**Environment Management Framework of PKSF**

**Palli Karma-Sahayak Foundation (PKSF)**

www.pksf-bd.org

**PKSF Environment Management Framework**

Date of Publication: January, 2012

Published byPalli Karma-Sahayak Foundation (PKSF)

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**Table of Contents**

***Subjects*  *Page***

**List of Acronyms ………………………………………………………………………………………………………………………**03

**Background …………………………………………………………………………………………………………….………………**05

***SECTION ONE***

1. **Introduction to Environmental Management…………………………………….……………………** 06
	1. Environmental Management **…………………………………………………………………………………** 06
	2. Key Principles of Environmental Management of PKSF**……………………………………** 06

***SECTION TWO***

1. **Environmental Management……………………………………………………………………………….……...**07
	1. Environmental Assessment**…………………………………………………………………………………………** 07
		1. Environmental Screening**……………………………………………………………………………………….**07
		2. Initial Environmental Examination (IEE)**……………………………………………….…………….**07
	2. Category of interventions for environmental assessment**………………………………………….**07
	3. Environmental Screening**…………………………………………………………………………………………….**07
	4. Initial Environmental Examination (IEE)**…………………………………………………………………...**08
	5. Steps for IEE**…………………………………………………………………………………………………………………**08
	6. Environmental Assessment and Monitoring Flow Chart**…………………………………………...**10
	7. Inclusion of people’s participation in assessment**…………………………………………………..….**11
	8. Suggested mitigation measures**………………………………………………………………………………...…**11

***SECTION THREE***

1. **Environmental Monitoring and Training**
	1. Environmental monitoring**…………………………………………………………………………………………...**12
	2. Time of Monitoring **……………………………………………………………………………………………………...** 12
	3. Responsibility of Monitoring**………………………………………………………………………………………** 13
	4. Community Monitoring**……………………………………………………………………………………………….** 13
	5. Training/Capacity building**………………………………………………………………………………………… .**13

Annex A: List of negative attributes**…………………………………………………………………………………..**14

Annex B: Environmental Screening**……………………………………………………………………………………**16

Annex C: Initial Environmental Examination Format**……………………………………………………….**19

Annex D: Progress Monitoring Format**……………………………………………………………………………...**27

Annex E: Environmental Effect Monitoring Format**………………………………………………………...**28

Annex F: Community Monitoring Format**…………………………………………………………………………**29

Annex G: Suggested mitigation measures and Environmental Code of Practices**………** 30

Annex H: List of Banned Pesticides in Bangladesh**…………………………………………………………** 34

Annex I: Consideration for Impact Assessment**……………………………………………………………..…** 37

**List of Acronyms**

**Project Project Name**

**DoE Department of Environment**

**ECA Environmental Conservation Act**

**ECR Environmental Conservation Rules**

**EMF Environmental Management Framework**

**EMP Environmental Management Plan**

**ES Environmental Screening**

**FGD Focus Group Discussion**

**IEE Initial Environmental Examination**

**IGA Income Generating Activities**

**KII Key Informant Interview**

**PO Project Implementing Partner**

**PKSF Palli Karma-Sahayak Foundation**

**PMU Project Management Unit**

**SGP Sub-Grant Proposal**

**WASH Water, Sanitation & Hygiene**

**WHO World Health Organization**

**Background**

Palli Karma-Sahayak Foundation (PKSF), an apex development organization, has been established by the Government of Bangladesh (GoB) in May 1990, for sustainable poverty reduction through employment generation. PKSF, primarily set it's goal to create self-employment opportunities in rural off-farm sector by extending loan facilities to the rural moderate poor. This loan programme has been diversified over the years to provide for changing needs of heterogeneous groups of poor people. PKSF’s “inclusive financing programme” now extends financial packages to the ultra poor, moderate poor, small and marginal farmers, micro-entrepreneurs etc. It provides a wide range of development services including appropriate credit, basic education, primary health care, technology transfer and business development services to the disadvantaged segments living anywhere in Bangladesh through the appropriate pro-poor organizations called Partner Organizations (POs).

PKSF has adopted disaster management and micro insurance programme under the fold of its social protection programmes aiming to enhance the capacities of the poor to increase their resilience to the adverse impacts of climate change. In addition, mapping of various rural business clusters has been completed to commence programmes for the development of rural industries.

The major objectives of PKSF are:

1. To provide financial assistance and institutional development for reduction of poverty;
2. To assist socio-economic development by education, capacity building health, training and risk reduction;
3. To build and strengthen the institutional capacity of the POs (partner organisations) and enhance their ability to provide services to the poor on a sustainable manner;
4. To support, promote and sponsor for climate change effects and environmental development;

PKSF do endorse, where applicable, laws, regulations, policies and guidelines of country related to environmental management, international treaties, laws, and conventions related environmental protection. This policy also consulted the targets related to Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). This policy will be a living document, meaning it will be reviewed time to time based on the requirement. Environmental and Social safeguard are always considered of all activities undertaken by PKSF.

***SECTION ONE***

1. **Introduction to Environmental Management**
	1. **Environmental Management**

Environmental management is a process that controls human interventions on and interaction with the environment in order to eliminate or offset harms to the environment, maximize development benefits as well aspreserve natural resources(Saunders and Bailey, 1999[[1]](#footnote-2))Environmental Management System is a source of competitive advantages to resolve the paradox by developing a theory based framework (Robert p. Sroufe et.al.[[2]](#footnote-3)). Environmental management of development projects takes into account the environmental dimensions of the project activities from project planning to operational phases with a focus on the improvement of human well-being for present and future generations.

The objective of environmental management is to improve quality of human life. In most cases, it does not actually involve managing the environment itself, but rather is the process of taking steps and promoting behaviors that will have a positive impact on how environmental resources are used and protected.It is based on the principles of ecology.

* 1. **Key Principles of Environmental Management of PKSF**

The key principles of the environmental management of PKSF are:

1. Projects and programs when funded for implementation will be subject to an environmental screening and initial environmental examination (IEE) in order to prevent execution of sub- projects with significant long-term negative environmental impacts and also to plan and implement mitigation measures for less significant environmental impacts,
2. PKSF will ensure due diligence to the related government regulations (ordinance, acts, rules etc.) related to environment
3. POs will be responsible for obtaining and ensuring clearance required from localgovernment agencies as necessary,
4. PKSF will promote environmental sound design and environmental capacity building of POs and community.
5. Climate resilient considerations will be integrated in designing relevantprojects.

***SECTION TWO***

1. **EnvironmentalManagement**
	1. **Environmental Assessment**

Environmental assessment is a procedure to ensure that the environmental implications of decisions are taken into account before the decisions are made. Environmental assessment can be undertaken for individual projects. The common principle is to ensure that plans, programmes and projects likely to have significant effects on the environment are made subject to an environmental assessment, prior to their approval or authorization. Consultation with the community is a key feature of environmental assessment procedures. PKSF aims to provide a high level protection of the environment and to contribute to the integration of environmental considerations into the preparation of projects, plans and programmes with a view to reduce their environmental impact.

Two types of tools will be used in PKSFconsidering nature of interventions and magnitude of impacts. The environmental assessment tools to be used by the POs are:

1. Environmental Screening
2. Initial Environmental Examination (IEE)
	1. **Category of interventions for environmental assessment**

A number of activities are being implemented by PKSF. Some activities have a minor and some have major impacts on environment. Generally, small infrastructures(designed for individual household) and IGAs require environmental screening as they have minor impact on health and social life. On the other hand,some interventions may have relatively greater impact on the physical, social and biological environment. These interventions will require Initial Environmental Examination (IEE).

* 1. **Environmental Screening**

The ‘environmental screening’ is a mandatory requirement for the design of a project or sub-project. The purpose of the environmental screening is to address environmental concern before further decision and/or design of a sub-project and to ensure that actions to mitigate environmental impacts. It is the first step to understand the possible environmental impacts and also to identify the environmental categorization of the project or sub-project. The participation and consultation with local communities are important to indentify the potential impacts of the project interventions. The screening format for the sub grant projects under Project is provided in Annex- B. The proposed screening criteria have been selected from the experience of other projects and typical environmental impacts of the proposed project interventions. It is the responsibility of the PO to carry out the environmental screening. Using the screening form, proposed sub projects will be screened by respective POs, to identify any potential adverse impacts/effects from the sub project activities.

 2.3.1 Steps for Environmental Screening:

1. Review the list of negative attributes (Annex A)
2. Review the design of interventions (if applicable)
3. Review whole process of implementation.
4. Review the list of environmental code of practice.
5. Review the Screening Format(Annex-B) before going to field.
6. Fill the screening format in the field.
7. Prepare an environmental mitigation and management plan following prescribed format
8. Prepare a monitoring plan as per attached format
	1. **Initial Environmental Examination (IEE)**

The IEE is a review of the reasonably foreseeable effects on the environment of a proposed development intervention/activity. The IEE is conducted if the project is likely to have minor or limited impacts, which can easily be predicted and evaluated, and mitigation measures could be prescribed easily. However, the IEE is also important to confirm whether the specific activity requires an EIA or not.

* 1. **Steps for IEE**
		1. **Step-1: Describing Environmental Condition of the Project Area**

This is the first step ofthe initial environmental examination (IEE). This includes collection ofbaseline information on biophysical, social and economic aspects of the project area.The description ofenvironmental settings includes the characteristics of the area on which the activity ofproposed project would occur. IEE should cover area affected by all impactsincluding potential area to address and potential area affected by itsalternatives. Normally, information generated from secondary sources or from other existing documents and throughfield sampling.

* + 1. **Step-2: Assessing the potential impact**

Prediction and quantification of the potential impactis the technical heart of the environmental examination process. The process involves theprediction of changes over time invarious environmental aspects as a result of a proposed project. The impacts of thepre-construction, construction and post-construction operation & maintenanceactivities will be separately identified. The prediction of the nature, extent, andmagnitude of environmental changes likely to result from a proposed project is aidedby various tools and techniques.

* + 1. **Step-3:Formulating Mitigation Measures**

Once the impacts have been identified, thenanalysis of the impacts is crucial i.e.,whether they are acceptable, requiremitigation measures, or are unacceptable. The scale Environmental Impact is to be considered depending upon time, place and condition. Afterward, measures will be devising to mitigatethe anticipated environmental changes and consequential impacts during projectimplementation and operation, or further reduce the residual environmental changesinherent in the selected project design with a sustainable and low-cost method. It normally includes technical, social, andinstitutional measures to be implemented as integral elements of the project. During the development paradox, some of the decisions may cost the environment. For an example, in cases,where mitigation measures not directly possible in the saline prone area, potable water is one of the major concern. To setup a rain-water-harvesting tank, some where cutting of tree/s may be important, compensationmeasures i.e., plantation of more trees of similar species should be considered.

* + 1. **Step-4:Environmental Management Plan (EMP)**

An EMP is a plan of scheduled actions thatfollows directly from a completed environmental assessment of a project. An EMP isthe organized expression of the environmental safeguards for the project. EMP has 2parts: i) Environmental Mitigation Plan; ii) Environmental Monitoring Plan.The mitigation plan is a major sub-plan of the EMP.The mitigation plan manages thepotential negative impacts of the project. Mitigation measure is a modification of a proposed project activity using differenttypes of actions, which can be applied individually or collectively like deletion of activity; change in location of activity;change in timing of activity;change in intensity of activity; isolation of activity and social or environmental compensation.

All the steps are compiled in the prescribed format of IEE in *Annex C*.The PO will follow the following steps to accomplish the IEE.

1. Review the list of negative attributes (Annex A)
2. Review the design of interventions (if applicable)
3. Review whole process of implementation.
4. Review the list of environmental code of practice.
5. Review carefully the IEE Format (Annex-C) before going to field.
6. Fill the IEE format in field.
7. Prepare an environmental mitigation and management plan following prescribed format
8. Prepare a monitoring plan as per attached format.
	1. **Environmental Assessment and Monitoring Flow Chart**

Review the list activities

Review list of negative attributes

Review List of Exclusion

Review the Design/process of preliminary selected activities

Progress Monitoring

Conduct Environmental Assessment

Implementation of EMP

Preliminary Selected Activities

Categorize interventions for Environmental Assessment

Selected Activities for Environmental Screening

Selected Activities for IEE

Prepare EMP

Sharing EMP with Community

Effect Monitoring

Community Monitoring

Reporting & Documentation

* 1. **Inclusion of people’s participation in assessment:**

People’s participation is an integral part of the environmental assessment. Throughout the whole assessment process, local people including men, women and elderly will be asked for gathering information regarding the environmental issue. Individual/KII/FGD should be carried out in this process.

* 1. **Suggested mitigation measures**

During the assessment, mitigation measureswill be suggested to eliminate/minimize the problem when the proposed interventions will create any adverse environmental impact in moderate or major magnitude. Most of the suggestive measures of PKSF will be simple and cost effective. A list of suggested mitigation measures and suggested environmental code of practices has been attached in Annex G for designing and implementation of PKSF interventions.

***SECTION THREE***

1. ***Environmental Monitoring and Training***
	1. **Environmental monitoring**

Environmental monitoring is an integral part of an effective environmental management system. It provides scope to revise the interventions or mitigation measures to make them more sustainable or environmentally compatible. Environmental monitoring is necessary to improve the project’s environmental implementation and performance.

The major objectives of monitoring are

* To monitor the implementation quality/appropriateness of selected mitigation measures.
* To monitor the effectiveness of mitigation measures.

Three types of monitoring involved in PKSF interventions which are

1. Performance/Progress Monitoring- will be conducted during implementation or construction.
2. Effect Monitoring-will be conducted after implementation of the action to determine the effectiveness of the mitigation measures.
3. Community Monitoring- will be conducted in both stage (during & post) by the community.
	1. **Time of Monitoring**

PKSF should conduct environmental monitoring in 2 stages for better performance of the interventions or mitigation measures:

***Stage 1: During implementation or construction***

During implementation of the interventions, progressmonitoring will be conduction to check the progress of implementation of environmental mitigation measures and adversely affected parameters. Environmental progress monitoring should be conducted at least once for the whole implementation period, particularly, in peak time of the construction work/process by usingthe ‘progress monitoring format(See annex D for progress monitoring format).

***Stage 2: Post implementation***

Monitoring of environmental effect is to determine the effectiveness of the mitigation measures and detect the changes in the environmental parameters due to the interventions. For measuring ‘Post intervention effect monitoring’ will be conducted after construction of activities or complete setup of IGA interventions. It will be carried out two times in a year i.e. interval period is six months. Seasonal variation is important to find out the actual effectiveness of the interventions and mitigation measures (See annex E for effect monitoring format).

* 1. **Responsibility of Monitoring**

The environmental focal person of POs who carried out the environmental assessment is responsible for monitoring as well. The environmental focal person will review and compile the monitoring report for sharing the findings to the project management.

* 1. **Community Monitoring**

Community monitoring is another approach for environmental monitoring where people of the community will independently monitor the effect and function of the interventions/mitigation measures. Community monitoring will give early indication of the environmental problems or hazards which can be manageable during the project tenure and before the problems become unmanageable. Community monitoring will be done by the leader of the respective community with the help of PO’s representative. Environmental focal person may help to understand the issue prescribed in the format which is attached in Annex-F.Community monitoring will be done during implementation of interventions and after end of interventions.

* 1. **Training/Capacity building**

Environmental focal person of Pos along with project head will receive necessary training for conduction of environmental assessment and monitoring of the infrastructure and IGA interventions. PKSF will organize the training sessionsfor the capacity building of the PO regarding the environmental issues and assessment.

**Annex: A**

**List of Negative Attributes**

If the screening identifies significant environmental impacts like possibility of drainage congestion in the adjacent areas due to the new embankment or uses of excessive agrochemicals or shrimp farming encroaching the mangrove area, the subprojects will not be recommended for financing under Project.

The proposed sub project in the environmentally sensitive areas or proposed subproject with significant and long-term environmental impacts will not be recommended. Approval will not be given to the beneficiary who will deals with unauthorized and excessive pesticides, toxic chemicals, polythene, narcotics or any unlawful/environmentally unacceptable interventions. The following activities will not be supported under project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl #** | **Intervention/ Attributes/**  | **Brief Description** | **Example** |
| **1** | Protected areas/Archaeological Historical Sitesdeclared by theGovernment of Bangladesh | Activities within or adjacent to the protected areas or archaeological historical sites identified by DoE or other Government agencies(Attach a list of protected areas & archaeological historical sites) | Any activities in Sundarban is Banned.  |
| **2** | Natural habitat and sensitive ecosystem | Activities that may adversely affect the natural habitat with sensitive ecosystems like natural pond/beel/baor/haor etc with important aquatic life |  |
| **3** | Use of pesticides (AnnexG : the list of banned pesticides)  | Use of excessive pesticides in agricultural land, tree plantation, large scale nursery.  |  |
| **4** | Road construction | Construction, reconstruction and extension of regional, national road and highway involving major concrete/cement concrete/reinforced cement concrete/ concrete block |  |
| **5** | Extraction of Natural Resource | Activities supporting commercial logging in forested areas or involving the use of unsustainably harvested timber or fuel-wood or significant conversion or degradation of critical natural habitats |  |
| **6** | Extensive Shrimp Firming | Sub-projects involving threats to mangrove forest and coastal environment |  |
| **7** | Dams/Embankment | Construction/reconstruction of dam/embankment involving major concrete/cement concrete/reinforced cement concrete /concrete blocks |  |
| **8** |  Supply of contaminated water | Tube-wells with Arsenic contamination (higher than national standard (0.05 mg/l) base below the 10 years flood levelwater supply schemes with high probability of bacterial contamination |  |
| **9** | Unsanitary disposal of solid waste and waste water | New or significant expansion of disposal facilities with negative health impacts to nearby water sources or population |  |
| **10** | Major loss of agricultural land | Construction/reconstruction of road/drain, canal/pond excavation with major loss of agriculture land and use of concrete cement/ reinforced concrete cement |  |
| **11** | Land filling | Sub-projects that will impact major destruction of top soil of agricultural land and land filling by industrial, household and commercial waste |  |

**Annex B**

**Environmental Screening**

­­Date of Screening:………

Name of union:………………………….

Name of upazila:……………………… Name of district:………………………..

**Section A: Identify Interventions**

|  |  |  |
| --- | --- | --- |
| **Category of Intervention** | **Name of the interventions** | **Number of Interventions** |
|  |  |  |

**Section B: Checklist for Environmental screening**

| **Sl #** | **General intervention issues** | **Yes** | **No** | **N/A** | **If yes, please indicate specific intervention & location** |
| --- | --- | --- | --- | --- | --- |
| **Issues related Agriculture/Plantation** |
| 1 | Crop residues that may be used as fertilizers |  |  |  |  |
| 2 | Involve use of pesticides/pest management |  |  |  |  |
| 3 | Destruction of trees and vegetation or orchard or plant garden |  |  |  |  |
| 4 | Possibility to increase soil salinity  |  |  |  |  |
| **Issues related to Fisheries/Livestock** |
| 5 | Waste generation (e.g. animal, carcass, slaughter house waste, etc.) |  |  |  |  |
| 6 | Waste from livestock/poultry that may be used as compost |  |  |  |  |
| 7 | Susceptible to disease  |  |  |  |  |
| 8 | Possibility of breaching the dyke and flow of flood/waste water to the pond |  |  |  |  |
| 9 | Deteriorate water quality through agricultural/ storm run-off  |  |  |  |  |
| 10 | Impact on fish habitat and migration |  |  |  |  |
| **Issues Earth work/Plinth Raise** |
| 11 | Involves use of earth work or land filling |  |  |  |  |
| 12 | Damage of cultivable land (area in decimal) |  |  |  |  |
| 13 | Involves use of fertile top soil |  |  |  |  |
| 14 | Water logging or water stagnation/ drainage congestion |  |  |  |  |
| 15 | Erosion of slope of raised plinth of settled ground/road |  |  |  |  |
| **Issues related to Water Supply/Sanitation/irrigation**  |
| 16 | Involves excavation/re-excavation |  |  |  |  |
| 17 | Run-off/waste water flow to/from water sources |  |  |  |  |
| 18 | Involves latrines, septic tank or sewerage system |  |  |  |  |
| 19 | For water supply options, tested positive for Arsenic |  |  |  |  |
| 20 | Possibility to affect quality or quantity of surface water |  |  |  |  |
| 21 | Possibility to affect quality or quantity of ground water |  |  |  |  |
| 22 | Diversion or use of surface water |  |  |  |  |
| 23 | Withdrawal of ground water |  |  |  |  |
| 24 | New or rebuilt irrigation or drainage system |  |  |  |  |
| 25 | Tested positive for Salinity |  |  |  |  |
| 26 | Possibility of rain water harvesting |  |  |  |  |
| 27 | People use pond water for drinking |  |  |  |  |
| 28 | Possibility of contamination of surface water source from waste or latrine pit |  |  |  |  |
| **Issues related to Biodiversity/Ecosystem** |
| 29 | Negative or significant effect on threatened or endangered species. |  |  |  |  |
| 30 | Negative or significant effect on designated wetlands or water body |  |  |  |  |
| 31 | Negative effect on locally important or valued ecosystem |  |  |  |  |
| 32 | Introduction of invasive species (plant or fish) which have negative impact on local environment |  |  |  |  |
| 33 | Negative impact of electrical waste i.e. acid or lead from battery, used CFL bulb, polythene etc. |  |  |  |  |
| **Other** |
| 34 | Possibility of water stagnation/drainage congestion/water logging situation created for implementing interventions |  |  |  |  |
| 35 | Require to cut/destroy tree |  |  |  |  |
| 36 | Obstruction of natural connection between river and wetlands |  |  |  |  |
| 37 | Increased noise due to construction activities |  |  |  |  |
| 38 | Increased windblown dust from materials |  |  |  |  |
| 39 | Health risk to labors involved in project activities |  |  |  |  |

**Section C: Environmental Management Plan** (Please identify the mitigation measures for any of the “Yes” answer provided in Section B)

1. **Environmental mitigation and enhancement plan**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name of the intervention** | **Potential Environmental Impacts** | **Location** | **Mitigation measures/ Environmental Code of Practices** | **Estimated cost** | **Stage of application ( during or post construction)** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

1. **Monitoring Plan**

|  |  |  |
| --- | --- | --- |
| **Interventions/ Mitigation Measures** | **Monitoring Timing & Frequency** | **Person Responsible** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Prepared by** Name : ………Designation:……Signature:……Date ……… | **Reviewed by** Name:…………Designation: ……Signature…Date … | **Approved by** Name………… Designation:…Signature :……Date………… |

**Annex C**

**Initial Environmental Examination (IEE) Format**

Examination date:………

Name of union:………………………….

Name of upazila:……………………… Name of district:……………………….

**Section A: General Information**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category of Intervention** | **Name of the Intervention** | **Number of the intervention** | **Brief description of the design** |
|  |  |  |  |
|  |  |  |
|  |  |  |

1. Description of existing Environment: Describe the physical, biological and socio-economic conditions of the catchment area. (Use extra page detail description)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………...

**Section B: Environmental Examination (Please see annex H for identification of impacts and magnitude)**

| **Sl #** | **Environmental Issues/Parameters** | **Baseline/ Current Situation** | **Impact Assessment** | **Suggested Mitigation Measures** |
| --- | --- | --- | --- | --- |
| **Impacts?** | **Magnitude** | **Measure/Quantify impacts (if possible)** | **Describe possible impacts (if quantification is not possible)** |
| **N/A, Yes, No** | **Low, Moderate, High** |
| **Issues related to homestead and plinth raise/land filling/school/community ground raise/ construction/renovation of connecting road** |
| **1** | Damage of cultivable/Agriculture land  |  |  |  | Quantity of damaged land area (Decimal) |  |  |
| **2** | Loss of fertile top soil  |  |  |  | Quantity of land from where top soil collected(Decimal) |  |  |
| **3** | Water stagnation/drainage congestion/water logging situation/affect storm run-off |  |  |  | # of probable affected point |  |  |
| **4** | Destruction of trees and vegetation or orchard or plant garden |  |  |  | # of loss trees |  |  |
| **5**  | Health risk to labors involved in project activities |  |  |  | # of affected labors |  |  |
| **6** | Negative effect on locally important or valued ecosystem |  |  |  | # of affected ecosystem |  |  |
| **7** | Negative or significant effect on threatened or endangered species. |  |  |  | # of species that could be affected |  |  |
| **8** | Increased noise due to construction activities |  |  |  | # of noise pollution sources |  |  |
| **9** | Plantation which have negative impact on environment. |  |  |  | # of plant of such kind  |  |  |
| **10** | Obstruction of natural connection between river and wetlands. |  |  |  | # of obstacle |  |  |
| **11** | Affect culture or capture fishery. |  |  |  | # of source |  |  |
| **12** | Negative impact on soil fertility. |  |  |  | probable affected area (Decimal) |  |  |
| **13** | Impact on large or highly important construction i.e. national highway, town protection embankment etc. |  |  |  | # of affected point |  |  |
|  | **Issues related to pond/canal/dyke excavation/re excavation** |
| **1** | Damage of cultivable/Agriculture land  |  |  |  | Quantity of damaged land area (Decimal) |  |  |
| **2** | Loss of fertile top soil  |  |  |  | Quantity of land from where top soil collected(Decimal) |  |  |
| **3** | Destruction of trees and vegetation or orchard or plant garden |  |  |  | # of loss trees |  |  |
| **4** | Health risk to labors involved in project activities |  |  |  | # of affected labors |  |  |
| **5** | Negative effect on locally important or valued ecosystem |  |  |  | # of affected ecosystem |  |  |
| **6** | Negative or significant effect on threatened or endangered species. |  |  |  | # of species that could be affected |  |  |
| **7** | Increased noise due to construction activities |  |  |  | # of noise pollution sources |  |  |
| **8** | Plantation which have negative impact on environment. |  |  |  | # of plant of such kind |  |  |
| **9** | Affect culture or capture fishery. |  |  |  | # of source |  |  |
| **10** | Affect quality of surface water |  |  |  | # of affected point |  |  |
| **11** | Affect quality of ground water |  |  |  | # of affected ground water point |  |  |
| **12** | Erosion of slope of raised plinth/land |  |  |  | # of eroded point  |  |  |
| **13** | Possibility of water-borne disease  |  |  |  | # of suspected source  |  |  |
| **14** | Odor |  |  |  | # of source |  |  |
| **Community rain water harvesting system/traditional irrigation pump/solar irrigation pump**  |
| **1** | Damage of cultivable/Agriculture land |  |  |  | Quantity of damaged land area (Decimal) |  |  |
| **2** | Loss of fertile top soil  |  |  |  | Quantity of land from where top soil collected(Decimal) |  |  |
| **3** | Water stagnation/drainage congestion/water logging situation/affect storm run-off |  |  |  | # of affected point |  |  |
| **4** | Destruction of trees and vegetation or orchard or plant garden |  |  |  | # of loss trees |  |  |
| **5** | Health risk to labors involved in project activities |  |  |  | # of affected labors |  |  |
| **6** | Negative effect on locally important or valued ecosystem |  |  |  | # of affected ecosystem |  |  |
| **7** | Impact on large or highly important construction i.e. national highway, town protection embankment etc. |  |  |  | # of affected point |  |  |
| **8** | Run-off/waste water flow to/from water sources/water body |  |  |  | # of affected point |  |  |
| **9** | Affect quality of surface water |  |  |  | # of affected surface water point |  |  |
| **10** | Affect quality of ground water |  |  |  | # of affected ground water point |  |  |
| **11** | Possibility of water-borne disease  |  |  |  | # of suspected source |  |  |
| **12** | Odor |  |  |  | # of source |  |  |
| **13** | For water supply options, tested positive for Arsenic |  |  |  | # of affected source |  |  |
| **14** | Tested positive for Salinity |  |  |  | # of affected source |  |  |
| **15** | Indiscriminate withdrawal/inefficient use of water |  |  |  | # of source and type of technology |  |  |
| **Issues related to community latrine in village market or gathering place** |
| **1** | Damage of cultivable/Agriculture land  |  |  |  | Quantity of damaged land area (Decimal |  |  |
| **2** | Loss of fertile top soil  |  |  |  | Quantity of land from where top soil collected(Decimal) |  |  |
| **3** | Destruction of trees and vegetation or orchard or plant garden |  |  |  | # of loss trees |  |  |
| **4** | Health risk to labors involved in project activities |  |  |  | # of affected labors |  |  |
| **5** | Negative or significant effect on threatened or endangered species. |  |  |  | # of species that could be affected |  |  |
| **6** | Increased noise due to construction activities |  |  |  | # of noise pollution sources |  |  |
| **7** | Run-off/waste water flow to/from water sources/water body |  |  |  | # of affected point |  |  |
| **8** | Affect quality of surface water |  |  |  | # of affected surface water point |  |  |
| **9** | Affect quality of ground water |  |  |  | # of affected ground water point |  |  |
| **10** | Possibility of contamination of surface water source from waste or latrine pit |  |  |  | # of suspected source |  |  |
| **11** | Possibility of damages of latrine pit from flood |  |  |  | # of suspected source |  |  |
| **12** | Possibility of water-borne disease  |  |  |  | # of suspected source |  |  |
| **13** | Improper disposal of excreta |  |  |  | # of suspected source |  |  |
| **14** | Odor |  |  |  | # of source |  |  |
| **15** | Tested positive for Salinity |  |  |  | # of affected source |  |  |

**Section C: Environmental Management Plan** (Summary of the mitigation measures identified in Section B and additionally identify some measures for overall enhancement of the local environment at the project site)

1. **Environmental mitigation and enhancement plan**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Environmental Issues/Problems** | **Mitigation/enhancement measures/environmental code of practice** | **Location** | **Cost of Implementation** | **Person Responsible for Implementation**  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1. **Monitoring Plan**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Interventions / Mitigation Measures** | **Types of Monitoring Suggested**  | **Monitoring Frequency** | **Monitoring Time** | **Person Responsible** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Reviewed by**

Name ……………………….

Designation :………………

Signature :………………

Date…………………………

**Prepared by**

Name :……………………………

Designation :……………………………

Signature :……………………………

Date :……………………………

**Annex D**

**Progress Monitoring**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Interventions/ Mitigation Measures to be monitored** | **Progress (** Completed, Not Completed, In Progress) | **Observations**  | **Need for further monitoring** | **Monitoring Frequency** | **Person Responsible** |
| Yes | No |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |
| --- |
| **Summary Observations:** |

**Monitoring Conducted By**

Name :……………………………

Designation :……………………………

Signature :……………………………

Date :……………………………

**Reviewed By**

Name :……………………………

Designation :……………………………

Signature :……………………………

Date :……………………………

**Annex E**

**Environmental Effect Monitoring Format**

Monitoring date:

Sub-project completion date:………

Name of village:………………………….. Name of union:………………………….

Name of upazila:……………………… Name of district:………………………..

**Section A: General Information (Name/location/description of the schemes/interventions and brief descriptions of the specific site)**

|  |  |  |
| --- | --- | --- |
| **Name of the interventions/ Mitigation Measures**  | **Brief description of the Design** | **Brief Description of Baseline Environment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Section B: Environmental Effect Monitoring (identify environmental issues, parameters, mitigation measures needed to be monitored from the IEE)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No** | **Environmental Issues/ Interventions/Mitigation measures** | **Effect Monitoring**  | **Describe/ quantify the effects**  | **Need further monitoring** |
| Yes | No |
| +ve | -ve | No |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

**Annex F**

**Community Monitoring Format**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Environmental Problems/ issues** | **Relevant Interventions/ Mitigation Measures**  | **Completion status**  | **Problem Mitigation**  | **Remarks**  |
| (Done/In progress/Not Done) | Solved | Not solved  | N/A |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |
| --- |
| **Summary Observations:** |

|  |  |
| --- | --- |
| **Monitoring Conducted By** **Name : ……………………………** **Designation : ……………………………****Signature : ……………………………****Date :……………………………** | **Reviewed By** **Name : ……………………………** **Designation : ……………………………****Signature : ……………………………****Date :……………………………** |

**Annex G**

 **Suggested mitigation measures and Environmental Code of Practices**

|  |  |  |
| --- | --- | --- |
| **SL #** | **Interventions /Environmental Issues** | **Mitigation measures and Environmental Code of Practices** |
|  | WASH  | 1. Maintain safe distance (minimum 10 m) between latrine and tube well or other water sources;
2. Maintain 250 m distance between two adjacent wells;
3. Design water seal sanitary latrine. Seal off bottom of the pit, if possible;
4. Conduct water quality test for arsenic contamination and salinity;
5. Design rain water harvesting system;
6. Maximum limit for arsenic concentration in drinking water 0.05 mg/lit;
7. Maximum limit for iron in drinking water is 0.3 mg/lit;
8. Drinking water should be free from coli forms;
9. Hand wash is must before eating and after using toilet;
10. Connection with water body from latrine pit is prohibited;
11. Maintain 3 feet distance between ground water table and bottom of latrine pit;
12. Sufficient ventilation should be ensured in latrine superstructure;
13. Untreated water from open pond should be discouraged;
14. Natural oxidation of waste water allowing through mud-channel;
 |
|  | Agriculture  | 1. Use of Integrated Pest Management (IPM) technologies (Pheromone, Perching, Light trapping, Hand picking);
2. Do not cut mature trees. If needed, plant a sapling or design a plantation program;
3. Maintain seed bank in village;
4. Water re-use and re-cycle for homestead garden;
5. Maximization the use of local/indigenous and sustainable varieties for ecological succession;
6. Reduce monoculture and maximize multicultural crop-rotation;
 |
|  | Livestock  | 1. Safe distance has to maintain between poultry shed and kitchen;
2. Use the litter for composting and reduce the scattering of waste;
3. Prohibition of mixing and outing during the epidemic period;
 |
| **1** | Earth filling/Earth cutting/Loss of top soil | 1. Collect earth/soil form dry pond/canal/borrow pits or where the top soil had already been lost;
2. Depth can be increased rather than increase of area;
3. Use grass to prevent soil erosion;
4. Personal safety should be allowed for the labor of earth-work;
 |
| **2** | Water stagnation/drainage congestion/water logging | 1. Construct user-friendly drain/s;
2. Construct user-friendly culvert;
3. Properly maintain natural slop;
4. Alternative project may include considering logged water;
5. Natural management of mosquito breeding like allowing local species of catfishes into ditches;
 |
| **3** | Soil erosion and degradation/sedimentation | 1. Tree plantation or use turf to cover the slope;
2. Preparation and application of compost;
3. Addition of organic matter like animal manures including com dung and farmyard manures, green manure, oilcake, industrial organic wastes, homestead waste etc.;
4. Incorporation of residues of leguminous crops into the soil;
5. Plantation of leguminous varietiesfor nitrogen fixation;
 |
| **4** | Declines of soil fertility | 1. Crops diversification;
2. Balanced fertilizer application;
3. Use of mixed fertilizer for balanced nutrients;
4. Use of bio-fertilizer or organic fertilizers;
5. Top covering and allowing siltation;
6. Retaining moisture by straw, hyacinth etc.;
 |
| **5** | Soil salinity | 1. Use of duck weed for removing soil salinity;
2. Discourage drainage to intrusion of saline water;
3. Flushing soil with pre-monsoon rain water;
4. Shrimp-rice farming system;
5. Use of organic fertilizer;
6. Drip irrigation;
 |
| **6** | Pest infestation/management | 1. Integrated pest management (IPM);
2. Use of varieties tolerant to pest infestation;
3. Crop diversification;
4. Use biological trap;
5. Planting multiple varieties with varying susceptibility to pests
6. Use of pheromone trap;
7. Use of light during the darkness;
 |
| **7** | Maintaining biodiversity | 1. Encourage to increase local species of flora and fauna;
2. Propagation and conservation of endangered species in the ecosystem;
3. Undisturbed the natural ecosystem, habitat and ecological succession;
4. Prohibition of mono-culture as well as introducing exotic species;
 |
| **8** | Depletion of groundwater level | 1. Emphasize on surface water irrigation;
2. Economic use of irrigation water;
3. Use of spray method for irrigation;
4. Increasing rate of natural recharge;
5. Introduce low consumption water varieties or crops;
6. Increase use of rain water;
7. Renovation of river/canal/pond to collect rain water;
8. Increase re-use of ground water by using brown water for flashing toilets;
 |
| **9** | Salinity intrusion in the Southern region | 1. Increased use of surface water;
2. Utilize fresh water raised by high tide;
3. Avoid groundwater extraction;
4. Increase irrigation efficiency and water productivity;
5. Rain water harvesting;
 |
| **10** | Destruction of trees and vegetation or orchard or plant garden  | 1. Plant alternative sapling as compensation;
2. Revise the proposed plan;
3. Compensate plantation in another place or adjacent place;
 |
| **11** | Impact on fish habitat and migration | 1. Construct passage for fish migration;
2. Revise the proposed plan;
3. Endangered species may be migrated to another place;
4. Avoiding mono-culture and maximize multi-layer fish culture for maximizing resource within limited area;
 |
| **12** | Obstruction of natural connection between river and wetlands | 1. Construction of culvert or diversion passage;
2. Revise the proposed plan for alternative use of recourses for minimizing loss;
 |
| **13** | Impact on surface water quality | 1. Promote 3R (Reduce, Recycle and Re-use) options;
2. Introduce solid waste management;
3. Prohibition of dumping polithenes and wastes inside of the river and water-bodies;
 |
| **15** | Increased noise due to construction activities | 1. Introduce sound proof system (if possible);
2. Readymade construction materials may arrange.
3. Site may change.
4. Using low noise techniques;
5. Maximize mechanical lubrication to reduce noise from machines;
 |
| **16** | Increased windblown dust from materials | 1. Consider weather condition like wind flow, wind speed etc.;
2. Rescheduling working time period and time;
3. Using musk;
4. Using water spray and using wet-net wall;
 |
| **17** | Health risk to labors involved in project activities | 1. Follow the safety instruction and safety wear;
2. Supporting first-aid box and to provide minimal level of training;
3. Adequate transport facility to allow a patient into the hospital;
4. Enlisting the names and numbers of village doctors in nearby community places/shops;
 |
| **18** | Plantation which have negative impact on environment | 1. Increase the plantation of local varieties avoiding the exotic species;
2. Pruning the bunches of trees before the cyclone period to avoid loss of lives under the broken trees;
 |
| **19** | Negative impact of electrical waste i.e. acid or lead from battery, used CFL bulb, polythene etc. | 1. Promote 3R(Reduce, Recycle and Re-use);
2. Promote specific waste management system;
3. Promoting the recycle shops;
 |

**AnnexH**

**List of Banned Pesticides in Bangladesh**

|  |
| --- |
|  |
| **Name of pesticide** | **Registration** **Number** | **Name of Company** |
| 1. Diazinon  | 14G AP-08  | Shetu Corporation Ltd.  |
| 2. Bizaguard  | 2P AP-09  | Ciba-Geigy (Bangladesh) Ltd.  |
| 3. Roxion  | 40EC AP-11  | International Services (Bangladesh) Ltd  |
| 4. Dankavapon  | 100 AP-13  | Shetu Corporation Ltd.  |
| . 5. Damphin  | 2P AP-19  | Ciba-Geigy (Bangladesh) Ltd.  |
| 6. Diazinon  | 90L AP-20  | Ciba-Geigy (Bangladesh) Ltd.  |
| 7. Damphin 950EC  | AP-25  | Ciba-Geigy (Bangladesh) Ltd.  |
| 8. Dichlorovos  | AP-27  | Bayer (Bangladesh) Ltd.  |
| 9. Cureterr 3G  | AP-30  | Bayer (Bangladesh) Ltd.  |
| 10. 2,4-D Na Salf  | AP-34  | Bayer (Bangladesh) Ltd.  |
| 11. Folithion ULVC 98  | AP-36  | Bayer (Bangladesh) Ltd.  |
| 12. Methybron  | AP-38  | Excell trading Co.  |
| 13. Heptachlor 40WP  | AP-39  | Krishi Banijjya Protishthan  |
| 14. Chlordane 40 WP  | AP-40  | Krishi Banijjya Protishthan  |
| 15. Aerovap 100 EC  | AP-41  | Liza Enterprise Ltd.  |
| 16. Aerodriel 20EC  | AP-42  | Liza Enterprise Ltd.  |
| 17. Aeromal 57% EC  | AP-44  | Liza Enterprise Ltd.  |
| 18. Padan 10G  | AP-52  | Data Enterprise Ltd.  |
| 19. Fenitrothin 98  | AP-53  | Farm Chemical corporation Ltd.  |
| 20. Carbin 85 WP  | AP-54  | Farm Chemical corporation Ltd.  |
| 21. Diamal 57EC  | AP-55  | Farm Chemical corporation Ltd.  |
| 22. Detia Gas EXT  | AP-56  | Farm Chemical corporation Ltd.  |
| 23. Dichlovos 100  | AP-57  | Farm Chemical corporation Ltd.  |
| 24. Methyl Bromide 98  | AP-58  | Farm Chemical corporation Ltd.  |
| 25. Malathion 57EC  | AP-68  | BPI Ltd.  |
| 26. Cureterr 3G  | AP-69  | Bayer (Bangladesh) Ltd.  |
| 27. Dieldrin 20EC  | AP-73  | Shell Company of Bangladesh Ltd.  |
| 28. Bidrin 24WSC  | AP-74  | Shell Company of Bangladesh Ltd.  |
| 29. Malathion 57EC  | AP-78  | Burma Eastern Ltd.  |
| 30. Vapona  | AP-79  | Shell Company of Bangladesh Ltd.  |
| 31. Bidrin 85WSC  | AP-80  | Shell Company of Bangladesh Ltd.  |
| 32. Diealdrin 50WP  | AP-82  | Shell Company of Bangladesh Ltd.  |
| 33. Dieldrin 40WP  | AP-83  | Shell Company of Bangladesh Ltd.  |
| 34. Furadan 3G  | AP-85  | FMC International S. A.  |
| 35. Actellic 2% Dust  | AP-99  | Bangladesh Manufacturers Ltd.  |
| 36. Quickphos  | AP-102  | Agrani Traders  |
| 37. Torque 550g/l  | AP-115  | International Service Bangladesh Ltd.  |
| 38. Ridan 3G  | AP-131  | Rupali Sangstha Ltd.  |
| 39. Bkzne 14G  | AP-135  | B. K. Traders Ltd.  |
| 40 Aerocypermethrin  | AP-137  | Liza Enterprise Ltd.  |
| 41. Karmex  | AP-145  | BEXIMCO Agrochemicals Ltd.  |
| 42. Carbaryl 85Wp  | AP-147  | Shetu Corporation Ltd.  |
| 43. Agridhan 3G  | AP-154  | Shetu Corporation Ltd.  |
| 44. Techo 2% Dust  | AP-157  | Alco Pharma Ltd.  |
| 45. Manex II  | AP-163  | Shetu Corporation Ltd.  |
| 46. Phyto MZ-80  | AP-164  | Liza Enterprise  |
| 47. Uniflow TM Sulphur  | AP-167  | Shetu Corporation  |
| 48. Fenkil 20EC  | AP-169  | Agrani Traders  |
| 49. Sunfuran 3G  | AP-171  | Shertu Corporation Ltd.  |
| 50. Hekthion 57EC  | AP-178  | Farm Chemicals Corporation Ltd.  |
| 51. Poligor 40EC  | AP-180  | Farm Chemicals Corporation Ltd.  |
| 52. Melbromid 98  | AP-185  | Horizon Trade Ltd.  |
| 53. Mebrom  | AP-186  | Bengal Wings Trade Ltd.  |
| 54. Agrine 85WP  | AP-187  | Edgro (Pvt) Ltd.  |
| 55. Drawizon 60EC  | AP-190  | Keeco Pesticides Ltd.  |
| 56. Gastoxin  | AP-195  | Bright Corporation  |
| 57. Cekumethrin 10EC  | AP-219  | Premier Traders  |
| 58. Cythrin  | AP-220  | Bari and company Ltd.  |
| 59. Cekuthoate 40EC  | AP-225  | Premier Traders  |
| 60. Arifos 20EC  | AP-229  | Bari and company Ltd.  |
| 61. Malathion 57Ec  | AP-230  | Sabrina Trading Corporation.  |
| 62. Cardan 5G  | AP-234  | Bari and Company Ltd.  |
| 63. Diazinon 14G  | AP-236  | Liza Enterprise Ltd.  |
| 64. Rizinon 60EC  | AP-239  | Bari and Company Ltd.  |
| 65. Zincphosphide  | AP-258  | Liza Enterprise Ltd.  |
| 66. Davison Glyphosate  | AP-266  | Shetu Pesticides Ltd.  |
| 67. Morestan 25WP  | AP-269  | BEXIMCO Agrochemicals Ltd.  |
| 68. Manzate 200  | AP-301  | Auto Equipment Ltd.  |
| 69. Dimecron 100Sl  | AP-301  | Novratis (Bangladesh) Ltd.  |
| 70. Pillarcron 100SL  | AP-148  | Shetu Pesticides Ltd.  |
| 71. Benicron 100WSC  | AP-06  | Sabrina Trading Corporation.  |
| 72. DDVP 100W/V  | AP-03  | ACI Formulations Ltd.  |
| 73. ChemoDDVP  | AP-245  | Chemsfil Bangladesh Ltd.  |
| 74. DDVP 100EC  | AP-151  | Mcdonald Bangladesh (Pvt) Ltd.  |
| 75. Nogos 100EC  | AP-26&274  | Novratis (BD) Ltd.  |
| 76. Phosvit 100EC  | AP-46  | Data enterprises Ltd.  |
| 77. Daman 100EC  | AP-325  | Petrochem (B) Ltd.  |
| 78. Azodrin 40WSC  | AP-336  | BASF Bangladesh Ltd.  |
| 79. Nuvacron 40SL  | AP-18&275  | Novratis (Bangladesh) Ltd.  |
| 80. Megaphos 40SL  | AP-175  | Mcdonald Bangladesh (Pvt) Ltd.  |
| 81. Phoskil 40SL  | AP-339  | United Phophorous (Bangladesh) Ltd.  |
| 82. Kadette 40WSC  | AP-284  | BISCO Pesticides & Chemical Corporation  |
| 83. Monophos 40WSC  | AP-328  | Alpha Agro Ltd.  |
| 84. Monodrin 40WSC  | AP-07  | Sabrina Trading Corporation  |
| 85. Corophos 40SL  | AP-342  | Corbel International Ltd.  |
| 86. Luphos 40SL  | AP-388  | ACI Formulations LTD.  |
| 87. Amcordin 40SL  | AP-340  | Atherton Imbros Co. Ltd  |
| 88. Vitacron 40SL  | AP-341  | Shetu Marketting Co.  |
| 89. Monotaf 40WSL  | AP-331  | Auto Equipment Ltd  |
| 90. Tamaron 40SL  | AP-188  | Haychem (B) Ltd.  |
| 91. Polythion 50EC  | AP-32  | Haychem (B) Ltd.  |
| 92. Macuprex 65%  | AP-65  | Bayer Crop Science  |
| 93. Zithiol 57EC  | AP-126  | Rohn Polenk Bangladesh.  |
| 94. Delapon Na-85  | AP-66  | Rohn Polenk Bangladesh.  |
| 95. Enthio 25EC  | AP-64  | Rohn Polenk Bangladesh.  |
| 96. Zolone 35EC  | AP-67  | Rohn Polenk Bangladesh.  |
| 97. Rentokill CC Type 75%  | AP-221  | Getco Limited  |
| 98. Paramound CC Type  | AP-300  | B. D. Associate and Company.  |
| 99. Darsbun 20EC  | PHP-5  | Auto Equipment Ltd.  |
| 100. Darsbun 20EC  | PHP-85  | Auto Equipment Ltd.  |
| 101. Diazinon 60EC  | AP-23  | Syngenta Bangladesh Ltd.  |
| 102. Mortin King Mosquito Coil  | PHP-54  | Reckit and Benckiser  |
| 103. Mortin Mosquito Coil  | PHP-101  | Reckit and Benckiser  |

**Annex I**

**Considerations for impact assessment**

**Type of impact:**

*Beneficial and adverse impact*

When the predicted impacts of the interventions are useful or beneficial and are not detrimental to the immediate or surrounding environment as a whole or to any of its component will be identified as beneficial. But when the impacts are not useful or beneficial and are generally detrimental to the immediate or surrounding environment as a whole or to any of its components will be identified and marked as‘adverse’.

**Magnitude/ severity of impact:**

*None:* When it is clearly understood that there is no impact of the intervention.

*Minor (Low):* When it is felt or clearly understood that there is impact but that is not a significant one and generally does not require any special corrective or mitigation measures and often expected that the impact will be corrected naturally or automatically over a period of time or even if that is not corrected will not bring any consequence of significance.

For example: Improper management of construction debris and solid waste could cause blockage of drainage line/ path and environmental pollution. With some measures these minor problems can be mitigated easily. Impacts due to felling of a few immature small locally available trees or shrubs will be minor.

*Moderate (medium):* when it is felt or clearly understood that there is significant impact but thatis not an extreme one though generally may require some kind o corrective or mitigation measures and it is not generally expected that the impact will be corrected naturally or automatically over a period of time.

For example, not matured but reasonably grown tree cutting in the community may have impact of moderate magnitude to settlement environment, aesthetics, horticulture, timber availability, birds nesting, soil stability etc.

*Major (High):* When it is felt or clearly understood that there is impact of very significant nature and obviously will require mitigation measures to address the problem to significantly minimize the consequences of the impact. It is not expected that the impact will be corrected naturally or automatically. It is often anticipated in such case that the consequences will not be completely mitigated and the original situations not restored but the mitigation may bring down the consequences of the impact of significance.

For example: Deforestation of a small patch forest would have major impact on the environment. Or if a pond located close to a sub-project (toilet) site is used for washing/ bathing or for fish culture, pollution of the pond from fecal discharge would generate significant adverse impacts.

1. Saunders, A.M. & Bailey, J. 1999. Exploring the EIA/environmental management relationship. *Environmental Management* 24(3): 281-295. [↑](#footnote-ref-2)
2. Robert P. Sroufe *et.al*., S. 1998. Environmental Management System as a source of competitive Advantage, <http://www.asse.org/assets/1/7/EMS-CA.pdf>. [↑](#footnote-ref-3)