and therefore a Change Management Plan has been provided to manage such changes. The management of changes is discussed under two separate headings, changes to the EMMP and changes to the operation.

### 8.9.1. Changes to the EMMP

The EIA report and the EMMP have been developed based on the best possible information available at the time of the EIA study. However, it is possible that during the construction and operational phase, some aspects of the EMMP may need to be changed owing to their non-applicability in a certain area of operation or the need for additional mitigation measures based on the findings of environmental monitoring during the construction and operational phases. In such cases following actions shall be taken.

- A meeting will be held between management and the concerned contractor. During the meeting the proposed deviation from the EMMP, planning and designing will be discussed and agreed upon by all parties.
- Based on the discussion during the meeting, a change report will be produced collectively, which will include the original EMMP clause/plan or design, the change that has been agreed upon, and the reasons for the change.
- The report will be signed by all the parties and will be filed at the site office. A copy of the report will be sent to the management of the project and contractor head offices.
- All relevant project personnel will be informed of the change.
- The proposed project design will follow the principle of sustainable development.
- Improved Management and Monitoring Practices will be adopted.

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.

### 8.9.2. Changes to the Operation

The change management system recognizes three orders of changes.

- **First Order Change:**

A first order change is one that leads to a significant departure from the project described or the impacts assessed in the EIA report and consequently require a reassessment of the environmental

impacts associated with the change. Examples of such change include change in location of the proposed project.

In such an instance, the environmental impacts of the proposed change will be reassessed, and the results sent to the Punjab EPA for approval.

- **Second Order Change:**

A second-order change is one that entails project activities not significantly different from those described in the EIA, and which may result in project impacts whose overall magnitude would be similar to the assessment made in this report.

In case of such changes, the environmental impact of the activity will be reassessed, additional mitigation measures specified if necessary, and the changes reported to the Punjab EPA.

- **Third Order Change:**

A third-order change is one that is of little consequence to the EIA report findings. This type of change does not result in impact levels exceeding those already assessed in the EIA; rather these may be made onsite to minimize the impact of an activity. The only action required in this case will be to record the change in the change record register.

**Table 8-6 Environmental Budget**

| Environmental Component             | Quantity (Number) | Amount PKR | Description                              |
|-------------------------------------|-------------------|------------|------------------------------------------|
| <b>Wastewater Treatment</b>         | L.S.              | 4 million  | Lump sum                                 |
| <b>Solid Waste management</b>       | L.S.              | 5 million  | Lump sum                                 |
| <b>Air Emission control</b>         | L.S.              | 2 million  | Lump sum                                 |
| <b>Tree Plantation</b>              | 5000-6000         | 1 million  | Cost includes total budget of plantation |
| <b>Health &amp; Safety Measures</b> | L.S.              | 25,000     | Lump sum                                 |
| <b>Miscellaneous Cost</b>           | L.S.              | 15,000     | Lump sum                                 |
| <b>Air Quality Monitoring</b>       | L.S               | 40,000     | 2 samples @ 20,000/sample                |
| <b>Water Quality Monitoring</b>     | L.S               | 20,000     | 2 samples @10,000/sample                 |

|                                                |     |        |                         |
|------------------------------------------------|-----|--------|-------------------------|
| Noise Level Monitoring                         | L.S | 16,000 | 2 samples @ 8000/sample |
| Training                                       |     | 50,000 | Lump sum                |
| External Monitoring                            |     |        | 50,000                  |
| Total Environmental and Social Management Cost |     |        | 12.5 million            |

### 8.10. Schedule of Implementation

**Stage I:** The clearing of land, preparation of land for construction activity.

**Stage II:** During this phase machinery will be brought to the site and installed.

**Stage III:** In this phase all the outstanding activities will be completed, construction activities will be initiated.

**Stage IV:** after completing construction, employees will be hired, and staff will be assigned their respective work. The operation activities will be initiated.

**Table 8-7 Proposed EMP Reporting and Reviewing Procedures**

| Potential Activity and Impact                            | Objective of monitoring                                                                                 | Parameter to be monitored      | measure ment               | location                                                                                 | Monitoring equipment/sensor/gadget | Responsibility |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------|------------------------------------------------------------------------------------------|------------------------------------|----------------|
| Disturbance due to noise from operational activities     | To check whether the existing noise control measures can bring the sound level within prescribed limits | Noise level near the receptor  | Noise measure ment         | At least three locations on the plant boundary and three locations at the receptor level | Decibel Meter                      | Administration |
| Wastewater from the scrubber from operational activities | To check the quality of wastewater within the prescribed limits                                         | Quality of water at the source | Water quality measure ment | At the point of release of water                                                         | EPA Certified lab tests of samples |                |

|                                                         |                                                                                                                        |                                                                                                                 |                           |                                                                                        |                                         |                |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------|-----------------------------------------|----------------|
| Air pollutants /emissions from nutraceuticals operation | To check the harmful emissions from the fuel burning coming out of stack within prescribed limits                      | Monitoring of air emissions from the gases, Type of emissions (PM, SO <sub>x</sub> , NO, NO <sub>x</sub> , SPM) | Air emission measurement  | At least three location on the plant boundary and three location at the receptor level | HAZ scanner equipment                   | Administration |
| Safety                                                  | To check and evaluate the effectiveness of the workers safety plan and availability and access of first aid facilities | Injuries                                                                                                        | Injuries will be recorded | Entire Unit                                                                            | Training sessions and monitoring expert | Administration |

## **Summary of Impacts and Mitigation Measures**

The major positive impacts of the project include job opportunities and new business opportunities. The project will raise the people's income, enhance social infrastructure, and improve socioeconomic conditions in the area. The project is expected to stimulate the local economies around the Project area to a greater extent and to benefit people who have a low standard of living.

With reference to the activities being conducted such as excavation, major impacts will be related to noise, vibrations, increased rates of sediment deposition and minor dust pollution. In order to minimize these impacts, the mitigation measures for the stated issues that have been mentioned in the impacts and mitigation measures during the operation phase may be followed.

Negligible to low negative impacts can be foreseen during project implementation including Air Quality, Noise, Landscape and Visual Impact of Installation, Wastewater Generation and Disposal, Biodiversity, Odor, Dust, Water Supply and Land Spreading. Mitigation measures will be implemented to minimize environmental impacts. All the impacts can be managed cost effectively. Careful mitigation and monitoring, specific selection criteria and assessment procedures for subprojects have been specified to ensure that minimal impacts take place

## 9. STAKEHOLDER CONSULTATION

Stakeholder's consultation is a tool used for communication with a diverse group of stakeholders having multifarious aims such as information dissemination, exchanging views, soliciting feedback and suggestions on issues pertaining to the project, plan future actions. This practice initiates a need assessment and identify areas of concern for all the parties that maybe affected by the project activities.

Stakeholders by definition are all those people and institutions who have an interest in the successful design, implementation and sustainability of the project. This includes those positively and negatively affected by the project.

Project can actively participate in decisions on planning and management. The stakeholders including regulators, government representatives and NGOs were met to appraise and discuss the environmental and social perspective of project activities related to the construction and operation of nutraceuticals unit. Their valuable concerns and suggestions were noted and thereafter incorporated in the EIA process and study.

During the field survey for this EIA study, meetings were held with the communities residing within the project area. The objective of these meetings was to solicit and record their views and concerns for inclusion in project design at the planning phase. In the same vein, meetings were held with the members of local and provincial government, NGOs and district government representatives.

All the stakeholders were briefed about the project verbally. Their feedback was noted, and all the concerns voiced in the discussion were relayed to the management team of the project.

### 9.1. Benefits and Objectives of Stakeholders Consultation

Consultation with stakeholders leads to an overall better understanding of the project on the part of the communities and gives the proponent a clearer understanding of the stakeholders' perspective. Effective public consultation can add substantial value to the EIA process. The information gained through public consultation on the stakeholders' concerns, interests, and their ability to influence decision-making helps identify key cause of environmental problems.

This can be used to evaluate direct and indirect environmental impacts and assess short term and long-term resource use implications. The input from local communities and NGOs can help evaluate alternatives and strengthen the management planning by incorporating local input and know-how.

An informed public will better understand the tradeoffs between project benefits and disadvantages; be able to contribute meaningfully to the project design; and have greater trust with the project proponent and support for the project, says the Asian Development Bank. These factors contribute towards improved project implementation sensitized to the human environment of the area. The objectives of stakeholders' consultation are to:

- Promote better understanding of the proposed operation through explaining its objectives and its potential positive and negative impacts.
- Identify and address concerns of all interested and affected stakeholders.
- Provide a mechanism to resolve issues identified by communities, before project plans are finalized and development begins, thereby, avoiding public outcry and resentment.
- Instill trust between various stakeholders and the proponent to promote cooperation.

## **9.2. Identification and Classification of Stakeholders**

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Identification of stakeholders is important for the sustainability of a developmental project and helps to evaluate and envisage the role of stakeholders. The influence or impact of the project on stakeholders can be elaborated in the form of a matrix and the mitigation measures are proposed accordingly.

All the stakeholders had different types of stakes according to their professions. The stakeholders that are likely to be influenced by the project activities or would like to participate in the project include:

- **Industries surrounding the project area.**

Stakeholders can be classified depending on the influence of the project activities on them. The stakeholders for the project are classified as follows:

- Industries: Industries, groups or institutions directly affected by the project and can influence the project outcome.
- Local communities: Residential areas around the project site.

### 9.3. Views, Concerns and Suggestions of Various Stakeholders

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

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

#### 9.4. Methodology for Consultation

Stakeholder consultation is a two-way flow of information and dialogue between the project proponent and stakeholders, specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage assist in implementing solutions and monitor ongoing activities. Various techniques are used worldwide to carry out the stakeholder consultation that includes discussions, meetings and field visits. A series of scoping sessions and informal focus group discussions were carried out with local communities and local government representatives. The meetings were held at various locations.

#### 9.5. Environmental Practitioners and experts

Consultation with Environmental Practitioners and experts was done and following comments and suggestions were noticed.

Table 9-1 List of Experts

| Sr. No | Name                  | Designation                          | Comments/Suggestions                                                                                                                                                                                                                                                                                                                                           |
|--------|-----------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.     | Engr. Muhammad Bilal  | Environmental Engineer               | Following comments are summarized to control the air pollution generation during operational phase <ul style="list-style-type: none"> <li>• It should be ensured that the pollution abatement technique i.e. bag house filters must be installed on coal fired boiler</li> <li>• Dyeing should be carried out under controlled conditions</li> </ul>           |
| 2.     | Sara Fatima           | Environmental                        | <ul style="list-style-type: none"> <li>• She said that Installation of textile industry will have positive impact on economy but its construction should be done in Environmental Friendly way</li> <li>• During construction and operation emissions must be controlled properly</li> <li>• Basic facilities should be provided to local community</li> </ul> |
| 3.     | Zia ur Rehman Farooqi | Ph.D. Scholar Environmental Sciences | Following mitigation measures should be adopted: <ul style="list-style-type: none"> <li>• Tree plantation in designated green zones should be carried out</li> <li>• Proper disposal of the solid waste</li> <li>• HSE management measures should be adopted and implemented effectively.</li> </ul>                                                           |

|    |                      |                        |                                                                                                                                                                                                                                                                                                                                                    |
|----|----------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. | Mr. Saffi Ahmed      | Environmental          | <ul style="list-style-type: none"> <li>• He said that locals should be preferred for employment.</li> <li>• Value addition of area</li> <li>• In case of outsiders residence must be provided</li> <li>• Proper mitigation measures must be adopted while construction and operation of this project</li> </ul>                                    |
| 5. |                      | Environmental          | <ul style="list-style-type: none"> <li>• She said that in case of removal of vegetation trees must be planted after construction at designated green areas</li> <li>• Water conservation strategies must be adopted</li> <li>• Solid waste must be collected and dispose off properly</li> </ul>                                                   |
| 6  | Hafiz Zeeshan Safder |                        | <ul style="list-style-type: none"> <li>• Wastewater should not mix with surface water channels it must be properly dispose off after meeting PEQS.</li> <li>• Avoid groundwater contamination</li> </ul>                                                                                                                                           |
| 7  | Miss Misbah Ali      | Environmental Engineer | <p>According to her following mitigation measures should be adopted during construction</p> <ul style="list-style-type: none"> <li>• Site re-vegetation must be done</li> <li>• Latest technology must be installed</li> <li>• Residence must be provided to contractors and workers</li> <li>• Locals must be preferred for employment</li> </ul> |

## 9.6. Institutional Capacity

Following functionaries will be involved in the implementation of EMMP:

- Mr. Maqsood Ahmad, as the proponent of the project and owner of Environmental Management Plan during construction as well as operation stage.
- Project contractor(s) as executors of the EMMP during the construction phase of the project.
- Operational & Maintenance (O&M) and the Health, Safety and Environment team of the project as an executor of the EMMP during the operational phase of the project.
- Environmental Protection Agency (EPA), Punjab as Government Department to review and monitor the implementation of remedial and mitigation measures as given in (Environment Impact Assessment) EIA.

**9.6.1. Responsibilities of functionaries:**

Specific responsibilities of key role players are illustrated hereunder:

**9.6.2. Responsibilities of management of project:**

Management of the project will be responsible for the environmental management and supervisory affairs during the project activities. Environmental personnel designated by the management of the project will look after the environmental related issues during the project activities. The responsibilities of Environmental personnel are as follows:

- Monitoring progress of the project as per planned schedule of activities.
- Exercising oversight over the implementation of environmental mitigation measures by the contractor.
- Documenting the experience in the implementation of the environmental process.
- Preparing training materials and implementing programs.
- Maintaining interfaces with the other lined departments/ stakeholders and
- Reporting to the management of the project on the status of EMMP implementation.

**9.6.3. Responsibilities of project contractor:**

Contractor appointed for the commissioning of the project including the auxiliary facilities is responsible for:

- Implementation of, or adherence to, all provisions of the EMMP and with any environmental and other codes of conduct required by the project.
- Provision of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use.

**9.6.4. Responsibilities of EPA:**

To review and monitor the implementation of remedial and mitigation measures as given in the (Environment Impact Assessment) EIA.

Table 9-2 Proponent's management team

| Sr.# | Managers                        | Responsibilities                                                                                                                                                                                                                                                                                                           |
|------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.   | <b>Contract Manager</b>         | <ul style="list-style-type: none"> <li>• Implementation of EMP</li> <li>• Environmental issues identification during pre-construction phase.</li> <li>• Communication EMP to all employees.</li> </ul>                                                                                                                     |
| 2.   | <b>Contractor</b>               | <ul style="list-style-type: none"> <li>• Ensure that the control measures identified</li> </ul>                                                                                                                                                                                                                            |
|      |                                 | <ul style="list-style-type: none"> <li>• During environmental surveys are implemented as they are relevant to their work/visit.</li> <li>• Ensure that the project management team is notified of any non-conformance of control measures or environmental incident where the environment has been put at risk.</li> </ul> |
| 3.   | <b>Site Manager</b>             | <ul style="list-style-type: none"> <li>• Ensure site material and safe handling of waste</li> <li>• Controlled access arrangement to avoid hazards</li> <li>• Emergency egress arrangements to avoid any unfortunate incident.</li> <li>• First aid facilities/services should be readily available on-site.</li> </ul>    |
| 4.   | <b>Site HSE Advisor</b>         | <ul style="list-style-type: none"> <li>• Ensure good standards of workmanship</li> <li>• Engaged health and safety to devise site waste management plan to be followed and implemented.</li> <li>• Daily checks &amp; weekly checks.</li> <li>• Regular consultation with workers.</li> </ul>                              |
| 5.   | <b>Site Environment Advisor</b> | <ul style="list-style-type: none"> <li>• According to legislation and consent develop EMP.</li> <li>• Ensure application of EMP.</li> <li>• Carry out regular site inspection.</li> </ul>                                                                                                                                  |
| 6.   | <b>Public Contact Officer</b>   | <ul style="list-style-type: none"> <li>• First point of contact for members of the public.</li> <li>• Arrange and manage public forums.</li> <li>• Maintain relation with stakeholders.</li> <li>• Door to door surveys as appropriate.</li> <li>• Coordination with work.</li> </ul>                                      |

Table 9-3 List of People Consulted

| Sr.# | Name                | Father Name               | CNIC #          |
|------|---------------------|---------------------------|-----------------|
| 1    | Mazhar Hussain      | Muhammad Sardool Khan     | 36502-3709815-1 |
| 2    | Shahbaz Khan        | Jaffar Hussain            | 36502-9590248-9 |
| 3    | Waseem Ahmed        | Hafeez Ahmed              | 36401-9470678-1 |
| 4    | Kamran Ali Khan     | Amjid Ali                 | 36502-1262560-5 |
| 5    | Muhammad Waqass     | Muhammad Tajj             | 36502-7182240-9 |
| 6    | Qaiser Farooq       | Muhammad Riaz             | 36502-6069520-9 |
| 7    | Ghulam Mujtaba      | Ghulam Hussain            | 36502-5623790-1 |
| 8    | Mehboob Alam Shahid | Sayed Muhammad Tahir Shah | 36502-3634737-1 |
| 9    | Muhammad Latif      | Muhammad Mansha           | 36502-1306860-5 |
| 10   | Muhammad Ejaz       | Kameer Ali                | 36502-5667711-9 |
| 11   | Rab Nawaz           | ALLAH Yar                 | 36502-7752653-9 |
| 12   | ALLAH Yar           | Fareed                    | 36502-8319926-9 |
| 13   | Ahmed Saeed         | Muhammad Kabeer           | 36502-1307025-7 |
| 14   | Muhammad Jabbar     | Bashir Ahmed              | 36502-3746161-9 |
| 15   | Muhammad Ramzan     | Muhammad Ameen            | 36502-2391980-9 |

## Pictorial View of Consultation





**Figure 12-Consultation with nearby Industries**



**Figure 13-Affected and Wider Community**

**9.3.1. Study area:**

The area of Dad Fattiana Tehsil Chicha Wattni District Sahiwal was the part of our study boundaries but specifically, it included. The land for proposed nutraceuticals units is situated at Dad Fattiana Tehsil Chicha Wattni District Sahiwal.

**9.3.2. Study schedule:**

The composition and schedule to conduct the group discussions and interviews and also impact location profile was prepared using the attached Performa in annexure.

**9.3.3. Local community**

Concerns of the locals of the project were solicited and collected in the following manner:

- A field visit was arranged to contact the communities within 5km of the project area.
- The team was completely aware of the processes and environmental issues related to the project.
- A brief description of the project was provided verbally to the local community and they were asked to express their concerns regarding the project.
- Concerns, complaints and suggestions were recorded in written form.

**9.3.4. Local Communities Concerns**

The issues and suggestions raised were recorded in field notes for analysis, and interpretation, by reaching out to a wider segment of the population and using various communication tools such as participatory needs assessment, community consultation meetings, and focus group discussions. The findings of the Community consultations have been addressed in various sections of the EIA report, and the mitigation plans have been incorporated into the EMMP.

**9.4. Key Findings of Study:**

The study findings depict that people perceive overall positive social impacts by development of proposed project. Their attitude towards project development is highly positive with the expectation that locals are provided with jobs especially where unskilled labor is required. Majority of the people is convinced for positive sign for development in area and they correlate

this change with the pace of their upward social mobility and progress. However, they want waste water treatment plants to be installed.

| Sr. No | Place         | Date      | No. Of Participants | Main Concerns                                                                                                                                                                                                                                                                                                              | Expectations                                                                                                                                                                                                                      |
|--------|---------------|-----------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Sahiwal City  | 15-1-2023 | 6                   | <ul style="list-style-type: none"> <li>•Community water resources should not be over-exploited.</li> <li>•Increased traffic should not jeopardize the safety of the communities.</li> <li>•Priority for employment should be given to residing communities.</li> <li>•Waste management should be proper managed</li> </ul> | Employment opportunities will be generated for local communities.                                                                                                                                                                 |
|        | Chak # 9/11.L | 15-1-2023 | 3                   | <ul style="list-style-type: none"> <li>• Priority for employment should be given to residing communities.</li> <li>• Waste management should be proper to avoid any mishandling and open dumping/burning of solid waste in project area.</li> <li>• Waste water should be properly treated before discharging.</li> </ul>  | <ul style="list-style-type: none"> <li>• Employment opportunities will be generated for local communities</li> <li>• Economy of the area will get a boost.</li> </ul>                                                             |
|        | Chak # 7/11.L | 18-1-2023 | 2                   | <ul style="list-style-type: none"> <li>• Waste effluents should be disposed of after proper treatment so as not to affect the quality of the water in the nearby channels.</li> </ul>                                                                                                                                      | <ul style="list-style-type: none"> <li>• Employment opportunities for the local population</li> <li>• Preference would be given to the locals while hiring unskilled workers for the operational phase of the project.</li> </ul> |

|  |               |           |    |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                     |
|--|---------------|-----------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Vicinity area | 18-1-2023 | 04 | <ul style="list-style-type: none"> <li>• Emissions from the nutraceutical's unit should be controlled</li> <li>• Noise levels should be controlled so as not to disturb the local residents during their daily activities</li> </ul> | <ul style="list-style-type: none"> <li>• Employment opportunities for the local population</li> <li>• Improvements in the sewerage system and health facilities due to an increase in Industrialization.</li> </ul> |
|--|---------------|-----------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 9.5. Other department and agencies

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

**Table 9-3 Views of Participants of Public Sector Stakeholders**

| Sr.#                                       | CNIC/Designation        | Concerns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environmental Protection Department</b> |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1                                          | GM (SWMC)               | Following comments area summarized to control the pollution: <ul style="list-style-type: none"> <li>• Solid waste should be managed in Environmentally friendly manner.</li> <li>• Wastewater should be treated effectively &amp; approval should be acquired from concerned agency before disposing off in nearby drain.</li> <li>• HSE* at the site should be managed effectively.</li> <li>• No impact is being foreseen due to the selected location.</li> <li>• Locals should be given job opportunity.</li> </ul> |
| 2                                          | Environmental Inspector |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Social Welfare Department |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3                         | Deputy Director Officer         | <p>Following comments are suggested by the Deputy Director on the behalf of Social Welfare Department:</p> <ul style="list-style-type: none"> <li>• Final goods should be affordable for the locals.</li> <li>• The proposed product should facilitate locals and they should be economical.</li> <li>• Job opportunities should be given to the locals.</li> <li>• Wages should be given according to the work assign to them.</li> <li>• Life insurance of the workers should be given as well as all the facilities should be given as per labor laws.</li> </ul> |
| Irrigation Department     |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4                         | Sub Division                    | Following comments were suggested:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                           | Executive Engineer              | <ul style="list-style-type: none"> <li>• Untreated wastewater should not be disposed off in the nearby drains without proper treatment.</li> <li>• Beneficial as job opportunities will be available to the residents.</li> </ul>                                                                                                                                                                                                                                                                                                                                    |
| Forest Department         |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5                         | District Forest Officer Sahiwal | <p>Following recommendation were suggested by the forest department:</p> <ul style="list-style-type: none"> <li>• Planation and landscape activities should be carried out on broader scale.</li> <li>• Indigenous species such as; Arjarn, Barna, Neem, Suharjna, Amaltas and Jaman should be planted.</li> <li>• Proper drainage system must be available at site.</li> </ul>                                                                                                                                                                                      |



**Figure 14-Consultation with Govt. Departments**

## 9.6. Results of Survey

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

### 9.6.1. Occupation of Respondents

Majority of the respondents (38%) belongs to the labor class, 16% associated with their own business, 13% were daily wagers, 13% of respondents were associated with agriculture, 7% were shopkeepers and remaining 7% were the private employees. During survey, efforts were made to interact with local stakeholders representing all walks of life. The detailed graphic representation of occupational status is given below,

### 9.6.2. Personal Income

Based on the sample survey results, as the figure shows that 5% of the respondents were earning less than 20,000 rupees, 24% of respondents fall within the income range of 20,000–25,000, 41% respondents earn 30,001–40,000 while only 16% of the respondents earn within the range of 40,001–45,000 and 14% of respondents were earning more than 45,000 rupees.

### 9.6.3. Facilities Available

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

### 9.6.4. Acceptance Level of the Project

The opinions of the respondents were noted during the public consultation. The majority of respondents (94%) of were in favor of aforesaid project. They expect that establishment of aforesaid project will also increase the economic value of local assets. According to them the proposed project will boost the employment opportunities, mobility access to resources and social amenities.

## 10. CONCLUSION

The project is aiming at providing nutraceuticals unit for the nearby market to meet the herbal supplement demand. The project falls under the category of the projects requiring Environment Impact Assessment (EIA).

**At the end of this study it has been found that:**

- It has also developed ways and means for environmentally sustainable disposal of solid wastes to be generated from the project operations.
- The noise levels will be kept well within the required limiting values of the NEQS Pakistan.
- This project will create job opportunities during construction and operation stages leading towards reduction of poverty.
- Sewage will be passed through septic tanks before final treatment and disposal.
- It will help in improvement of community/social service status in the local area. It will also provide such facilities for people from other places.
- Project site means the development criteria like electricity supply, gas supply, water supply and sewage system.
- There are no sensitive elements/segments of environment around the project site.
- EMP, as recommended in this EIA Report, is to be put in place during all operational stages of the project.
- Environmental monitoring by the project proponent and a third party also ensures that the project will run in accordance with legal requirements,
- Availability of water for the project is ensured from the underground water sources without any effect on the needs of the people around the project area.

Based on these findings of the EIA Report the project merits for issuing of Environmental Approval by the Environmental Protection Agency, Government of Punjab, and Lahore.

# **ANNEXURE 1**

## **GLOSSARY**

## GLOSSARY

**EIA (Environmental Impact Assessment):** It is the process of identifying, predicting, evaluating and mitigating the effects of biophysical, social and other relevant proposed projects and physical activities prior to major decisions and commitments being made.

**EMP (Environmental Management Plan):** An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

**ESIA (Environmental Social Impact Assessment):** It is to identify the impacts of the project on social and environmental conditions.

**FAUNA:** Word used for combination of all the species of animals.

**FLORA:** Word used for combination of all the species of plants.

**IEE (Initial Environmental Examination):** Initial examination of projects for identification of hazards of project.

**NCS (National Conservation Strategy):** Three objectives of the National Conservation Strategy (NCS) are: (i) conservation of natural resources; (ii) sustainable development; and (iii) improved efficiency in the use and management of resources.

**NOC (No Objection Certificate):** It is a kind of clearance issued by EPA necessary for any project to be constructed.

**PEPA (Pakistan Environmental Protection Act 1997):** An act to provide the protection, conservation, rehabilitation and improvement of environment, for the prevention and control of pollution and promotion of sustainable development.

**Topography:** Physical features of any area including soil, water and air are called topography.

## **ANNEXURE 2**

### **LIST OF ABBREVIATION**

### LIST OF ABBREVIATIONS

|                  |                                                 |
|------------------|-------------------------------------------------|
| AA               | Ambient Air                                     |
| APHA             | American Public Health Association              |
| AOI              | Area Of Influence                               |
| BOD <sub>5</sub> | Biological Oxygen Demand                        |
| CMS              | Convention On Migratory Species                 |
| COD              | Chemical Oxygen Demand                          |
| dB(A)            | Decibel                                         |
| EA               | Environmental Assessment                        |
| EHS              | Environmental Health Safety                     |
| EIA              | Environmental Impact Assessment                 |
| EPD              | Environmental Protection Department             |
| PEPA             | Pakistan Environmental Protection Act           |
| EPA              | Environmental Protection Agency                 |
| ESIA             | Environmental And Social Impact Assessment      |
| ESA              | Environmental And Social Assessment             |
| ESMP             | Environmental/Social Management Plan            |
| EMP              | Environmental Management Plan                   |
| EC               | Electrical Conductivity                         |
| GIS              | Geographical Information System                 |
| GOP              | Government Of Pakistan                          |
| GPS              | Global Positioning System                       |
| GRC              | Grievance Redress Committee                     |
| GRM              | Grievance Redress Mechanism                     |
| HSE              | Health Safety & Environment                     |
| IEE              | Initial Environmental Examination               |
| I & D            | Irrigation And Drainage                         |
| IAIA             | International Association For Impact Assessment |
| IWM              | Industrial Waste Management                     |
| IUCN             | International Union For Conservation Of Nature  |
| KM               | Kilometers                                      |

|        |                                                       |
|--------|-------------------------------------------------------|
| LGO    | Local Government Ordinance                            |
| MW     | Mega Watt                                             |
| MEAS   | Multilateral Environmental Agreements                 |
| MSDS   | Material Safety Data Sheets                           |
| NEQS   | National Environmental Quality Standards              |
| PMD    | Pakistan Meteorological Department                    |
| PPE    | Personal Protective Equipment                         |
| PEQS   | Punjab Environmental Quality Standards                |
| NEAP   | National Environmental Assessment Plan                |
| NWFP   | North West Frontier Province                          |
| Q&EHS  | Quality, Environment, Health & Safety                 |
| O & M  | Operation And Maintenance                             |
| PKR    | Pak Rupees                                            |
| PPM    | Parts Per Millions                                    |
| PAP    | Project Affected People                               |
| PEPC   | Pakistan Environmental Protection Council/Punjab      |
| PSC    | Project Steering Committee                            |
| QA/QC  | Quality Assurance/Quality Control                     |
| RAP    | Resettlement Action Plan                              |
| ROG    | Reactive Organic Gas                                  |
| SWM    | Solid Waste Management                                |
| TDS    | Total Dissolved Solids                                |
| TT     | Technology Transfer                                   |
| UNFCCC | United Nation Frame Work Convention On Climate Change |
| UNCC   | United Nation Convention To Combat Desertification    |
| UNEP   | United Nations Environmental Programs                 |
| GOP    | Government Of Pakistan                                |
| WHO    | World Health Organization                             |
| R&R    | Rehabilitation And Resettlement                       |
| WWTP   | Waste Water Treatment Plant                           |

**ANNEXURE 3**

**LIST OF PEOPLE**

**CONSULTED**

### List of Individuals Consulted

| Sr.# | Name                | Father Name               | NIC #           | Address                                                              |
|------|---------------------|---------------------------|-----------------|----------------------------------------------------------------------|
| 1    | Mazhar Hussain      | Muhammad Sardool Khan     | 36502-3709815-1 | Chack # 93/D, P.O Box Noor Pur, Tehsil & Disst Sahiwal.              |
| 2    | Shahbaz Khan        | Jaffar Hussain            | 36502-9590248-9 | Chack # 86/6-R, P.O Box Kot Khadim Ali Shah, Tehsil & Dist. Sahiwal. |
| 3    | Waseem Ahmed        | Hafeez Ahmed              | 36401-9470678-1 | Chack # 22/EB, P.O Box Khass, Tehsil Arifwala, Disst. Pakpattan.     |
| 4    | Kamran Ali Khan     | Amjid Ali                 | 36502-1262560-5 | Chack # 62/4-R, P.O Box Khass, Tehsil & Dest. Sahiwal.               |
| 5    | Muhammad Waqass     | Muhammad Taji             | 36502-7182240-9 | Rati Tibi, Chack # 88/6-R, P.O Box Khass, Tehsil & Disst. Sahiwal.   |
| 6    | Qaiser Farooq       | Muhammad Riaz             | 36502-6069520-9 | Kot Alla Din # 1, House # 7, Street # 1, Sahiwal.                    |
| 7    | Ghulam Mujtaba      | Ghulam Hussain            | 36502-5623790-1 | Peplz Colony, House # 886, Street # 6, Sahiwal.                      |
| 8    | Mehboob Alam Shahid | Sayed Muhammad Tahir Shah | 36502-3634737-1 | Farid Town, House # 774, Block M, Sahiwal.                           |
| 9    | Muhammad Latif      | Muhammad Mansha           | 36502-1306860-5 | Chack # 55/GD, P.O Box Noor Shah, Tehsil & Dist. Sahiwal.            |
| 10   | Muhammad Ejaz       | Kameer Ali                | 36502-5667711-9 | P.O Box Noor Shah. Chack # 55/GD, Tehsil & Dist. Sahiwal.            |
| 11   | Rab Nawaz           | ALLAH Yar                 | 36502-7752653-9 | Chack # 55/GD, P.O Box Noor Shah, Tehsil & Dist. Sahiwal.            |
| 12   | ALLAH Yar           | Fareed                    | 36502-8319926-9 | Chack # 55/GD, P.O Box Noor Shah, Tehsil & Dist. Sahiwal.            |
| 13   | Ahmed Saeed         | Muhammad Kabeer           | 36502-1307025-7 | Chack # 55/GD, P.O Box Noor Shah, Tehsil & Dist. Sahiwal.            |
| 14   | Muhammad Jabbar     | Bashir Ahmed              | 36502-3746161-9 | P.O Box Noor Shah, Chack # 052-a/GD, Tehsil & Dist. Sahiwal.         |
| 15   | Muhammad Ramzan     | Muhammad Ameen            | 36502-2391980-9 | P.O Box Khass, Chack # 100/9-L, Tehsil & Dist. Sahiwal.              |

**ANNEXURE 4**

**SOURCES OF DATA**

## Sources of Data

- Punjab Environmental Protection (Amendment) Act 2012 (PEPA)
- Guidelines for the preparation and review of Environmental Reports, October 1997
- Review of IEE/ EIA Regulation, 2000
- The 2004 Baseline Survey on Millennium Development Goals in AACs, Pakistan
- World Weather Online.com
- Water and Sanitation Agency (WASA), Lahore.
- RED Data Book of IUCN
- Material Safety Data Sheet (MSDS) of chemicals
- [/www.wsask.ca/Global/Water%20Programs/Water%20Conservation/SWA-Water\\_Efficiency\\_on\\_the\\_Farm\\_Booklet\\_WEB.pdf](#)
- <http://www.madehow.com/Volume-2/Lead.html>
- <https://www.gravitatechnomech.com/Battery-Recycling/Environment-Guidelines.html>
- <https://www.gravitatechnomech.com/Lead-Metal/Lead-Pollution-Control-Solutions.html>
- [https://www.ila-lead.org/UserFiles/File/ILA9927%20FS\\_Recycling\\_V06.pdf](https://www.ila-lead.org/UserFiles/File/ILA9927%20FS_Recycling_V06.pdf)
- [http://www.ijirset.com/upload/2013/november/18\\_Disposal.pdf](http://www.ijirset.com/upload/2013/november/18_Disposal.pdf)
- <https://www.who.int/news-room/fact-sheets/detail/health-care-waste>
- [https://www.env.go.jp/recycle/3r/en/asia/02\\_03-2/04.pdf](https://www.env.go.jp/recycle/3r/en/asia/02_03-2/04.pdf)
- [https://www.env.go.jp/recycle/3r/en/asia/02\\_03-2/04.pdf](https://www.env.go.jp/recycle/3r/en/asia/02_03-2/04.pdf)
- <https://www.slideshare.net/DebajyotiBose/dioxin-and-furans-control-from-waste-to-energy-plants>

**ANNEXURE 5**

**TERMS OF REFERENCES**

### Terms of References

- \* According to regulation 7 of Review of IEE and EIA regulations, 2000, proponent shall pay, at the time of submission of IEE/EIA, a nonrefundable review fee to EPA, in accordance with rates specified in schedule-III.
- \* Provide all documents/details required for completion of IEA report
- \* Proponent shall be responsible for paying any fines/ penalties levied by the EPA Punjab or Environment Tribunal.
- \* Proponent shall be responsible correctness and validity of all information and documents provided to the consultant for onward submission to EPA Punjab and consultants will bear no responsibility.

In M/s Tibb e Mashriq

For Enviro Stewards Co. Pvt. Ltd.

Ms. Sara Fatima

Mr. Zia ur Rehman

**ANNEXURE 6**

**LIST OF NAMES, QUALIFICATIONS  
OF TEAM MEMBERS**

## List of Names, Qualifications and Roles of Team

### Members

| Sr. #                   | Name                      | Qualification                          |
|-------------------------|---------------------------|----------------------------------------|
| Team Leader             |                           |                                        |
| 1                       | Miss. Sara Fatima         | M.Phil. Environmental Sciences         |
| Environmental Scientist |                           |                                        |
| 3                       | Mr. Zia ur Rehman Farooqi | Ph.D. Environmental Sciences (Scholar) |
| 4                       | Hafiz Zeeshan Safder      | M.Sc. Analytical Chemistry             |
| 5                       | Mr. Saffi Ahmed           | M.Phil. Environmental Sciences         |
| Environmental Engineers |                           |                                        |
| 7                       | Miss Misbah Ali           | B.Sc. Environmental Engineering        |
| 8                       | Engr. Muhammad Bilal      | B.Sc. Environmental Engineering        |
| Sociologist             |                           |                                        |
| 9                       | Qazi Muhammad Ahmed Raza  | M.Phil Sociology                       |