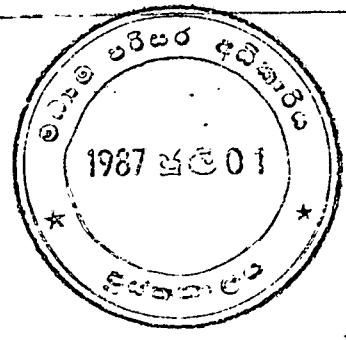


**HAND-BOOK ON
ENVIRONMENTAL IMPACT ASSESSMENT**

CENTRAL ENVIRONMENTAL AUTHORITY



C O N T E N T S

	Page
1. Introduction	01
2. Objectives of Environmental Impact Assessment	01
3. The Environmental Impact Assessment Procedure	02
a. Initial Environmental Examination	03
b. Scoping	05
c. Environmental Assessment	06
d. Environmental Action Plan	10
e. Supplemental Environmental Report	11
4. Screening of Projects	12
a. Project Threshold	13
b. Sensitive Area Criteria	13
c. Positive and Negative Lists	15
d. Matrices/Checklists	15
e. Initial Environmental Examination	15
5. Questionnaire	16
6. Classification of Industries	16
7. Guidelines	17
8. Environmental Standards and Criteria	17
9. Quarterly Returns	19
10. References	20

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APPENDICES

	Page	
I	Approving Agencies	21
II	Checklist of Impacts by Type of Project	22
III	Checklist of Impacts by Type of Region	23
IV	Questionnaire on Initial Environmental Examination	24
V	Classification of Industries	41
VI	Guidelines for Aquaculture Projects	50
VII	Guidelines for Paddy Mills	61
VIII	Guidelines of Premix Plants	62
IX	Guidelines for the Storage of Malathion	64
X	Guidelines for Advertising Pesticides	68
XI	Tolerance Limits for Industrial Waste Water Discharged into Public Sewer	70
XII	Quality of Inland Surface Waters	72
XIII	Tolerance Limits for Industrial Effluents Discharged on Land for Irrigation Purposes	73
XIV	New Source Air Emission Norms	74
XV	Noise Level Criteria	75
XVI	Classification of Industries and Buffer Zones	76
XVII	Tolerance Limits for Industrial Effluents Discharged into Inland Surface Waters	77
XVIII	Tolerance Limits for Inland Surface Waters for Use as Raw Water for Public Water Supply	78
XIX	Tolerance Limits for Industrial Waste Water Discharged into Marine Coastal Areas	79
XX	Sri Lanka Standard Specification for Potable Water	
	- Part I - Physical & Chemical Requirements	80
	Part II - Bacteriological Requirements	82
XXI	List of CEA Registered Laboratories	83
XXII	Inventory of Development Projects	84

A B B R E V I A T I O N S

EIA	-	Environmetnal Impact Assessment
EAP	-	Environmental Assessment Procedure
IEE	-	Initial Environmental Examination
EA	-	Environmental Assessment
AP	-	Environmental Action Plan
SER	-	Supplemental Environmental Report
PAAA	-	Project Approving Agencies
CEA	-	Central Environmental Authority

INTRODUCTION

Since the late 1970s, with the introduction of the new economic development policy in Sri Lanka, a large number of development projects have been launched both by the public and the private sectors. Such development projects have often paid little or no attention to associated environmental consequences. It was soon realised that such unregulated use and development of resources have resulted in serious adverse environmental impacts such as soil erosion, landslides, flooding, loss of valuable fauna and flora, pollution of water, air and soil and loss of historical and cultural resources. Consequently, the need for integrating environmental, economic and social considerations with the planning and decision making process was realised and the Government of Sri Lanka decided to introduce the Environmental Impact Assessment (EIA) of development projects as an aid to the decision making process through which possible adverse environmental impacts of proposed development projects could be minimised or prevented. Accordingly, it was made mandatory that all development projects be subject to an Environmental Impact Assessment (EIA) from January, 1984. Even prior to this mandatory requirement, EIA's had been carried out for two major development projects in Sri Lanka viz., the Accelerated Mahaweli Development Project and the Investment Promotion Zone at Katunayake.

OBJECTIVES OF ENVIRONMENTAL IMPACT ASSESSMENT

Any development will have both economic and environmental benefits and costs. In the past, project selection was based purely on Benefit/Cost analysis. Projects with significant economic benefits were selected for development. No consideration was given to the environmental costs associated with such development activities. Recognition of such limitations of the Benefit/Cost evaluation led to the development of the environmental impact assessment techniques.

The concept of Environmental Impact Assessment was originated in late 1960's in the United States of America, as a result of the environmental movement. In developing countries where poverty is widespread, the perception about environmental impacts of development activities can be rather different from those of developed nations.

However, it is now widely recognised that development can be planned to make optimum or sustainable use of resources, to avoid environmental degradation and even to improve the quality of the environment. The process of Environmental Impact Assessment forms part of the planning of such environmentally sound development.

THE ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURE

On the directives of the Government of Sri Lanka, the Central Environmental Authority (CEA) from its inception, has given high priority to the development of an EIA system. As a part of its development plan for the EIA system, the basic guidelines for the Environmental Assessment Procedure (EAP) were developed at a High Level Policy Development Seminar held in September 1983, organised by the CEA in collaboration with the USAID. Subsequently, Cabinet approval was also obtained for their implementation through a number of Project Approving Agencies (PAAA) as identified by the Cabinet of Ministers. The list of PAAA is given in Appendix (I).

The guidelines which are described below are general in nature in that they can be applied to any type of development project. It is expected that each individual agency will adopt its own procedures based on these guidelines and develop specific guidelines taking into consideration any specific requirements.

The environmental assessment procedure consists of five (05) distinct phases :

- a. Initial Environmental Examination (IEE)
- b. Scoping
- c. Environmental Assessment (EA)
- d. Environmental Action Plan (AP)
- e. Supplemental Environmental Report (SER)

STEP I - INITIAL ENVIRONMENTAL EXAMINATION (IEE)

A. Definition

An Initial Environmental Examination (IEE) is the study of potential impacts which a proposed project will have on the environment. An IEE is a brief statement of key environmental issues, based upon readily available information and is intended for use in the early (prefeasibility) phases of project planning. The main function of the IEE is to recommend whether or not further in-depth study, in the form of an Environmental Assessment, is needed.

B. IEE Document

The IEE report should be relatively brief, probably less than 15 pages in length, and include the following :

i. Description of Proposed Project

This should be a short description of the nature, scope and schedule of the proposed project or programme. It should include a description of the preferred development plan and any feasible development alternatives identified.

ii. Description of the Project Area

The area which will be affected by the project, should be defined in terms of site location(s) and geographical boundaries. Maps and plans to show location of site(s), elevation and ground plans should be included.

iii. Existing Environment

This should be a short description of the present environmental resources in the project area. The term 'environmental resources' are defined broadly to include the natural and human environment as well as relevant aesthetic, historic and cultural resources.

iv. Evaluation of Impacts

This section should be a brief analysis of project impacts. Details of inputs in terms of raw materials, labour etc., and outputs such as emissions and effluent discharges should be given. The objective is to make an initial or preliminary determination whether or not the probable impacts will be significant to the degree that further study may be warranted.

v. Discussion of Mitigation and Protection Measures

In this section, a conclusion will be reached whether or not environmental mitigation or protection measures are necessary. If it is concluded that such measures are necessary, then an explanation will be made describing whether or not proposed project planning is incorporating such measures in an adequate fashion.

vi. EA Recommendation

A recommendation will be made whether or not an Environmental Assessment (EA) is required ;

a. If it has been determined that the probable project impacts will be substantial or significant and if the corresponding mitigation and protection measures included in the current level of project planning are inadequate, then an Environmental Assessment will be required. In this case, some brief statements may be included in the IEE which give an indication of the scope of the recommended EA.

b. On the other hand, if it is believed that the probable impacts will not be significant and that protection measures are either unnecessary or are being adequately provided in the current project plans, then it is likely that no EA will be required.

In addition, a certain degree of flexibility can be exercised, as appropriate, in concluding that no EA will be required for a project even though its probable impacts may be significant. This would be possible in cases where the environmental impacts are all deemed beneficial or perhaps if the impacts in question are relatively limited to the extent that adequate protection measures can be proposed as covenants to the project paper. In any case, when no EA is recommended, the Environmental Assessment Procedure terminates with the completion of the IEE.

vii. List of Prepares

This should include only those individuals who had a principal input to the preparation of the IEE.

C. Review and Comments

The IEE will be reviewed by interested agencies and parties and appropriate comments will be incorporated prior to inclusion in the pre-feasibility phase of project preparation.

STEP 2 - SCOPING

A. Definition

Scoping is the process of identifying the important issues which must be addressed in detail in the Environmental Assessment (EA).

B. Scoping Meeting

When practicable, a scoping meeting should be held among interested agencies and parties with the objective of identifying the important issues which will be investigated in detail in the EA. This will ensure that the major concerns of all interested agencies or parties will be considered in the EA, and simultaneously that agency resources will not be spent studying issues which are relatively insignificant.

The meeting will generate basic terms of reference for conducting the EA and set the stage for future review and co-ordination among the interested agencies and parties.

C. **Scoping Document**

The Scoping Document should be relatively short, probably less than 10 pages. It will report the findings of the scoping meeting and include the following ;

i. EA Work Plan

This will include the major environmental issues which are to be covered in the EA and the relative depth of analysis required for each.

ii. EA Schedule

This will indicate approximate dates when milestones are to be reached in conducting the EA and when it will be available for review by interested agencies and parties.

iii. Staff and Resource Requirements

This will be an estimate of the number and kinds of specialists and other resources needed to conduct EA.

STEP 3 - ENVIRONMENTAL ASSESSMENT (EA)

A. **Definition**

An Environmental Assessment (EA) is a detailed study of the probable significant effects both beneficial and adverse which a proposed project will have on the environment. An EA will be prepared in accordance with the findings of the scoping process. An EA is an in-depth comprehensive analysis of significant environmental effects and is intended for use in the feasibility phase of project planning. An EA will also provide recommendations for any additional actions which are deemed necessary.

B. **EA Document**

The EA should be concise and analytic in nature. Supporting material and background information should be included in separate appendices. In general, an EA should usually be less than 100 pages and include the following ;

i. Introduction

This will identify the project by title, respective agency responsibilities, abbreviations used in the text and other general information.

ii. Table of Contents

iii. Summary

The summary should emphasize the key environmental impacts and issues, principal conclusions and the major protection measures and recommended actions.

iv. Description of Proposed Project

This should be a brief description of the proposed project, including the preferred development plan and the reasonable alternatives which are addressed in the following sections of the EA. The project area should be clearly defined in terms of site location(s) and geographic boundaries.

v. Existing Environment

This section will be a concise description of the existing environmental resources (see definition on Page 3) which will be affected by the proposed project. The depth of analysis and length of description for each environmental resource should be commensurate with the probable magnitude of the impact on that resource. The description should be no longer than is necessary to understand the degree of project impacts.

vi. Impact Analysis

This section will contain a detailed analysis of the probable beneficial and adverse impacts which the project will have on the environment. It will include a comparison of the impacts of the preferred development plan with the impacts of any reasonable alternative development plan(s). The analysis will focus on determining the significance of direct and, where applicable, indirect effects of the proposed project. Where these effects would constitute unavoidable adverse impacts or would involve an irretrievable commitment of resources, they will be so indicated.

vii. Mitigation, Protection and Enhancement Measures

This section will identify and recommend the possible means for establishing environmental safeguards, minimizing detrimental impacts, enhancing beneficial aspects of the project and for effective management of the environmental resources affected by the project. A primary intent is to provide practical solutions to ameliorate potential environmental problems which may arise as a result of project implementation. Particular emphasis should be given to deriving measures which, to the greatest extent possible, mitigate unavoidable adverse impacts or irretrievable commitments of resources.

viii. Recommended Actions

In this section, recommendations will be presented which will include the following;

- a. Recommendations will be made, by ranking the proposed development alternatives including the preferred plans for the most to the least acceptable in terms of the net effects each alternative would have on the environment.

Net effects will be assessed on the basis of overall significant impacts relative to the ability to provide measures to mitigate those impacts.

- b. Recommendations may be made to consider additional project development alternatives, including the alternative of not implementing the proposed project.

- c. The means for implementing the mitigation, protection and enhancement measures will be recommended. A specific recommendation will be made whether or not an Environmental Action Plan (EAP) will be necessary. If the protection measures are relatively minor in scope and/or are presented in insufficient detail in the EA, then an EAP may not be needed. If the protection measures are substantial, requiring a large amount of planning and effort for implementation, then an EAP may be authorized. In this case, a recommendation will then be made for which of the measures should be included in the Action Plan.

- d. Other recommendations will be made as deemed appropriate.

ix. List of Preparers

This should include only those individuals who had a principal input to the preparation of the EA.

x. List of References

xi. Appendices

Appendices will contain supporting material, back-ground information and baseline data. If this information is lengthy, it should be included in separate volumes.

C. **Review and Comments**

The EA will be reviewed by interested agencies and parties within a specified time period. Comments obtained will be incorporated as appropriate into the EA report before it is included in the feasibility phase of project implementation.

STEP 4 - ENVIRONMENTAL ACTION PLAN (EAP)

A. **Definition**

An Environmental Action Plan (EAP) is an implementation plan for specific mitigation, protection and/or enhancement measures which are recommended in the EA. The EAP presents in detail how these measures should be designed and operated, the resources required and the schedule for implementation. In essence, the EAP transforms the protection measures from an identification stage in the EA to individual projects ready for implementation. It is intended that in the EAP the implementation status of the protection measures will be elevated to a level suitable for incorporation in the design phase of the proposed project. It may not be necessary or appropriate to include in the EAP all of the protection measures identified in the EA. The protection measures which require the formulation of detailed implementation plans, and therefore inclusion in the EAP will be selected on the basis of the recommended actions in the EA and the review of the EA by the interested agencies and parties.

B. **EAP Document**

The EAP Document will contain an implementation plan for each of the selected mitigation, protection or enhancement measures. Therefore, the EAP may consist of one or several implementation plans. Each of these should include, the following :

i. Objective

This section should briefly describe the protection measure and the impact(s) it is intended to ameliorate.

ii. Work Plan or Design Criteria

This section will include the work task and/or the design criteria needed to implement the protection measure(s).

iii. Implementation Schedule

This schedule should indicate the timing of the work tasks when the protection measure is to be constructed and/or operational and how long it should be in effect.

iv. Staff and Resource Required

This should include the management, technical and support staff and any resources required to implement the protection measure.

STEP 5 - SUPPLEMENTAL ENVIRONMENTAL REPORT (SER)

A. **Definition**

If a major change is made in a proposed project after the EA and/or EAP have been completed, then a Supplemental Environmental Report (SER) will be prepared to evaluate specific impacts which may occur due to the new change(s). A SER may also be warranted if significant new circumstances or information arise which would have a bearing on the proposed project or its impacts.

B. **SER Document**

This document will be variable depending upon the circumstances of the new change(s). The document should contain the following, as appropriate :

i. Description of Project Change

This should be brief and indicate the magnitude of the change which requires new assessment.

ii. Impact Analysis
 This should focus upon only the impacts which will occur because of the new change(s). The impact analysis should be comparable in detail to that presented in an EA, but it should not duplicate the impact evaluation already completed in the EA for the proposed project.

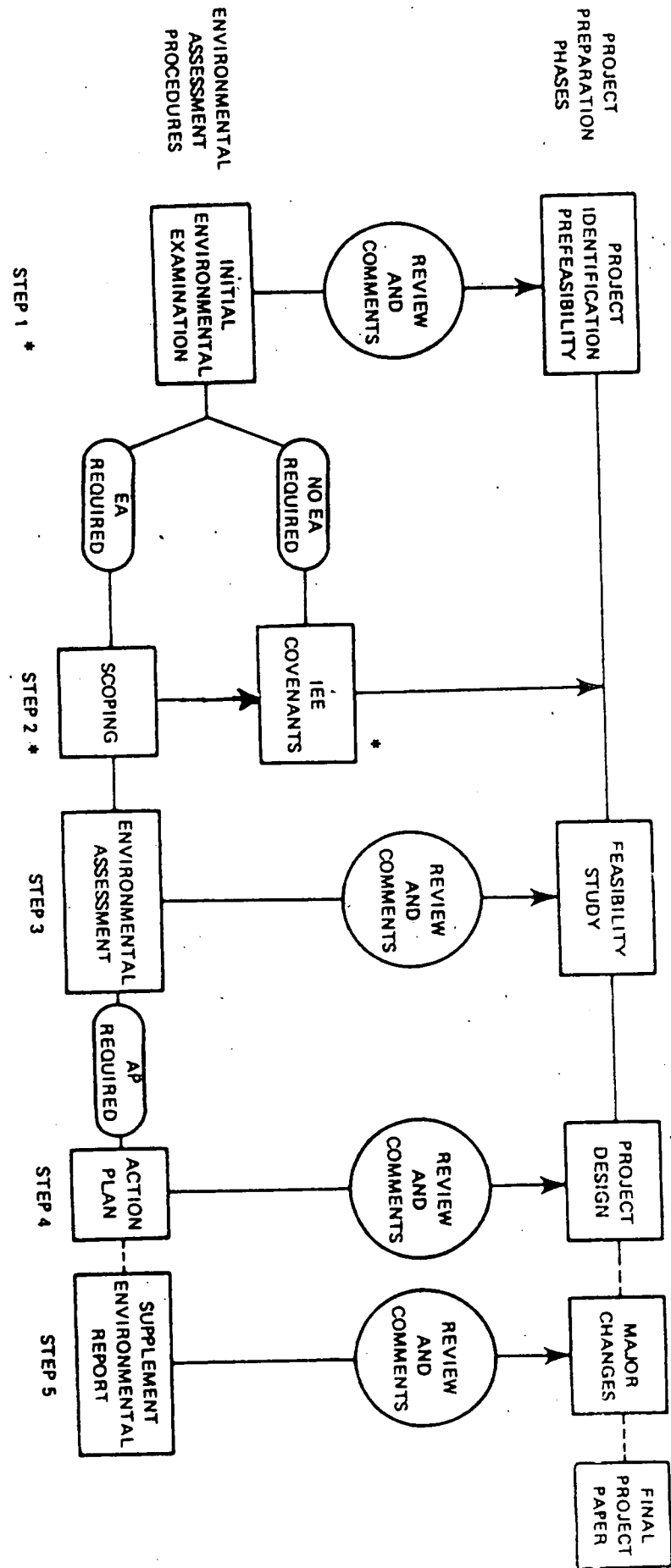
iii. Recommended Actions
 Recommendations for mitigation, protection or enhancement measures or action should be made specifically in reference to the impacts identified and analysed in the SER. Duplication of recommendations already provided in the EA or EAP should be avoided.

SCREENING OF PROJECTS

To be effective, environmental assessment procedures need only be applied to those activities which are considered to have significant environmental consequences. Therefore, it is important that proper mechanisms be established for the identification and assessment of possible environmental impacts. This is generally referred to as "Screening of Projects". As a result of screening, three (03) main categories of projects may be identified ;

- i. Projects that clearly require an EIA
- ii. Projects that do not require an EIA
- iii. Projects for which the need for EIA is not clear

The projects and programmes that are automatically exempt from EAPP include emergency relief or assistance, most research activities, training and other educational programmes, nutritional or health care services, minor legislation and security measures. It is expected that the individual agency will identify the projects belonging to the above three categories based on the 'Guide for Screening of Projects' given below;



FLOW DIAGRAM: ENVIRONMENTAL ASSESSMENT PROCEDURES

* NOTE : GENERALLY, MAJORITY OF THE PROPOSED DEVELOPMENT PROJECTS COULD BE TERMINATED EITHER AT STEP ONE OR STEP TWO (FLOW DIAGRAM) OF THE EAPS. IN INSTANCES WHERE ADVERSE ENVIRONMENTAL IMPACTS HAVE BEEN IDENTIFIED, APPROPRIATE MITIGATORY MEASURES (COVENANTS) MUST BE RECOMMENDED, AND SUBSEQUENT MONITORING BE CARRIED OUT TO ENSURE COMPLIANCE. IT IS EXPECTED THAT THE DEVELOPER WILL CARRY OUT CONTINUOUS MONITORING OF SUCH PARAMETERS WHERE AS THE PAA AND THE CEA WILL CARRY OUT RANDOM CHECKS. A LIST OF LABORATORIES REGISTERED WITH THE PAA AND THE CEA THAT ARE WILLING TO UNDERTAKE MONITORING ARE GIVEN IN APPENDIX (V)

Five methods are available to assist screening of projects. They are ;

- i. Project threshold
- ii. Sensitive area criteria
- iii. Positive and negative lists
- iv. Matrices /Checklists
- v. Initial Environmental Examination.

i. Project Thresholds

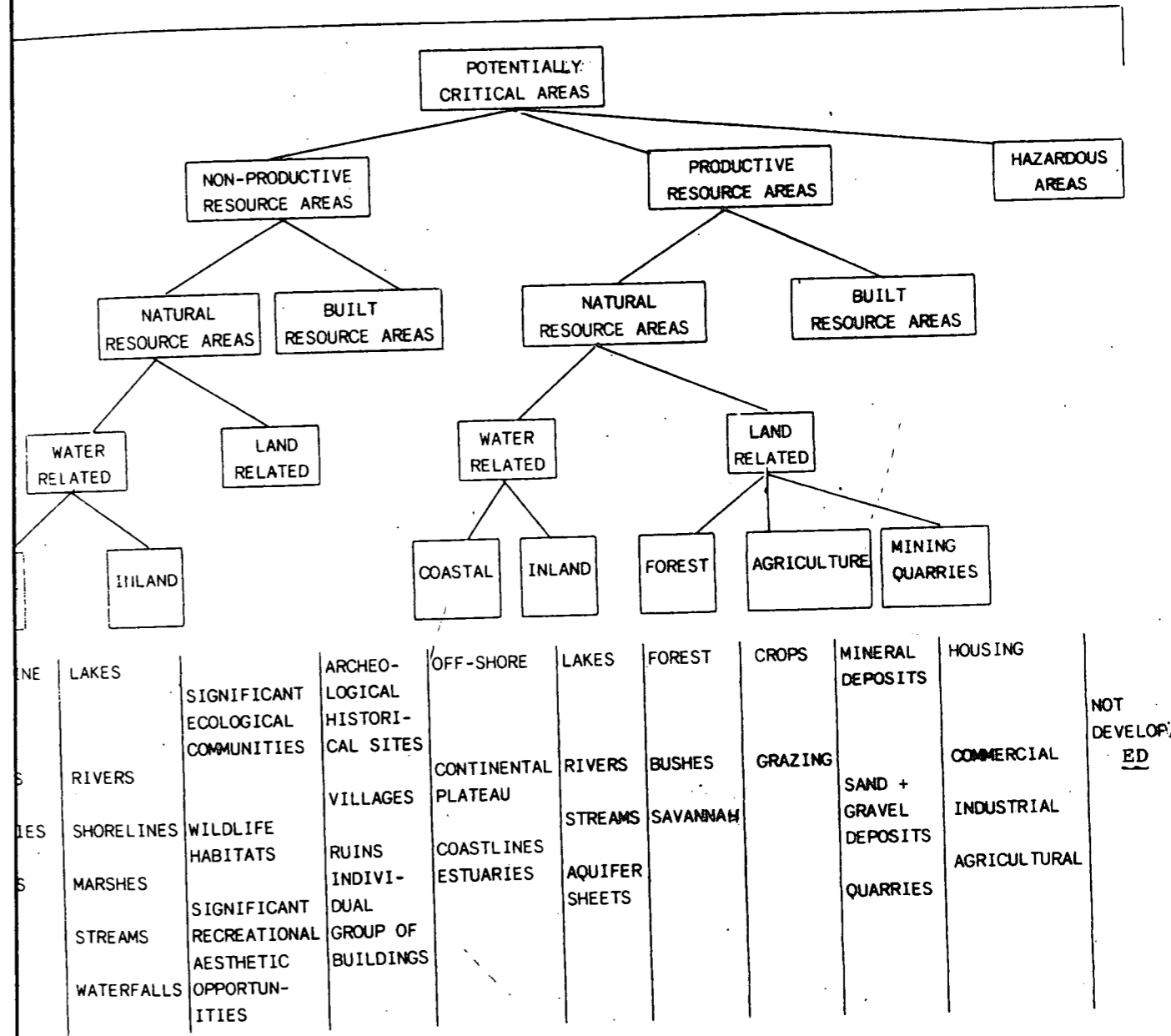
The environmental factors such as the amount of agricultural land used up for development, amount of pollution generated or project factors such as project size, cost; raw material requirement or infrastructure demand may be used as project thresholds. The normal practice is to link a number of different thresholds together since reliance upon one threshold may give rise to a number of incorrect decisions.

ii. Sensitive Areas

The determination of environmentally sensitive areas could be based on two criteria

- a. Carrying capacity of the area in relation to the degree or intensity of interference eg.- the concentration of pollutants which can be discharged into the environment without causing adverse effects. Proposed developments giving rise to pollutant discharges below the carrying capacity of the environment need not require EIA.
- b. Determination of the importance of individual components of this area. In this approach, the characteristics of the environment, in terms of its objective and subjective values, rather than purely its ability to withstand perturbation are given emphasis. A classification scheme by which environmentally sensitive areas could be identified, has been produced by Battelle (1973) and is given in Figure (I).

FIGURE 1 - LIST OF POTENTIALLY CRITICAL AREAS (From BATTLE, 1973)



iii. **Positive and Negative Lists**

Positive lists may be compiled by a review of existing developments, identifying those giving rise to significant environmental impacts. Similarly, projects which seldom give rise to adverse environmental consequences can be identified and listed on a negative list, i.e. a list of projects not requiring EIA. In the case of those projects for which the above identification is difficult, an intermediate status can be created in which other supporting screening methods can be used.

iv. **Matrices/ Checklists**

This method of screening has been developed to overcome the weaknesses of both the project and environment based screening methods, while avoiding the need for extensive studies to determine the need for an EIA. The matrix is an extension of the checklist, where the project activities are listed against existing environmental characteristics. They can be used as visual aids and reference for the identification of environmental impacts. Two levels of matrices have been developed.

Examples of checklists for identification of environmental resource values by type of project and type of region are given in Appendices (II) and (III) respectively.

iv. **Initial Environmental Examination**

The preparation of an IEE report is described under the basic guidelines on EAPP. This involves the application of tests in order to determine the elements and subelements such as sensitive areas, coastal zones of the environment which may be subject to significant impacts. This could be easily carried out by answering a series of questions related to impact types. A questionnaire developed for this purpose is described under the section on "Questionnaire".

QUESTIONNAIRE

A preliminary questionnaire on Initial Environmental Examination (IEE) prepared by the CEA consists of three (03) major parts :

1. Part A General
2. Part B Process details
3. Part C Environmental considerations

The format of this questionnaire is given in Appendix (IX)

This questionnaire seeks to elicit information necessary for assessing the environmental impacts of a proposed development activity. This would provide adequate information to identify significant environmental impacts and hence be considered equivalent to an Initial Environmental Examination (IEE), which forms the first step of the EAPP. This questionnaire could be used to assess the environmental implications of projects of the intermediate category i.e. - the projects for which the need for EIA is not clear.

The PAAA may use this questionnaire either as a supplement to their own questionnaires/application forms or to expand or revise their questionnaires based on it in order to give environmental clearance for proposed projects.

Classification of Industries

Based on the types of industries received for approval, a classification of industries has been developed by the Ministry of Industries and Scientific Affairs. Five categories according to the level of pollution have been identified ;

1. Very low level of pollution (Category A)
2. Low level of pollution (Category B)

3. Pollution to some extent (Category C)
4. Pollution at considerable level (Category D)
5. Heavy pollution (Category E)

The types of industries given under each category is given in Appendix (V). A revision of this classification may be considered to develop positive and negative lists.

GUIDELINES

The approval of a large number of projects are being carried out in an ad-hoc manner. Therefore, the need for guidelines for different types of projects, to help both the developer and the project approving agency was realised. A number of Inter-agency Working Groups with selected Sri Lankan experts have been set up at the Central Environmental Authority to draw up guidelines in a number of areas. Amongst these are ;

Aquaculture Development Projects
 Manufacture of Rubber Goods
 Leather Processing
 Pesticided and
 Agro Industries etc.

Some of the guidelines prepared by the CEA are given in Appendices (VI - X).

ENVIRONMENTAL STANDARDS AND CRITERIA

The development of environmental standards and criteria is particularly important for the proper implementation of EIA procedures. The Sri Lanka Standard Institute whose main responsibility is to lay down standards for consumer products is also involved in the preparation of National Standards for areas of environmental concern. For this purpose, a number of Drafting Committees have been established at the Sri Lanka Standards Institute.

Each Committee consisting of a number of experts in relevant fields includes a representative/s of the Central Environmental Authority. Until such time the National Standards are made available, the Central Environmental Authority in 1983 issued the following Interim Standards under Section 10(c) of the National Environmental Act No. 47 of 1980, for pollution control and the protection of the environment. These are meant to serve as guides to industries, industrial planners and those involved in advising and approving Industrial Projects.

1. Tolerance limits for industrial waste water discharged into public sewers.
2. Tolerance limits for Industrial Waste Water discharged into inland surface water.
3. Quality of inland surface waters (fresh water)
4. Tolerance limits for industrial effluents discharged on land for irrigation purposes.
5. Tolerance limits for industrial effluents discharged into Marine Coastal Waters.
6. New source air emission norms
7. Typical noise level criteria
8. Classification of industries and buffer zones.

Since 1983, National Standards have been issued on the following :

1. Tolerance limits for industrial effluents discharged into inland surface waters - SLS 652 (Reference 2 above).
2. Tolerance limits for industrial and domestic effluents discharged into marine coastal areas - SLS 721 (Reference 5 above).
3. Tolerance limits for inland surface waters used as water for public water supply SLS 722.
4. Sri Lanka Standard specifications for Potable Water
 - Part 1 - Physical and chemical requirement SLS 614 (1983).
 - Part 2 - Bacteriological requirements SLS 614 (1983).

The National Standards where available and the CEA Interim Standards for other parameters are given in Apendices (XI) to (XX).

A list of laboratories with facilities for monitoring water, soil, air quality and noise is given in Appendix (XXI).

QUARTERLY RETURNS

An "Inventory of Development Projects" issued by the CEA to collect information regarding type and nature of projects for which EAPP have been applied by each PAA. It was expected that each PAA would complete and return this form to CEA every quarter for review. The format of the "Inventory of Development Projects", is given in Appendix (XXII).

REFERENCES

1. Manual of NEB Guidelines for preparation of Environmental Impact Evaluations , National Environment Board, Thailand - April 1979.
2. Environmental Impact Assessment Principles and Procedures Scope 5 (Scientific Committee on Problems of the Environment) Second Edition - R.E. Munn.
3. Environmental Impact Assessment - PADC Environmental Impact Assessment and Planning Unit, University of Aberdeen, United Kingdom.

ENVIRONMENTAL ASSESSMENT OF DEVELOPMENT PROJECTS
APPROVING AGENCIES

1. Urban Development Authority
27, D.R. Wijewardena Mawatha, Colombo 10.
2. National Planning Division,
Ministry of Finance and Planning
Galle Face Secretariat, Colombo 01.
3. Foreign Investment Advisory Committee
Ministry of Finance and Planning
Galle Face Secretariat, Colombo 01.
4. Greater Colombo Economic Commission
Sir Baron Jayatillake Mawatha, Colombo 01.
5. Ministry of Industries and Scientific Affairs
Sri Jinaratana Road, Colombo 02.
6. National Aquatic Resources Agency
Crow Island, Mattakkuliya, Colombo 15.
7. Coast Conservation Department
New Secretariat, Maligawatte, Colombo 10.
8. Ministry of Textile Industries
Torrington Square, Colombo 07.
9. Ceylon Tourist Board
228, Havelock Road, Colombo 05.
10. State Gem Corporation
29, Galle Face Terrace, Colombo 03.
11. Ministry of Lands and Land Development
500, T B Jaya Mawatha, Colombo 10.
12. Ministry of Agricultural Development and Research
73/1, Galle Road, Colombo 03.
13. Ministry of Plantation Industries
363, Galle Road, Colombo 03.
14. Ministry of Mahaweli Development
500, T B Jaya Mawatha, Colombo 10.
15. Ministry of Health
Inland Revenue Building, 4th Floor, Colombo 02.

EXAMPLES OF ENVIRONMENTAL RESOURCES/VALUES OF
PRIMARY IMPORTANCE BY TYPE OF PROJECT

Examples of Environmental Resource/Value	Examples of Types of Project													
	Manufacturing Plant	Hotel	Beach Resort	Dam/Reservoir	Water Supply System	Shopping Center	Harbor	Fossil Fuel Power Plant	Agro-Industry	Highway	Sugar Refinery	Oil Refinery	Mining	Logging
Aesthetics	x	x	x	x	x	x	x	x		x		x	x	
Agriculture	x			x				x	x	x				x
Air Resources	x		x	x		x		x		x	x	x		x
Aquatic Biology	x		x	x			x	x			x	x	x	x
Archaeological				x						x			x	
Cultural				x						x				
Fisheries	x		x	x			x	x		x	x	x	x	x
Flood Control/Drainage				x			x			x				x
Forests/Watershed				x	x			x	x				x	x
Geology/Seismology				x	x					x			x	
Ground Water	x	x	x	x	x	x	x	x	x	x		x	x	x
Industrial Development	x		x	x		x	x	x	x	x	x	x	x	x
Land Uses	x	x	x	x		x	x	x		x		x	x	
Mineral Resources	x							x					x	
Navigation	x			x			x					x	x	x
Power	x		x	x	x	x	x	x			x	x		
Public Health			x	x	x								x	
Public Safety	x		x	x						x			x	
Recreation		x	x	x	x	x				x				
Resettlement				x						x				
Sediments/Erosion				x			x			x			x	x
Socio-Economics	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Soils			x	x			x		x	x			x	x
Surface Water	x		x	x	x		x	x	x	x	x	x	x	x
Transportation (Land)	x	x	x	x		x	x		x	x	x	x	x	x
Water Quality	x		x	x	x		x	x			x	x	x	x
Water Supply	x	x	x	x	x	x	x	x	x		x	x	x	
Wildlife				x			x		x	x			x	x

(Source : NEB Guidelines)

Appendix III

ENVIRONMENTAL RESOURCES/VALUES OF PRIMARY

IMPORTANCE BY TYPE OF REGION

Environmental Resource/Value	Type of Region				
	Urban Sector	Coastal Area	Rural Areas	River Valleys	Forest/Hill Areas
Aesthetics	x	x		x	x
Agriculture			x	x	
Air Resources	x				
Aquatic Biology		x		x	x
Archaeology				x	
Cultural	x	x		x	
Fisheries		x	x	x	x
Flood Control/Drainage	x	x		x	x
Forests/Watershed		x	x	x	x
Geology/Seismology					
Ground Water	x	x	x	x	x
Industrial Development	x	x		x	
Land Uses	x	x			
Mineral Resources					x
Navigation		x		x	
Power	x	x	x		
Public Health	x	x	x	x	
Public Safety	x				
Recreation	x	x			x
Resettlement	x			x	
Sediments/Erosion		x		x	x
Socio-Economics	x	x	x	x	x
Soils		x	x	x	x
Surface Water	x	x	x	x	x
Transportation	x	x	x	x	
Water Quality	x	x		x	
Water Supply			x		x
Wildlife			x		x

(Source : NEB Guidelines)

Central Environmental Authority
Maligawatte New Town
Colombo 10.
SRI LANKA.

**Preliminary Questionnaire on
Initial Environmental Examination**

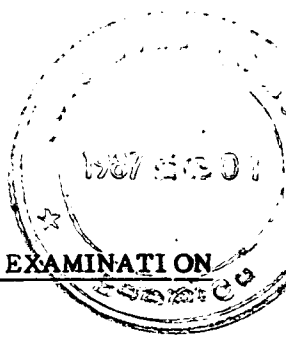
NOTE TO THE DEVELOPER

The environmental assessment for both public and private sector projects has been made mandatory by Cabinet decision since January, 1984. A number of development oriented Ministries have been identified as project approving agencies (PAA) through which the Environmental Assessment Procedures (EAPP) developed by the CEA would be implemented. To help these PAAA in this procedure, the CEA has prepared this questionnaire. This could either be used as it is or altered to suit specific agency requirements.

This questionnaire seeks to elicit information necessary for assessing the environmental impacts from a proposed development activity and may be considered as equivalent to an Initial Environmental Examination (IEE) report. The developer needs only to provide information specific to their particular activity. The other questionnaires may be answered "Not Applicable" (NA). All data in appropriate metric units must be clearly given.

The developer is expected to give any clarification as required.

If the examination of completed questionnaire indicates a need for detailed studies on key environmental issues a detailed environmental assessment report may be required.



PRELIMINARY QUESTIONNAIRE ON INITIAL ENVIRONMENTAL EXAMINATION

Name of the Project :

Location of the Project :

Name and Address of Proponent :

PART A

1. GENERAL PROJECT DESCRIPTION

Please provide details of ;

1.1 Size (attach site plan)

1.2 Nature

1.3 Purpose

1.4 Area of land available for the development

1.5 Capital investment

1.6 Date of commencement of operation :

1.7 Details of phased programmes :

1.8 Present design and future capacity
(factory lay out plan with floor areas for buildings etc.)

1.9 Key siting criteria

1.10 Alternative sites considered :

1.11 Envisaged workforce at one shift

Management	-
Machine operators	-
Labourers	-
Other	-

1.12 Number of shifts per day :

2. GENERAL DESCRIPTION OF PROJECT AREA

2.1 Geographical location - With details of elevation and terrain (attach survey maps)

2.2 Name of Local Government authority and/or special authority :

2.3 Climate :

Average annual rainfall	-
Average temperature	-
Average humidity	-

2.4 Main occupation groups in the area

3. LAND USE AT SITE AND WITHIN 10 Km RADIUS FROM THE SITE

3.1 Types of natural systems and distance from site
(Forests/Grasslands/Mangroves/Marshes/Water bodies/
Water sheds/Coral reefs)

3.2 Agricultural land - Extent
Types of crops

3.3 Fishing/Aqua culture

3.4 Wildlife habitats

3.5 Protected land/parks/water areas

3.6 Industries

3.7 Human Settlements

4. SOCIO-CULTURAL FACTORS

4.1 Impacts on agricultural, economic or commercial practices in the area by construction or operation phase, of the project :

4.2 Any historical, archaeological or aesthetic values of the project area :

5. Provisions made to conform to health and safety requirements as per factories ordinance :

6. GROWTH INDUCING CONSIDERATIONS

6.1 Ancillary development such as residential, retail and service centres :

6.2 Provisions made for increased transportation

7. CHECKLIST OF IMPACTS

ADVERSE IMPACTS	BENEFICIAL IMPACTS

8. DETAILS OF THE CONSTRUCTION PHASE

- 8.1 Duration
- 8.2 Monthly level of employment
- 8.3 Details of facilities provided for workers (Housing Sanitary etc.)

8.4 Activities during construction phase

Activity/Process	Duration	Resource affected	Mitigation measures adopted

8.5 Details of resources affected

Resource affected	Amount	Site of deposition	Mode of Transport	Mitigation measures adopted

9. If the proposed project is an agricultural, irrigational or water impoundment project, please provide details of the following :

9.1 What type of environmental planning is being done?

9.2 Will the project seriously affect existing eco-systems or alter present land use ?

9.3 How will downstream water users be affected by the project :

- a. Source of drinking water
- b. Leaching of agrochemicals

9.4 Details of adopted mitigation measures for the above (9.2 and 9.3)

Any other details could be given as separate annexures

Name of contact official -

Designation -

Contact Address -

Telephone -

PART B

10. PROCESS DETAILS :

10.1 A brief description of the processes used (attach process flow diagram)

10.2 Raw materials used (include catalysts, additives and process chemicals)

List of raw materials to be used at all stages of manufacture	Physical & chemical nature of raw material	Quantity/day (tonnes) at full production capacity)	Source of material

10.3 Precautionary measures adopted in the transport and handling of any hazardous/toxic/flammable/explosive material

10.4 Storage facilities for hazardous/toxic/flammable/explosive material

11. ENERGY REQUIREMENTS

11.1 Boilers and Furnaces used

Number	Purpose	Type of Fuel	Quantity/day (Tonnes)

11.2 Details of types of fuel used

Fuel	Fuel Oil	Diesel Oil	Natural Gas	Coal	Wood	Others Specify
Consumption Tonnes/day						
Cal. Value K. Joules/kg.						
Ash Content%						
Sulpher Content%						
Others (Specify)						

12. WATER REQUIREMENT

Purpose	Average demand Litres/day	Peak demand Litres/day	Source	Type-treated/Untreated
Processing				
Cooling				
Domestic				
Other				

13. EMISSIONS

13.1 Details of stacks/chimneys

No of stacks	Height (meters)	Internal diameter at top (meters)	Internal diameter at bottom (meters)	Emission rate Meters/Sec

13.2 Details of emissions from each stack/chimney

Component	% Concentration by volume	Quantity tonnes/day or kg/day	Method of analysis	Mitigation measures
Gases				
1.				
2.				
3.				
4.				
Hydrocarbons				
Particulate matter				
Smokiness				
Moisture				
Any other (Specify)				

13.3 Emissions from processes :

13.4 Details of composition and quality of emissions from each component

Emission	Quantity Tonnes/day	Source	Temperature	Mitigation measures
Gases				
1.				
2.				
3.				
4.				
Acid mists				
Hydrocarbons				
Hydrogen Sulphide				
Moisture				
Smoke				
Others (Specify)				

13.5 Provisions for sampling and measurements :

13.6 Whether the quality of emissions comply with prescribed National or CEA Standards which are in force ?

13.7 Monthly average wind speed and direction :

14. WASTE WATER

- 14.1 Composition/Characteristic :
- 14.2 Temperature
- 14.3 Total daily discharge :
- 14.4 Daily discharges from different processes :
 - Processes -
 - Cooling -
 - Processing -
 - Domestic -
 - Any other (specify)
- 14.5 Proposed method of discharge :
- 14.6 Final point of discharge :
- 14.7 Details of recycling :
- 14.8 Proposed treatment methods :
- 14.9 Method of disposal of sludge from treatment plant:

14.10 Whether the quality of treated effluents confirm to prescribed National or CEA Standards which are in force ?

14.11 Methods adopted for recording characteristics of waste water before treatment and after treatment :

P A R T "C"

15. ENVIRONEMNTAL CONSIDERATIONS

15.1 Solid Waste

Nature/Type	Composition	Quantity/day (Tonnes) at full production	Proposed method of disposal

15.2 If solid waste is removed from premises by private haulage contractor ;

a. Specify frequency of removal

b. Name & Address of haulage contractor
(Inform in cast of later change)

c. Location and address of disposal site

d. Mode of transport

15.3 Recovery/recycling possibilities :

15.4 Anticipated environmental problems, by the proposed method of disposal :

15.5 Proposed mitigation measures :

16. SEWAGE AND DOMESTIC WASTE

Method of treatment :

Method of disposal :

Recycling possibilities :

17. OTHER ENVIRONMENTAL CONSIDERATIONS

17.1 Noise

Source -
Level within factory -
Level at factory boundary -
Method of abatement -

17.2 Odour

Source -
Method of abatement -

17.3 Thermal/heat

Source -
Method of abatement -

17.4 Radioactivity

Source -
Level of radiation -
Method of mitigation -

18. FACILITIES/PERSONNEL AVAILABLE FOR MONITORING POLLUTION AT YOUR INDUSTRY

18.1 Laboratory -
Technical Staff -
Assisting Staff -

18.2 Total allocation of funds for pollution control and monitoring
(Indicate as a % of the total expenditure)

Any other details could be given as separate annexures

CLASSIFICATION OF INDUSTRIES
MINISTRY OF INDUSTRIES & SCIENTIFIC AFFAIRS

VERY LOW LEVEL OF POLLUTION (A)

1. Preserving of meat
2. Preserved vegetables, dehydrated, canned otherwise preserved
3. Beedi, cigars, cigarettes, smoking tobacco
4. Tobacco manufacture
5. Ice
6. Cosmetic and Perfumery
7. Absorbent cotton
8. Surgical dressings
9. Artificial teeth
10. Fibre board suitcases
11. Paper bags
12. Envelopes
13. Drinking straws
14. Manufacture of articles of paper and paper products
15. Manufacture of pottery, china and earthenware products
16. Costume jewellery
17. Spectacle frames

LOW LEVEL OF POLLUTION (B)

1. Milk pasturising and sterilising
2. Ghee
3. Inc-cream
4. Sauces, chutneys and pickles
5. Sugar and allied products
6. Flour milling
7. Macaroni, Noodles, Spaghetti and Vermicelli
8. Papadam
9. Curry powder, Chillie powder and Coffee
10. Animal and poultry foods
11. Jelly powder
12. Instant tea

Name of Contact Official -
Designation -
Contact Address -

Telephone -

I hereby declare that the information provided above is true to the best of my knowledge and agree to rectify any other problem areas brought to our notice, and also to bear the total cost for the pollution control measures and inspections.

.....
Date

.....
Signature of Project Proponent

.....
Name of Project Proponent

FOR OFFICE USE ONLY

Received on -
Processed by -
Designation -
Signature -

13. Instant coffee
14. Soup powder
15. Asphalt and other bituminous products
16. Polythene films and bags
17. Plastic rain-coats
18. Putty
19. Manufacture of paints, varnishes and lacquer
20. Candles
21. Tooth brushes
22. Insulating tape
23. Oxygen
24. Campher
25. Laundry blue
26. Joss sticks
27. Sealing wax
28. School chalk
29. Ink
30. Gelatine
31. Caffein
32. Water colours
33. Pharmaceuticals
34. Tooth paste and tooth powder
35. Orthopaedic appliances
36. Sanitary towels
37. Footwear
38. Leather suitcases, travelling bags
39. Leather sports goods
40. Leather goods
41. Rubber sports goods
42. Rubber compound
43. Packing chest
44. Wooden shoe lasts and wooden heels plate
45. Manufacture of wool
46. Paper cups and cartons
47. Exercise books and drawing books

48. Paint brushes
49. Penciles
50. Carbon paper
51. Typewriter ribbons
52. Manufacture of structural clay products
53. Ceramicware (domestic)
54. Sanitaryware
55. Ceramic floor and wall tiles
56. Ferrous and non-ferrous wire drawings
57. Foundaries
58. Tea machinery
59. Rubber machinery
60. Oil pressing and refining equipment
61. Crown cranks
62. G.I. buckets
63. Flash-light cases
64. Household fittings
65. Kerosene cookers and stoves
66. Locks
67. Metal fittings for tea chests
68. Pipe fittings
69. Sanitary ware (iron)
70. Springs and spring beds
71. Steel trunks
72. Table cutlery
73. Office pins and clips
74. Wood-screws (iron and brass)
75. Steel office furniture
76. Huricane lanterns
77. Buckles
78. Brass hollow ware
79. Safety pins and pin studs, hooks and eyes
80. Zip fasteners
81. Fishing hooks

82. Hair pins and clips
83. Oil filter manufacture
84. Silences manufacture
85. Toy tricycles
86. Distribution Boards
87. Radio assembly
88. Optical lenses

POLLUTION TO SOME EXTENT (C)

1. Condensed milk
2. Dried milk
3. Manufacture of dairy products
4. Fruit cordials, juices & syrups
5. Confectionery
6. Chocolates
7. Cocoa, Cocoa butter & Cocoa liquor
8. Manufacture of cocoa, chocolate & sugar confectionary
9. Sugar refining
10. Jaggery & sakkara
11. Manufacture of grain mill products
12. Wine
13. Bottled toddy
14. Wine industries
15. Bee, Ale & Stout
16. Breweries
17. Aerated water
18. Soft drinks & aerated water industries
19. Aerated water syrup
20. Liquid glucose
21. Margarine
22. Vinegar
23. Manufacture of plastic goods from plastic products
24. Manufacture of plastic goods from sheets
25. Mosquito coils
26. Charcoal
27. Coconut shell flour

28. Talcum powder
29. Refined coconut oil
30. Industrial tallow
31. Rubber heels and soles
32. Rubber shoes
33. Rubber solution and rubber cement
34. Rubber mattresses and cushions
35. Rubber toys
36. Proophylactics
37. Brooms and brushes
38. Earthenware pipes
39. Fire bricks
40. Roofing tiles (clay)
41. Sheet glass
42. Cement concrete pipes
43. Reinforced concrete products
44. Cement building bricks and blocks
45. Cement products
46. Sand paper
47. School slate manufacture
48. Slate pencil manufacture
49. Terrazo tiles
50. Glass fibre products
51. Refining of mineral sands
52. Aluminium rolling
53. Textile machinery and spares
54. Mist blowers and knapsacks sprayers
55. Staples
56. Razor blades
57. Hackshaw blades and steel files
58. Nuts and bolts
59. Tin containers
60. Metal doors and windows
61. Steel drums and storage tanks

62. Enamel ware
63. Expanded metal
64. Hinges and other fittings (iron and steel)
65. Stainless steel ware
66. Wire nails
67. Steel safes
68. Wire netting
69. Coconut scrapers
70. Metal toys
71. Assembly of motor cars
72. Assembly and manufacture of truck and buses
73. Radiator manufacture
74. Motor spares
75. Manufacture of bodies for motor vehicles
76. Assembly of motor scooters
77. Baby carriages, push carts,
78. Wheel barrows and other hand drawn industrial equipment
79. Other manufacture of transport equipment
80. Boat building
81. Motor vehicles
82. Electric wires and cables
83. Electric motors
84. Electric lighting accessories, lampholders, switcher, plugs etc.
85. Electric lighting fittings
86. Electric light bulbs
87. Electric fans
88. Electric irons
89. Electric cooker and hot plates
90. Manufacture of radio components
91. Photographic
92. Camera manufacture
93. Laboratory equipment
94. Surgical instrument
95. Manufacture of professional and scientific equipment

96. Watches
97. Clocks
98. Watchmen's clocks
99. Manufacture of watches and clocks
100. Musical instruments
101. Mathematical instruments
102. Pen nibs.

CONSIDERABLE LEVEL (D)

1. Ham and Bacon
2. Corned beef and other canned meats
3. Sausages
4. Canned fish
5. Canning and preserving of fish and other sea foods
6. Butter and cheese
7. Fruit canning
8. Canning and Preserving of fruits and vegetables
9. Baking powder
10. Biscuits
11. Bakery products
12. Distilling, rectifying and blending of spirits
13. Starch
14. Yeast
15. Varnishes, polishes
16. Fish oil
17. Vegetable and animal oils and fats
18. Glycerine
19. Fatty acid
20. Tanning of hides and skins
21. Artificial leather and leatherette manufacture
22. Automobile tyres and tubes
23. Bicycle tyres and tubes
24. Rubber compound
25. Glass mirrors

26. Asbestos cement products
27. Manufacture of products from graphite
28. Internal combustion engines
29. Sewing machines
30. Weighing machines
31. Washing machines
32. Manufacture of other machinery
33. Water pumps
34. Aluminium hollow ware
35. Barbed wire
36. Brake and clutch linings
37. Manufacture of electrical machinery
38. Manufacture of photographic and optical goods
39. Fountain pens and parts
40. Ball point pens and parts
41. Toys (other than metal)

HEAVY POLLUTION (E)

1. Petroleum refinery
2. Coal gas, coal tar and coke
3. Petroleum, coal products
4. Plastic pipes
5. PVC sheets
6. Paints
7. Paint removers and thinners
8. Adhesives and glue
9. Agro chemicals
10. Insecticides
11. Wood preservatives
12. Disinfectants
13. Nitro cellulose resin
14. PVC compound
15. PVA

16. Buttons
17. Caustic soda
18. Chlorine
19. Bleaching powder
20. Hydrochloric acid
21. Fireworks
22. Matches
23. Scouring powder
24. Fertilizer
25. Ind. alcohol
26. Sod. silicate
27. Plywood
28. Paper
29. Pulp, paper
30. Glassware
31. Cement
32. Iron, Steel smelting
33. Steel rolling
34. Cast iron manufacture
35. Processing and smelting of mineral sands
36. Iron and steel galvanizing
37. Refrigerators & deep freezers
38. Solder lead
39. Vacuum flasks
40. Welding electrodes
41. Printing lead type foundry
42. Electroplating & anodising
43. Agricultural tractors & trailers
44. Pedal cycles & components
45. Motorised tricycles
46. Accumulators for motor vehicles
47. Dry cell batteries

**GUIDELINES FOR
COASTAL POND AQUACULTURE DEVELOPMENT PROJECTS**

INTRODUCTION

Aquaculture may be defined as the development of all such techniques by which a certain degree of control is achieved over the aquatic animals and their environment so that these animals no longer remain wild and fugitive but are kept under different degrees of domestication and are harvested from time to time (Qasim 1975).

The coastal fisheries resources of Sri Lanka consist of 120,000 ha or brackish water lagoons, estuaries and tidal flats. However, due to ecological and economical reasons all this land may not be available for development of aquaculture.

In view of impacts of flood and erosion, destruction of mangroves and other coastal vegetation, long term effects on productivity of coastal ecosystems, sedimentation and salinity intrusion, controls over the development of the limited resources for aquaculture projects have become important.

The overall aim of this document is to :

help the developer as well as the Project Approving Agency (PAA) to identify key environmental factors that should be considered in developing an aquaculture project.

The specific aims are to :

- i. Control or manage loss of resources.
- ii. Prevent pollution problems.

GENERAL CONDITIONS :

a. All feasibility/appraisal reports should include a complete environmental assessment report. Proposals for satisfactory control of adverse impacts which could result from projects, prepared according to the basic guidelines for EIA, shall be included.

b. The approval given by the FIAC shall be subject to the final approval by the Ministry of Fisheries through a Scoping Committee.

* The other concerned authorities that the developer may contact are the :

- a. Irrigation Department (Hydrology Division)
- b. Coast Conservation Department (CCD)
- c. Central Environmental Authority (CEA)
- d. National Aquatic Resources Agency (NARA)
- e. Natural Resources, Energy & Science Authority (NARESA)
- f. Land Commissioner's Department
- g. Urban Development Authority (UDA)

c. All projects should be subject to monitoring the impacts as necessary and the cost of monitoring be borne by the developer.

d. In the event of the project being abandoned the developer should at his own cost implement any restoration/mitigation measures that would be imposed by the project approving agency.

e. The developer should permit authorised officers, to enter their project sites.

1. ENVIRONMENTAL/RESOURCES CONSIDERATIONS

1.1 Land Allocation

1.1.1 As the available land area suitable for aquaculture is limited conversion of land into fish pond construction should be properly controlled. A maximum of 100 acres (40 hec.) only could be allocated to any investor.

1.1.2 All foreign funded projects should be advised to use intensive farming techniques and water recycling methods in order to reduce pressure on land and water resources.

1.1.3 Buffer Zones of not less than 100 meters wide should be maintained between two developments.

1.1.4 Appropriate bank reservations for streams whether natural or man-made should be protected. The recommended reservations are as follows :

- a. Major rivers - (over 50' wide) 3 chains on each side from the edge of water
- b. Medium sized waterways - (15-50's wide) 2 chains on each side from the edge of water
- c. Minor waterways - (below 15' wide) 1 chain on each side from the edge of water
1 chain = 22 yards = 66' = 20.12 metres.

1.1.5 A belt of not less than 100 metres from the high water mark in areas facing bays, lagoons or the sea must be retained.

1.2 Site Selection and Zoning

1.2.1 Mangrove areas which have been identified as productive or unique areas that need to be preserved should not be destroyed.

1.2.2 Clearance should be obtained from the Irrigation Department for the extent of land area to be developed and for the pond plans for hydrological impacts.

1.2.3 If the site lies within the " Coastal Zone " as defined in the Coast Conservation Act, the developer should obtain a permit issued by the Director, Coast Conservation Department prior to the commencement of any construction or land development.

1.2.4 Development should be compatible with other land uses in adjacent areas.

1.2.5 Soil (Appendix 1) and water (Appendix 2) quality should be within the recommended parameters, for aquaculture. These should be monitored and a report be submitted to relevant authorities.

1.3 Raw Materials

1.3.1 Use of fertilizer or artificial food should not cause environmental problems.

1.3.2 Advice should be obtained from the Ministry of Fisheries regarding the quantity, area and time for collecting spawners.

1.3.3 Juveniles should not be collected from the wild stocks.

1.3.4 If natural feeds are to be utilised, permission should be sought from the Ministry of Fisheries for collection of the same.

1.3.5 The extraction of ground water should be carried out with the concurrence of the Irrigation Department.

2. PROJECT DESIGN AND CONSTRUCTION

2.1 Development should not interfere with other ecosystems and existing irrigation systems or restrict the normal tidal flooding or the natural drainage of the area.

2.2 The consequences of altered surface drainage patterns or run off rates must be anticipated.

2.3 Wise use of subsurface water resources is essential for most coastal areas. If misused they may become depleted or contaminated with salt water or pollutants. The recharge areas or aquifers which may be hundreds of k.m. inland must also be protected.

2.4 Development should not initiate or accelerate the process of soil erosion, which is likely to occur where the protective vegetation has been removed.

2.5 Always plant the outer banks of aquaculture ponds with mangroves in order to improve bank stability and help compensate for losses to the original area.

2.6 Pond designs and plans should be approved by the Irrigation Department.

2.7 Ponds should not be located in such a manner to divert freshwater run off from entering any mangrove forest seaward of the ponds. Run off waters should be diverted to the mangrove areas by means of shallow lateral channels.

3. OPERATIONS

3.1 Advice should be sought from the Irrigation Department and the Coast Conservation Department for the operations carried out during flood times and heavy rains.

3.2 Discharge waters must meet the quality standards laid down for water discharge into Inland Surface/Marine Coastal or Irrigation waters. (Appendix 3)

3.3 Continuous monitoring of discharge water for salt, NO_2^- and PO_4^{3-} levels and microbiological tests should be carried out by the developer at least fortnightly and records of same maintained and made available to authorised officers.

3.4 Suitable treatment measures in consultation with National Aquatic Resources Agency or Inland Fisheries Division of the Ministry of Fisheries should be adopted in the event of any parasitic, fungal, bacterial or viral disease of the stock.

3.5 Contingency measures should be provided to retain discharge waters until properly treated under undesirable conditions for discharge into surrounding water bodies or for recirculation.

3.6 The developer should submit quarterly progress reports to the Ministry of Fisheries on a format provided by them for review by the members of the Scoping Committee.

4. PROCESSING

4.1 Waste Waters

Waste waters from cooking and other washing and clean up processes should meet the respective standards for discharge into Inland Surface/Marine Coastal and Irrigation waters (Appendix 3).

4.2 Solid Wastes

4.2.1 Solid wastes such as offal from fish processing plants, screenings from the waste waters and trash fish should not be allowed to accumulate in holding bins for longer periods.

4.2.2 Any form of solid waste should not be applied as fertilizer or dumped on land, creating smell and fly nuisances in the neighbourhood.

4.2.3 Since the handling capacities of solid wastes of the existing fish processing plants are not sufficient to be utilized in fish meal processing plants, it is suggested that to economise on the cost of processing of trash fish and fish offal and to minimise the pollution hazards associated with the fish meal industry fish sillage production may be encouraged.

4.2.4 Air Pollution :
Air pollution from fish processing plants are negligible. However, in the fish meal processing, obnoxious and objectionable odours are emitted during drying of raw material. Hence, the installation of salt water scrubbers or deodorizers are recommended.

4.2.5 The developer should conform to any other conditions as stipulated by the Sri Lanka Standard Institute for fish processing plants.

5. LONG TERM CONSIDERATIONS

5.1 Will any provision be made for follow-up studies of the environmental and ecological consequences of the project ?

5.2 Will the developer be prepared to abandon or modify the project in the event of any long-term adverse environmental effects ?

Appendix 1

SOIL QUALITY PARAMETERS

Parameter	Range of suitability	
	Freshwater	Brackishwater
1. pH	Neutral	6.5 - 8.5
2. Texture	Sandy clay loam; loamy clay	- do -
3. Organic matter	8% - 26%	- do -
4. PO ₄	200 lbs/Ac	- do -
5. Iron content	25 ppm	- do -
6. Aluminium content	25 ppm	- do -

Appendix 2

WATER QUALITY PARAMETERS

Parameter	Range of Suitability	
	Freshwater	Brackishwater
1. Dissolved oxygen	5-15 mg/l	5-15 mg/l
2. pH	6.5 - 9	6.5 - 9.0
3. Salinity	0	15-44 ppt.
4. Alkalinity	25-40 mg/l	--
5. Phosphate	.1 - 1 mg/l	.1 - 1 mg/l
6. Ammonia	0.06 mg/l	0.06 mg/l
7. Nitrate	0.25 mg/l	0.25 mg/l
8. Nitrate	0.5 mg/l	0.5 mg/l
9. Iron	0.05 mg/l	0
10. H ₂ S	0	0
11. Temperature	28 ⁰ C - 30 ⁰ C	28 ⁰ C - 30 ⁰ C

TOLERANCE LIMITS FOR AQUACULTURE WASTE WATER DISCHARGED INTO IRRIGATION WATERS

Parameters	Values not to be Exceeded
1. pH Value	6 to 8.5
2. Total dissolved solids mg/l maximum	2,100
3. Sulphate (as SO ₄) mg/l maximum	1,000
4. Chloride (as Cl) mg/l maximum	600
5. Percent sodium, maximum	60
6. Boron (as B) mg/l maximum	2
7. Oils and grease, mg/l maximum	10
8. Biochemical Oxygen Demand mg/l	250

Cont'd.....

Parameters	Values not to be exceeded
9. Alpha emitters microcuries per millilitre maximum	10 ⁻⁹
10. Beta emitters, microcuries per millilitre maximum	10 ⁻⁸
11. Odour	No obnoxious odour
12. Floatable	No visible large size solids.

Appendix 3(a)

TOLERANCE LIMITS FOR AQUACULTURE WASTE WATER DISCHARGED INTO INLAND SURFACE AND MARINE COASTAL WATERS

Parameter	Values (not to exceed)	
	Inland surface	Marine Coastal
BOD (5 days at 20 ⁰ C)	30	50
COD mg/l	250	250
pH	6.0 - 8.5	6 - 8.5
Suspended solids mg/l	50	100
Temperature	30 ⁰ C	35 ⁰ C (at the point of discharge)
Oil and grease mg/l	10	20
Total Nitrogen mg/l	2.0	2.0
Phosphate mg/l	2.0	2.0
Phenolic Compounds mg/l	1.0	5.0
Cyanides mg/l	0.2	0.2
Sulphides mg/l	2.0	5.0
Fluorides mg/l	2.0	15.0
Total residual)		
Chlorine mg/l)	1.0	1.0

Parameter	Values (not to exceed)	
	Inland surface	Marine Coastal
Arsenic mg/l	0.2	0.2
Cadmium mg/l	0.1	2.0
Chromium mg/l	0.1	1.0
Copper mg/l	3.0	3.0
Lead mg/l	0.1	1.0
Mercury mg/l	0.0005	0.01
Nickel mg/l	3.0	5.0
Selenium mg/l	0.05	0.05
Zinc mg/l	5.0	5.0
Pesticides	Absent	Absent
<u>Radioactive Materials</u>		
Alpha emitters, /uc/ml	10 ⁻⁷	10 ⁻⁸
Beta emitters /uc/ml	10 ⁻⁶	10 ⁻⁷

GUIDELINES FOR PADDY MILLS

1.0 WATER POLLUTION

As water is used for soaking the paddy and for parboiling the paddy, the waste water should conform to CEA Interim Standards or where available to National Standards for discharge for Irrigation or for Inland Surface Water as per discharge point. It is recommended that the temperature of discharge water be reduced, prior to discharge through circulation in a cooling tank.

2.0 NOISE POLLUTION

Noise emitted from machinery and mills should conform to CEA Interim Standards for the specified zone. It is recommended that mills in residential areas should only operate a day shift and barriers be installed to reduce sound levels at the boundary.

2.1 Safety

When belt driven motors are attached to the mills, safety measures such as belt guards should be provided.

3.0 AIR POLLUTION AND DUST EMISSIONS

3.1 Dust emissions at milling should be controlled by collecting huks in bags or containers in protected areas to prevent wind action dispersing the rice hull.

3.2 Paddy hull used for feeding boilers may cause particulate emissions from chimney system. A grave to remove ash is recommended.

4.0 SOLID WASTE DISPOSAL

Ash may be disposed onto land and covered with soil to prevent wind action dispersing the ash. Husk and ash should not be discharged into water bodies.

Appendix VIII

GUIDELINES FOR PRE-MIX PLANTS

1.0 SITE SELECTION AND ZONING CRITERIA

Pre-mix plants shall be located in industrial zones or adjacent to metal quarries with no residential areas in the vicinity. Buffer zones of not less than 100 metres should be maintained.

2.0 RAW MATERIALS

Gravel, rock, asphalt (bitumen tar), quarry dust and sand are the raw materials utilized in the process. Suitable hoppers and enclosed storage areas should be provided for raw materials to prevent dust emissions due to wind action and during unloading/loading operations. Whenever possible materials should be handled in a wet state to suppress dust emissions.

3.0 DESIGN AND PROCESS CONTROLS

3.1 A cement/concrete apron shall be built for the operating area. Asphalt/bitumen tar shall be stored in sealed containers and kept on a cement apron to prevent leaching of materials and oil into the soil.

3.2 Drainage System

A drainage system to collect surface runoff shall be constructed around the perimeter of the cement apron and be directed into a detention tank.

3.3 Dust Control

Dust suppression systems utilizing wet or dry methods with collection efficiencies of 95% or more of input weight shall be installed. Discharge of emissions shall be from a stack height of not less than 25 metres, preferably a 30 metre height should be provided.

Wet systems shall adopt recirculation of water and sludge disposal shall include recycling or landfill with a soil cover of 15 cm in suitable landfill sites.

3.4 Noise Control

Noise emissions from process equipment and generators shall be controlled by enclosure or by fitting silencers. Screening banks be constructed to reduce fugitive dust due to wind action and noise emissions.

3.5 Factories Ordinance

The project shall conform to the requirements of the Factories Ordinance.

4.0 OPERATIONS AND MAINTENANCE

4.1 Housekeeping

Cleanliness and good housekeeping practices should be enforced.

4.2 Supply of Bitumen

Bulk supply of bitumen by bowzers is preferable to barrel supply.

4.3 Solid Waste Disposal

Sludge and empty containers should be disposed of at weekly intervals.

4.4 Transport Operations

Dust emissions due to transport operations be controlled by wet spraying of roadways onsite and tarpaulin covering be mandatory on lorries for transport of materials.

4.5 Trees

Suitable trees be planted and maintained on the perimeter boundary and on the ridge of screening banks.

GUIDELINES FOR THE STORAGE OF MALATHION

The following guidelines will be applicable to

- a. Central Malathion Stores ; and
- b. Regional Malathion Stores

where the total quantity of Malathion stored exceeds 500 kg.

1. SITE SELECTION

1.1 Stores should be built on well drained flat land not affected by seasonal flooding.

1.2 Storage buildings should not be constructed near wells, water tanks, ponds or other sources of domestic water.

1.3 The site should offer good access, preferably from more than one side, for delivery vehicles and fire fighting trucks.

1.4 Drainage

There should be no possibility of water contaminated with pesticides getting into main drainage systems, ground water, wells or water courses.

1.5 Stores should be located at a safe distance* from human activity other than industrial activity, from residential buildings, hospitals, schools and buildings used for storage of foodstuffs, beverages etc.

*Safe distance is specified as -

300 M for a Central Malathion Stores

100 M for Regional Stores.

1.6 The site should be cordoned off to prevent unauthorized entry.

1.7 As high temperatures may destabilize Malathion formulations, sites should be well shaded with trees to keep the temperature inside the store at a lower level.

2. BUILDING CONSTRUCTION

2.1 Whenever new buildings are planned for the storage of Malathion, fire safety design should be incorporated.

2.2 Construction materials should be as far as possible be fireproof.

- 2.3 All stores should be secure (and kept secure) and dry. Doors should have locks and windows if any should be barred to keep out unauthorized persons from entering the premises.
- 2.4 Rising dampness from the soil and rain must also be kept out.
- 2.5 The building should be secured against rodent attack.
- 2.6 Bunds

Stores should be surrounded by an outside bund so that in the event of fire, the contents of the store can be contained within the area, with no risk of gross environmental contamination.

2.7 Floors

Floors should be of smooth concrete or other impervious material so that pesticide spills will not be absorbed but may be easily cleaned up. Beaten earth, unglazed brick or tile, bitumen, rubber tiles and wood are all unsuitable materials.

3. **OTHER SAFETY REQUIREMENTS**

- 3.1 All personnel, who work in pesticide stores should receive proper instructions and on the job training before they are sent to work in the area.
- 3.2 Supervision of stores should only be done by an authorized person.
- 3.3 Floor space should be kept clear and uncluttered, with gangways between stacks and shelves for easy inspection and good ventilation.
- 3.4 Doorways and fire exits should be kept free from obstacles.
- 3.5 Manufacturers instructions should be strictly adhered to, in stacking Malathion (eg. stack height etc.)
- 3.6 Malathion containers should never be placed directly on the floor. Bricks or timber should be used under the containers so that leaks may be discovered easily.
- 3.7 Storage of damaged containers should be avoided.
- 3.8 The handling of pesticide containers in the Central Store, should be done using fork lifts.
- Standard safety practices should be adhered to in all stores.

4. **SPILLS**

- 4.1 Should a leak or spill occur keep people away from the area and decontaminate thoroughly as given below :

ALL SPILLS MUST BE CLEANED UP IMMEDIATELY

Spills of liquid formulations should be soaked up with absorbant material (saw dust, sand, earth).

Spills of solid formulations should be swept up and placed in marked containers for disposal. Adding damp sand or sawdust before sweeping helps prevent dust.

After sweeping, the area affected by the spill should be scrubbed with water and strong soap or detergent.

DO NOT hose down spills as this merely disperses the pesticide over a wide area.

DECONTAMINATION

Sodium Hypochlorite (bleach) and Sodium Carbonate are useful for decontamination and can be applied following initial scrubbing with soap and water.

5. **ELECTRICAL SAFETY**

- 5.1 Sparks from electrical equipment are a major cause of fires in pesticide stores, and should be guarded against. Electric cables should be housed in conduits or be of the mineral insulated or armoured type.
- 5.2 Earthing and trip switches should be provided in all stores.

6. **WATER SUPPLY**

Adequate supplies of water should be available for fire fighting purposes and for decontaminating the store in the event of spills.

7. **FIRE PRECAUTIONS**

- 7.1 Advice from the Government Analyst and Municipal Fire Authorities should be obtained for all pesticide stores.

- 7.2 An adequate number of suitable fire extinguishers should be available in the store and should be checked regularly to ensure proper operation. Buckets of sand or earth are useful for putting out small fires.
- 7.3 Advice should be obtained from manufacturers on the procedures to be followed in case of a major fire and local fire authorities advised beforehand.
- 7.4 Material required for fire fighting, spill control and decontamination should always be kept on hand.

8. LIGHTING AND VENTILATION

8.1 A minimum standard of lighting should be provided for in all pesticide stores - natural light should be used as far as possible.

8.2 Ventilation

This is one of the most important factors in the design of a pesticide store for three main reasons :

- * To prevent build up of toxic vapours which would endanger the health of those working in the store.
- * To prevent the build up of flammable vapours which would present a fire risk.
- * To keep the store as cool as possible since high temperatures can destabilize Malathion.

9. STORAGE PERIOD

The maximum storage period for Malathion should not exceed three months from the date of entry into the port.

REPORT OF THE SUB-COMMITTEE APPOINTED BY THE ENVIRONMENTAL COUNCIL TO PREPARE GUIDELINES FOR ADVERTISING PESTICIDES

The Committee recognizes the need to market and promote pesticide products for agricultural production. Advertisements and promotional campaigns are undertaken by firms authorised to import and market pesticides, by dealers and by numerous distributors right down to the village level. However, pesticides are hazardous compounds and cannot be considered as mass consumer products and therefore should be advertised and promoted with necessary and proper precautions.

In the interest of safety to the user and for consumer protection we set down the following guidelines to serve as a reference for advertising and promotion of pesticides. In following these guidelines the advertiser shall in no way contravene the provisions and regulations made under Section 18 of the Control of Pesticides (COP) Act No. 33.

1. Advertisements and promotional material shall not contain any statement contrary to directions on use and safety precautions given on the approved label.
2. Pesticides in the restricted category which have to be applied by specially trained applicators shall not be advertised. However, the availability of such services may be advertised.
3. Promotion programmes on pesticides in the restricted category which have to be sold by registered dealers shall indicate the restrictions placed on them.
4. All advertising materials for print, radio, TV and handouts shall contain precautionary notices -

Printed material	-Printed cautionary statement
Radio	-Commentary on hazards, at the end of commercials
TV	-Commentary as well as written message at the end of commercials.

In the case of TV advertisements using single slides lasting 10 to 15 seconds commentary is the only requirement.

On TV Filmlets however a written cautionary message as well as a commentary shall be used.

5. All banners and posters advertising restricted pesticide products shall carry the sign skull and crossbones within a square.

Demonstration boards and giveaways however may be exempted from this requirement.

6. The deadline for following these guidelines for print TV and radio advertisements is 31st March, 1987.

The Committee is of the view that wide publicity be given to the need to follow these guidelines. It is further convinced that monitoring is essential and that a committee or a Body be set up under the Central Environmental Authority to monitor the mass media. Violators must be brought to book.

The action to be taken could be the recall or cancellation of media material, followed by punitive action if the Control of Pesticides Act has been contravened.

CENTRAL ENVIRONMENTAL AUTHORITY - INTERIM STANDARDS

TOLERANCE LIMITS FOR INDUSTRIAL WASTE WATER DISCHARGED INTO PUBLIC (COMMON) SEWER FOR FURTHER TREATMENT

Ref. INDIAN STANDARD 3306 : 1974 WITH MODIFICATIONS

PARAMETERS	VALUES (NOT TO EXCEED)
BOD in 5 days at 20 C, mg/l	200
pH	Between 6 and 8.5
Suspended solids, mg/l	500
Temperature C	45
Phenolic compounds, mg/l (as C ₆ H ₅ OH)	5, (up to 50 if secondary treatment is followed)
Oils and grease, mg/l	30
Cyanides, mg/l	2
Chromium (Hexavalent), mg/l	2
Copper, mg/l	3
Lead, mg/l	1
Nickel, mg/l	2
Zinc, mg/l	10
Ammoniacal Nitrogen, mg/l	50
Radioactive Materials	
Alpha emitters, c/ml	10 ⁻⁷
Beta emitters, /ml	10 ⁻⁶
<u>If effluent used for irrigation</u>	
Boron, mg/l	2
Percent sodium	60
Total dissolved solids	2,100
Chlorides as Cl, mg/l	1,000 (if effluent used for irrigation)
mg/l	= milligrams/litre
c/ml	= microcuries/millilitre
BOD	= Biochemical Oxygen Demand

The quality of waste waters discharged into common sewer or collection system should be such as to ensure that the waste water :

- i. does not damage the sewer by physical or chemical action
- ii. does not endanger the health of the workers cleaning the sewer
- iii. does not upset the processes that are normally used in sewage treatment
- iv. does not overload the common treatment plant

CENTRAL ENVIRONMENTAL AUTHORITY - INTERIM STANDARDS

- v. does not damage the crops or affect the soil in case the effluent after treatment is used for irrigation, and
- vi. does not create fire and explosion hazards due to constituents present in the effluent.

Industrial effluents containing solids such as ash, sand, feathers, large floatables, straw, plastics, wood, lime, slurry, beer or distillery slops, chemical or paint residues, gross solids from cannery wastes, tar, hair, rag, metal shavings, garbage and broken glass, shall not be permitted to be discharged into public (common) sewers.

QUALITY OF INLAND SURFACE WATERS
(FRESH WATER) NORMS

Ref: INDIAN STANDARD : 2296 : 1973 with Modifications

PARAMETERS	FOR RAW WATERS FOR PUBLIC WATER SUPPLY; BATHING AND RECREATION	FISH CULTURE
BOD in 5 days at 20 C, mg/l max.	3	-
Dissolved Oxygen, mg/l min.	4	4
pH	Between 6.5 and 8.5	6 to 9
Fluorides, (as F), mg/l max	1.5	-
Arsenic (as As), mg/l max.	0.2	-
Chromium (as Cr), mg/l max	0.05	-
Lead (as Pb), mg/l max	0.1	-
Colour	Tolerable	-
Taste odour	No undesirable taste and odour	-
Cyanides, mg/l maximum	0.01	-
Ammonia (as N), mg/l	-	1.2
Electrical conductivity at 25 C maximum	-	1,000x10 ⁻⁶ mhos
Turbidity	-	Not excessive
Coliform organisms* max. (monthly average)(MPN per 100 ml)	5.000	-
Asthetics	No visible floating matter of sewage or industrial waste origin.	-

*With less than 5 percent of the samples with values greater than 20,000.

CENTRAL ENVIRONMENTAL AUTHORITY - INTERIM STANDARDS
TOLERANCE LIMITS FOR INDUSTRIAL
EFFLUENTS DISCHARGED ON LAND FOR IRRIGATION PURPOSES

Indian Standard 3307 : 1977 with modifications.

PARAMETERS	VALUES NOT TO BE EXCEEDED
1. Ph VALUE	6 TO 8.5
2. Total dissolved solids, mg/l maximum	2,100
3. Sulphate (as SO ₄) mg/l maximum	1,000
4. Chloride (as Cl) mg/l maximum	600
5. Percent sodium, maximum	60
6. Boron (as B) mg/l maximum	2
7. Oils and grease, mg/l maximum	10
8. Biochemical Oxygen Demand mg/l*	250
9. Alpha emitters microcuries per millilitre	10-9
10. Beta emitters, microcuries per ml. maximum	1-8 10
11. Odour	No obnoxious odour
12. Floatable	No visible large sized solids.

*Can be relaxed or tightened depending on soil conditions and application rate.

Please Note :

1. It is necessary to limit certain constituents in effluents, specially those considered toxic, so that the effluent may comply with normally accepted irrigation water quality.
2. The Authorities should give due consideration to the local conditions, and in special cases may relax or tighten the limits if need be.
3. Soils on which the effluents are applied are studied periodically from the viewpoint of physico-chemical characteristics to ensure that they are not damaged, and the ground waters are not polluted. Similarly, crop yields also need to be studied.

HYDRAULIC LOADING APPLICABLE FOR DIFFERENT SOILS

<u>SOIL TEXTURE CLASS</u>	<u>RECOMMENDED DOSAGE OF SETTLED INDUSTRIAL EFFLUENTS. CUBIC METRE/HECTARE/DAY</u>
1. Sandy	225 to 280
2. Sandy loam	170 to 225
3. Loam	110 to 170
4. Clay loam	55 to 110
5. Clayey	35 to 55

CENTRAL ENVIRONMENTAL AUTHORITY - INTERIM STANDARDS

NEW SOURCE AIR EMISSION NORMS

SOURCE	EMISSION
Fossil fuel fired steam generator (low capacity)	
Particulate matter, max.	0.5 lb/106 BTU heat input
Sulphur dioxide, max.	2.0 lb/106 BTU
Visible emissions	Not to exceed 20% capacity (occasionally up to 40% for 2 minutes)

Any source Smoke	Not to discharge smoke of a shade as dark or darker than No.2 of the Ringleman Chart. It may be exceeded for a short period (5 to 10 minutes) during start up or shut down.

CENTRAL ENVIRONMENTAL AUTHORITY - INTERIM STANDARDS

TYPICAL NOISE LEVEL CRITERIA

Ref. American Petroleum Institute "Guideline on Noise"
Medical Research Report

<u>Area</u>	<u>Sound level dB (A)</u>		
	<u>Day</u>	<u>Night</u>	<u>Other times</u>
Rural (residential)	50	40	45
Suburban (residential) hospitals, places of worship etc.	55	45	60
Urban (residential)	60	50	55
Urban (residential)- (with some commercial, retail or light industry)	63	55	60
Predominantly industrial	70	60	65

CENTRAL ENVIRONMENTAL AUTHORITY - INTERIM STANDARDS:**CLASSIFICATION OF
INDUSTRIES AND BUFFER ZONES**

TYPE	CATEGORIES & EXAMPLES	AREA OF EACH WORKS (HECTARES)	BUFFER ZONE WIDTH)
1. Heavy Industry	Oil refineries, metallurgical	750	2,000 metres or more
2. Heavy Industry	Machine manufacture, power station, ship building etc.	200-500	1,000 metres or more
3. Medium heavy Industry with much air pollution	Strawboard, artificial fibres, ceramic and glass products, cement work	50-200	500 metres or more
4. Medium heavy industry with moderate air pollution.	Cars, lamps, tiles etc.	150 to 200 metres or more	
5. Light industry with some air pollution	Tanneries, textile and food industry, glass.	1-50	50 to 100 metres
6. Light industry with little air pollution.	Electronics, garments etc., shoes	1-10	5 to 50 metres
7. Workshops, handi-crafts		1-10	3 to 50 metres.

Appendix XVII

TOLERANCE LIMITES FOR INDUSTRIAL EFFLUENTS DISCHARGED
INTO INLAND SURFACE WATERS
SRI LANKA STANDARD 652 ; 1984

PARAMETERS	VALUES (NOT TO EXCEED)
BOD in 5 days, at 20 C	30
pH	between 6 and 8.5
Suspended solids, mg/l	50 particle size below 850 microns
Temperature C	40
Oils and grease, mg/l	10 (top 30 cm layer)
Phenolic compounds, mg/l	1.0
Cyanides, mg/l	0.2
Sulphides, mg/l	2.0
Fluorides, mg/l	2.0
Total residual chlorine, mg/l	1.0
Arsenic, mg/l	0.2
Cadmium, mg/l	0.1
Chromium, mg/l	0.1
Copper, mg/l	3.0
Lead, mg/l	0.1
Mercury, mg/l	0.0005
Nickel, mg/l	3.0
Selenium, mg/l	0.05
Zinc, mg/l	5.0
Ammoniacal Nitrogen, mg/l	50
Pesticides	Absent
<u>Radioactive materials</u>	
Alpha emitters, c/ml	10 ⁻⁷
Beta emitters, c/ml	10 ⁻⁶
Chemical Oxygen Demand, mg/l	250
mg/l	- milligrams per litre
c/ml	- Microcuries per millilitre
BOD	- Biochemical Oxygen Demand

TABLE 1 - TOLERANCE LIMITS FOR INLAND SURFACE WATERS
FOR USE AS RAW WATER FOR PUBLIC WATER SUPPLY
SLS 722 (1985)

Determinant	Tolerance limit
1. Coliform organisms (monthly average, most probable number (MPN) per 100 ml.	Not more than 5000, with less than 5 per cent of the samples with value 20,000, and less than 20 per cent of the samples with the value 5000.
2. pH range at ambient temperature	6.0 to 9.0
3. Chloride (as Cl) mg/l, max.	1,200
4. Nitrate (as N) mg/l, max.	10
5. Fluoride (as F) mg/l, max.	1.5
6. Phenolic compounds (as phenolic OH) mg/l, max.	0.005
7. Oils and grease mg/l, max.	0.1
8. Pesticide residue	As per WHO/FAO* requirements
9. Arsenic (as As), mg/l, max.	0.05
10. Cyanide (as CN) mg/l, max.	0.05
11. Lead (as Pb), mg/l, max.	0.1
12. Mercury (total as Hg), mg/l, max.	0.001
13. Selenium (as Se) mg/l, max.	0.05
14. Chromium (as Cr) mg/l, max.	0.05
15. Dissolved oxygen (DO), mg/l, max.	4
16. Biochemical oxygen demand (BOD) mg/l, max.	5
17. Radio active material :	
a. Alpha emitters /uc/ml, max.	10 ⁻⁹
b. Beta emitters /uc/ml, max.	10 ⁻⁸

*Food and Agriculture Organisation
 /uc/ml - Micro curies per millilitre

**TOLERANCE LIMITS FOR
INDUSTRIAL WASTE WATER DISCHARGED INTO MARINE COASTAL AREAS
SRI LANKA STANDARD 721 : 1985**

PARAMETERS	VALUES NOT TO BE EXCEEDED
1. Biochemical Oxygen Demand (BOD) (5 days at 20 C mg/l)	100
2. Total suspended solids	
a. for process waste waters, mg/l max.	100
b. for cooling water effluent	Total suspended matter content of influent cooling water plus 10%
3. Particle size of	
a. floatable solids, maximum	3mm
b. settleable solids, maximum	850 microns
4. Temperature, maximum	45 C at the point of
5. pH value	Between 6 and 8.5
6. Oils and grease, mg/l maximum	20
7. Ammoniacal Nitrogen (as N) mg/l max.	50
8. Residual chlorine, mg/l maximum	01
9. Fluorides mg/l (as.F) maximum	15
10. Cyanides (asCN), mg/l maximum	0.2
11. Phenolic Compounds (as C ₆ H ₅ H) mg/l maximum	5.
12. Sulphides (as S), mg/l maximum	5
13. Arsenic (as As), mg/l, maximum	0.2
14. Selenium (as Se), mg/l, maximum	0.05
15. Pesticides	
a. Organo-phosphorous compounds (asP) mg/l maximum	1
b. Chlorinated hydrocarbons (as Cl), mg/l maximum	0.02
16. Copper (as Cu), mg/l maximum	3.0
17. Lead (as Pb) mg/l maximum	1.0
18. Chromium (as Cr), mg/l maximum	1.0
19. Cadmium (as Cd), mg/l maximum	2.0
20. Mercury (as Hg), mg/l maximum	0.01
21. Nickel (as Ni), mg/l maximum	5.0
22. Zinc (as Zn), mg/l maximum	5.0
23. Radioactivity	
Alpha emitters, microcuries/milli- litre maximum	10-8
Beta emitters, microcuries/milli- litre	10-7
24. Colour and odour	No visible colour or unpleasant odour.
25. Chemical oxygen demand mg/l maximum	250

SRI LANKA STANDARD SPECIFICATION FOR POTABLE WATER

PHYSICAL AND CHEMICAL REQUIREMENTS

SLS 614 : Part 1:1983

TABLE 1 - PHYSICAL REQUIREMENTS

Characteristic	Maximum desirable level	Maximum permissible level
Colour	5 Units	30 Units
Odour	Unobjectionable	Unobjectionable
Taste	Unobjectionable	Unobjectionable
Turbidity	2 Jackson turbidity Units	8 Jackson turbidity units

TABLE 2 - CHEMICAL REQUIREMENTS (BASIC)

Substance/characteristic	Max. desirable level	Max. permissible level
pH range	7.0 to 8.5	6.5 to 9.9
Electrical conductivity	750 μ s/cm	3,500 μ s/cm
Chloride (as Cl)	200 mg/l	1,200 mg/l
Free residual chlorine (as Cl ₂)		0.2 mg/l
Alkalinity (total as CaCO ₃)	200 mg/l	400 mg/l
Free ammonia		0.06 mg/l
Albuminoid Amonia		0.15 mg/l
Nitrate (as N)		10 mg/l
Nitrite (as N)		0.01 mg/l
Fluoride(as F)	0.6mg/l	1.5 mg/l
Total Phosphates (as PO ₄)		2.0 mg/l
Total residue	500 mg/l	2000 mg/
Total hardness as (CaCO ₃)	250 mg/l	600 mg/
Total iron (as Fe)	0.3 mg/l	1.0 mg/l
Sulphate (as SO ₄)	200 mg/l	400 mg/l

TABLE 3 - CHEMICAL REQUIREMENTS (OPTIONAL)

Substance or characteristic	Max. desirable level	Max. permissible level
Anionic detergents	0.2 mg/l	1 mg/l
Phenolic compounds(as phenolic OH)	0.0001 mg/l	0.0002 mg/l
Grease and Oil		1.0 mg/l
Calcium (as Ca)	100 mg/l	240 mg/l
Magnesium (as Mg)	Not more than 30 mg/l if there are 250 mg/l of Sulphate. If there is less sulphate, magnesium upto 150 mg/l may be allowed.	140 mg/l
Copper (as Cu)	0.05 mg/l	1.5 mg/l
Manganese (as Mn)	0.05 mg/l	0.5 mg/l
Zinc (as Zn)	5.0 mg/l	15 mg/l
Aluminium (as Al)		0.2 mg/l
Pesticide residues		As per WHO/FAO* requirements.
Chemical Oxygen demand		10 mg/l

* World Health Organisation/Food and Agriculture Organisation

TABLE 4 - TOXIC SUBSTANCES

Substance	Upper limit of concentration in mg/l
Arsenic (as As)	0.05
Cadmium (as Cd)	0.005
Cyanide (as CN)	0.05
Lead (as Pb)	0.05
Mercury (total as Hg)	0.001
Selenium (as Se)	0.01
Chromium (as Cr)	0.05

SRI LANKA STANDARD - SPECIFICATION FOR POTABLE WATER
PART 2 - BACTERIOLOGICAL REQUIREMENTS
SLS 614 (1983)

The bacteriological requirements for potable water are based on the examination of several samples taken from the supply source under different conditions. The samples obtained shall comply with the following requirements ;

1. Pipe borne public water supplies
 - 1.1 Throughout any year, 95 per cent of the samples shall not contain any foliform organisms in 100 ml.
 - 1.2 None of the samples examined shall contain more than 10 coliform organisms per 100 ml.
 - 1.3 Coliform organisms shall not be detectable in 100 ml any two consecutive samples.
 - 2.1.4 None of the samples examined shall contain E.coli in 100 ml.
2. Individual or small community supplies
 - 2.1 None of the samples examined shall contain more than 20 coliform organisms per 100 ml on repeated examination.
 - 2.2 No sample shall contain E.coli in 100 ml.

Note Individual or small community supplies include wells, bores and springs.

MONITORING OF AIR, WATER AND SOIL - A LIST OF CEA REGISTERED LABORATORIES

NAME OF THE INSTITUTION	CONTACT PERSON/S	ADDRESS	TEL. NO.	PARAMETERS FOR WHICH FACILITIES ARE AVAILABLE FOR TESTING			
				WATER	SOIL	AIR	NOISE
1 Ceylon Institute of Scientific and Industrial Research (CISIR)	Director	363, Baudhaloka Mawatha, Colombo 07	93807 598620	X	-	X	X
2 City Microbiologist's Laboratory	Dr C S S de Silva, City Microbiologist	Maligakanda, Colombo 10	92830	X*	-	-	-
3 Division of Occupational Hygiene	Mr D T Jayamanna, Specialist Research Officer	97 Jawatta Road, Colombo 05	584770	X	-	X	X
	Mrs L R G Uduman, Research Officer	- do -	582731				
4 Geological Survey Department	Dr O C Wickramasinghe, Chief Chemist	48 Sri Jinarathana Road, Colombo 02	24250	X	X	-	-
5 Government Analyst's Dept	Mr O C de Silva, Addl Govt Analyst	Torrington Square, Colombo 07	91959	X	-	-	-
6 Land Use Division, Irrigation Department	Dr W D Joshua, Head, land Use Division	P O Box 1139, Jawatta Road, Colombo 05	586427	X	X	-	-
7 National Water Supply and Drainage Board	Mrs J Sivabalasundaram Chief Chemist	NWS&DB, Ratmalana	715281	X	-	-	-

Appendix XXI

Cont'd.....

NAME OF THE INSTITUTION	CONTACT PERSON/S	ADDRESS	TEL. NO.	PARAMETERS FOR WHICH FACILITIES ARE AVAILABLE FOR TESTING			
				WATER	SOIL	AIR	NOISE
8 Sri Lanka Standards Institution	Director, Laboratory Services Division	5 Galle Road, Colombo 06	583195-6 589141	X	-	-	-
9 University of Colombo	Dr H D Gunawardhana, Senior Lecturer	P O Box 1490, COLOMBO 03	83105-7	X	-	-	-
10 University of Kelaniya, Department of Botany	Prof S A Gunasekera, Head, Dept of Botany	Dept of Botany, U'sity of Kelaniya Kelaniya	521916 521391-7	X	X	-	-
11 University of Kelaniya Department of Chemistry	Dr Mrs C M Arewgodda, Lecturer, Dept/Chemistry	Dept of Chemistry, U'sity of Kelaniya	521397	X	X	-	-
12 University of Peradeniya, Department of Zoology	Dr W R Breckenridge, Head, Dept/Zoology	Dept of Zoology U'sity/Peradeniya	88301-5 Extn 300	X	X	-	-
13 Water Resources Board	Mr A G N Wijesekera, Dy General Manager Chemist (Ground Water)	2A Gregory's Road, Colombo 07	596540	X	-	-	-

* Biological Parameters Only
X Facilities Available
- Facilities Not Available

CENTRAL ENVIRONMENTAL AUTHORITY
INVENTORY OF DEVELOPMENT PROJECTS

NAME OF AGENCY : PERIOD :
..... From :
..... To :

1 Number of Project proposals received

1.1 Number of project proposals approved

2 Number of projects for which an Initial Environmental Examination (IEE) was not required

2.1 *List of projects for which IEE was not required

3 Number of projects approved after IEE

3.1 *List of projects approved after IEE

4 Number of projects rejected after IEE

5 Number of projects referred for an Environmental Assessment (EA)

5.1 *List of projects approved after an EA

6 Number of projects for which an Environmental Action Plan (EAP) was formulated

6.1 *List of projects approved after an EAP

7 Number of projects for which Supplementary Environmental Report (SER) was formulated

7.1 *List of projects approved after SER

DATE : SIGNATURE :
NAME :
DESIGNATION:

* Please provide details of projects in separate annexures.