

MAIN COURSE: FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT (FEIA)

COURSE CODE: AFM 310

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COURSE GUIDE

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INTRODUCTION

AFM 310 is a two credit unit course on Fisheries Environmental Impact Assessment (FEIA). The course is broken into 23 units in all. These units will teach and explain Environmental Impact Assessment as a tool and systematic process for ensuring that environmental considerations are taken into account in all proposed activities such as projects, plans, programs or legislative actions for achieving sustainable development in fisheries and aquaculture, which is compatible with the environment in the present day and would continue to be in the future. This course guide defines what the course is all about as well as the course material that you will need to consult to ensure that the course is simple and within your reach. The course guide recommends some general guidelines for the estimated time you are likely to spend on each unit. The guide contains a distinct assignment file for your assessment.

WHAT YOU WILL LEARN IN THIS COURSE

This course AFM 310: Fisheries Environmental Impact Assessment (FEIA) consists of units and a course guide. This course guide tells you briefly what the course is about, what course materials you will be using and how you can work with these materials. In addition, it advocates some general guidelines for the amount of time you are likely to spend on each unit of the course in order to complete it successfully. It gives you guidance in respect of your Tutor-Marked Assignment which will be made available in the assignment file. There will be regular tutorial classes that are related to the course. It is advisable for you to attend these tutorial sessions. The course will prepare you for the challenges you will meet in the study of Fisheries Environmental Impact Assessment.

COURSE AIMS

The overall aim of this course is to teach you the basic concept of Fisheries Environmental Impact Assessment and providing you the basic skills to facilitate Environmental Impact Assessment of proposed Fisheries and aquaculture activity such as development project, plan, and program of action.

COURSE OBJECTIVES

In addition to the overall aim to be achieved, there are set objectives. Each unit of this course also has its specific objectives that are found at the beginning of each unit. You will need to understand these objectives before you start working on each unit. You are encouraged to refer to them periodically to check on your progress in learning and assimilating the content. On completion of a unit, you may re-examine the objectives to ensure that you fully learn what is essential. You will find below the objectives that are set in order to achieve the aims of this course. On successful completion of this course, you should be able to:

- Describe the tropical aquatic environment
- Discuss the Developmental issues in aquatic environment

- Discuss Conceptual framework for aquatic environmental management
- Define Environmental Impact Assessment
- Discuss the history of Environmental Impact Assessment
- Explain the nature and scope of Environmental issues and Impact.
- Describe the legal and institutional framework for Environmental Impact Assessment
- Discuss the principles and process of EIA
- Distinguish the key elements of Environmental Impact Assessment process
- Describe the concept of integrated assessment
- Cost and benefits of undertaking EIA

WORKING THROUGH THIS COURSE

To complete this course you are required to read each study unit, read the textbooks and read other materials which may be provided. Each unit contains self-assessment exercises and at certain points in the course you would be required to submit assignments for assessment purposes. At the end of the course there is a final examination. Below you will find listed all the components of the course, what you have to do and how you should allocate your time to each unit in order to complete the course on time and successfully.

This course entails that you spend a lot of time to read. It would be advised that you avail yourself the opportunity of attending the tutorial sessions where you have the chance of comparing your understanding with that of other people.

COURSE MATERIALS

The main components of the course are

- Course Guide
- Study Guide
- Text Books

The material you are reading now is called the course guide which introduced you to this course.

Study Guide

This course has been divided into six (6) modules and twenty (23) study units. The course outline are as follows:

MODULE 1 This module define and highlights different types of tropical aquatic environment, the developmental issues in aquatic environment. By the end of the module, you will have learned about:

Unit 1 Definition of tropical aquatic environment and types of tropical aquatic environment

Unit 2 The Developmental issues in aquatic environment

Unit 3 Framework for aquatic environmental management

MODULE 2 This module define Fisheries Environmental Impact Assessment and highlights the context within which Environmental Impact Assessment (EIA) has evolved. By the end of the module, you will have learned about:

UNIT 1 Definition and scope of Fisheries Environmental Impact Assessment

UNIT 2 The history and trends of Environmental Impact Assessment

UNIT 3 The Participants and their Roles in Environmental Impact Assessment Process

MODULE 3 This module describe the legal and Institutional framework for Fisheries Environmental Impact Assessment (EIA). By the end of the module, you will have learned about:

UNIT 1 The legal and institutional framework for Fisheries Environmental Impact Assessment

UNIT 2 The main features of the legal an institutional frame work of an EIA.

UNIT 3 Process and Procedural Framework in EIA.

MODULE 4 This module describe the key element of Environmental Impact Assessment. By the end of the module, you will have learned about:

UNIT 1 Scoping

UNIT 2 Screening

UNIT 3 Identifying and evaluating project alternative

UNIT 4 Mitigating Measures

UNIT 5 EIA report and certification

MODULE 5 This module Describe the basic guidelines and procedures of EIA. By the end of the module, you will have learned about:

UNIT 1 Preliminary activities

UNIT 2 Impact identification

UNIT 3 Impact evaluation

UNIT 4 Baseline study

UNIT 5 Documentation, decision making and Post audits

MODULE 6 This module discuss the concept of integrated assessment and the cost and benefits of an EIA. By the end of the module, you will have learned about:

UNIT 1 The integrated assessment of environmental resources

UNIT 2 Conducting an integrated assessment of environmental resources

UNIT 3 The cost of undertaking an EIA

UNIT 4 The benefits of undertaking an EIA

Every module has a subunit and each unit contains a list of references and further reading. Try to get the textbooks and materials listed. The textbooks and materials are meant to deepen your understanding of the course.

TEXT BOOKS AND REFERENCES

At the end of each unit, there is a list of recommended textbooks which though are not compulsory for you to acquire or read, but are necessary as supplement to the course materials.

ASSESSMENTS

There are three components of assessment for this course:

- Self-Assessment Exercises
- Tutor-Marked Assignment (TMA)
- End of course Examination

SELF-ASSESSMENT EXERCISES

The self-assessment exercises are provided for you to check your progress. Each unit has self-assessment exercises within the texts, and the answers are provided at the end of each unit. You should be sincere when working on the self-assessment exercises. Do not be quick at looking at the answers. Check the answers only when you know you have sincerely completed the questions asked. It is only by this way you will find the questions helping to aid your learning and mastery of the skills. The self-assessment exercises will not be scored.

TUTOR-MARKED ASSIGNMENT

The TMA is the continuous assessment component of this course. It accounts for 30 percent of the total score. You will be given four (4) TMAs to answer. The best three of the TMAs would be chosen which is 30% and will be added to the end of Semester Examinations. The TMAs would be given to you by your facilitator and returned to him or her after you have done the assignment.

FINAL EXAMINATION AND GRADING

There will be final examination for AFM 310. The duration will be three hours. This examination carries a total mark of 70 percent. This final examination will reflect the types of self-assessment self-testing and Tutor-Marked Assignments. Please make sure you revise all the self-testing questions and the comments of your Tutor before the final examination. The final examination will cover information from all parts of the course.

SUMMARY

The fisheries environmental impact assessment (FIEA) process is initiated by a description of the proposed action. The description is then screened to determine if an FEIA should be conducted. Screening should also indicate the relative scale of assessment that is needed. If screening indicates that an FEIA should be conducted, the scoping step establishes the terms of reference for the FEIA. Closely aligned with the scoping step is the identification and consideration of alternatives to the proposed action. A comparative evaluation is then conducted of the proposed action and its alternatives. Next, it is common to circulate a draft assessment for review and comment prior to the decision step. The last step is monitoring the actual impacts of the action taken.

MAIN COURSE: FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT (FEIA)

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MODULE 1 THE DEFINITION, TYPES AND DEVELOPMENTAL ISSUES OF TROPICAL AQUATIC ENVIRONMENT,

Unit 1 Definition and types of tropical aquatic environment

Unit 2 The Developmental issues in aquatic environment

Unit 3 Framework for aquatic environmental management

UNIT 1 DEFINITION AND TYPES OF TROPICAL AQUATIC ENVIRONMENT

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1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Definition of tropical aquatic environment

3.2 Types of tropical aquatic environment

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

You have just read through the table of contents. You will now have a general understanding of what this unit is about and how it fits into this course as a whole. This unit will define Tropical aquatic Environment. You will be acquainted with the definition and be able to identify different types of Tropical aquatic Environment.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Define tropical aquatic environment
- Identify the different types of tropical aquatic environment

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 Definition of Tropical Aquatic Environment.

Tropical aquatic environment are a diverse group of water dependent habitats that support important biodiversity and provide a wide range of benefits to people. As pressure on the world's

water resources has increased, there has been growing concern that increased investment in water management needs to include investments to sustain these aquatic environment and the benefits they provide. This is particularly so where these systems are used intensively by poor communities, mainly fishers and pastoralists, and are therefore of critical importance for efforts to sustain and improve these rural livelihoods.

3.2 TYPES OF TROPICAL AQUATIC ENVIRONMENT

Principal tropical aquatic environment includes the following:

- **Streams and rivers** are flowing waters
- **Floodplains** are the lowland areas, adjacent to water courses that are subject to periodic or near-permanent inundation and sediment deposition.
- **Reservoirs** are artificial water bodies, primarily used for irrigation, hydroelectric power and domestic water supply.
- **Lakes** are natural water bodies though, artificial lakes can be built. Both are usually freshwater and have high potential for aquaculture and conventional or enhanced capture fisheries.
- **Ponds** are small freshwater bodies, usually artificial, occasionally natural, in rain fed and irrigated areas where aquaculture, particularly integrated with agriculture, is possible.
- **Estuaries** are partially enclosed coastal bodies of water which are either permanently or periodically open to the sea and within which there is a measurable diurnal and seasonal variation of salinity due to the mixture of sea water with fresh water derived from land drainage (Day 1980 and Day *et al.*, 1989). They include key habitats, such as coastal lagoons ; that support coastal fisheries.
- **Lagoons** are coastal, lacustrine water bodies that are influenced by both land drainage inputs and marine inputs. They are similar to estuaries in their diurnal and seasonal salinity and tidal patterns.
- **Wetlands** are defined as a wide variety of habitats such as marshes, peat lands, floodplains, rivers and lakes, and coastal areas such as salt marshes, mangroves and seagrass beds. Also, coral reefs and other marine areas not deeper than 6m at low tide, similarly, constructed wetlands such as waste-water treatment ponds and reservoirs are classified as wetlands.
- **Rice fields** are man-made aquatic agro-ecosystems that cover extensive areas of the tropics, sub-tropics and warm temperate regions. In addition to their primary function of rice production, rice fields in many countries are extremely important sources of fish and other aquatic animals and plants for human consumption.

Self-Assessment Exercise

1. Define the term Tropical Aquatic Environment
2. What are the similarities between the estuary and the lagoon?

4.0 CONCLUSION

In this unit, you have learned what is meant by tropical aquatic environment. You should now be able to define and explain the concept and its nature in simple words. You have also been able to identify the different types of Tropical Aquatic Environment.

5.0 SUMMARY

This unit has explained the nature of tropical aquatic environment. You have learnt the basic definition and different types of tropical aquatic environment. You can now discuss and mention some types of Tropical Aquatic Environment.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of Tropical Aquatic Environment, try to answer the following questions.

1. What is Tropical Aquatic Environment?
2. Mention any 5 different types of tropical aquatic environment you have studied.

7.0 REFERENCES/FURTHER READINGS

1. Brown, C.A.; and King, J.M. (2000). Environmental flow assessments: Concepts and methodologies. *World Bank water resources and environmental management guideline series, guideline 6*. Report for the World Bank.
2. Day, J.W.; Hall; C.A. Kemp, W.M. Yanez-Arancibia. A. (1989). *Estuarine ecology*. Wiley and Sons.

UNIT2 DEVELOPMENTAL ISSUES IN AQUATIC ENVIRONMENT

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- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Definition of aquatic environment
 - 3.2 Developmental issues in aquatic environment
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

Aquatic ecosystems refer not only to coastal waters, rivers and lakes, but also to a complex and interconnected system of permanent and temporary habitats, with a high degree of seasonal variations. For instance, the term ‘wetland’ describes a particular group of aquatic habitats representing a variety of shallow, vegetated systems, such as bogs, marshes, swamps, floodplains, coastal lagoons, estuaries, etc. where the shallowest sites are often transitional areas and can be seasonally or intermittently flooded (Revenga *et al.*, 2000). The goods and services these ecosystems renders include water for human consumption, food production, irrigation, energy generation, regulating services (e.g. flood mitigation, water filtration, aquifer recharge and nutrient cycling), and transport and recreational services (Constanza *et al.*, 1997). Their value is irreplaceable, and they are an important part of the water, energy, health, agriculture and biodiversity sectors, which are essential for poverty alleviation and socio-economic development. However, these ecosystems are under severe pressures that threaten their ability to meet the multiple and growing demands placed upon them.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Define aquatic environment/ecosystem
- Identify the different types of developmental issues in aquatic environment

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 DEFINITION OF AQUATIC ENVIRONMENT/ECOSYSTEM.

Aquatic ecosystems refer not only to coastal waters, rivers and lakes, but also to a complex and interconnected system of permanent and temporary habitats, with a high degree of seasonal variations. It also include a diverse group of water-dependent habitats that support important

biodiversity and provide a wide range of benefits to people, examples are the marshes, swamps, floodplains and estuaries.

3.2 DEVELOPMENTAL ISSUES IN AQUATIC ENVIRONMENT

The majority of people live in temperate and subtropical regions centered on coastal or inland water systems. Coastal waters, rivers, lakes, wetlands, aquifers and other inland water systems such as swamps and fens have, as a consequence, been subjected to inconsistent human induced pressures (UNEP, 2002). These include:

- Construction along coastlines for harbors and urban expansion, alteration of river systems for navigation and water storage, drainage of wetlands to increase farmland, overexploitation of fisheries, and multiple sources of pollution.
- Human population growth and the expansion of economic activities are collectively placing huge demands on coastal and freshwater ecosystems. Water withdrawals, for instance, have increased six fold since the 1900s, which is twice the rate of population growth (UN, 2000).
- In addition, the quality of many water bodies is declining due to increased pollution from sources such as agriculture, industry, tourism, urban runoff and domestic sewage.
- Increased concentrations of suspended solids in coastal waters, rivers and lakes resulting from human activity can cause significant changes in habitats. Intensified agricultural practices that rely on the application of soluble fertilizers and pesticides can result in increased nutrient runoff, one of the major causes of deterioration in water quality (Gleick, *et al.*, 2001).
- Pressures on aquatic ecosystems have also caused a severe decline in the condition of species. Freshwater species are more threatened with extinction than in terrestrial or marine environments (Revenga *et al.*, 2003).

In addition to those pressures, there may be others, related to the current and likely future impacts of climate change on coastal and freshwater which are as yet not fully understood and need to be fully investigated.

Self-Assessment Exercise

1. In your own words what do you think are the major issues affecting aquatic environment?

4.0 CONCLUSION

In this unit, you have learned what is meant by aquatic environment/ecosystem. You should now be able to define and explain the concept with relevant examples in your own simple words. You have also been able to identify the different issues affecting the aquatic environment.

5.0 SUMMARY

This unit has explained the nature of aquatic environment and the developmental issues affecting the aquatic ecosystem. You can now discuss and mention some of the developmental issues of aquatic environment.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of aquatic environment, try to answer the following questions.

1. What is aquatic environment/ecosystem?
2. Briefly discuss any 5 issues affecting the aquatic environment.

7.0 REFERENCES/FURTHER READINGS

Hand book on aquatic ecosystem management (2013). Taylor and Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL 33487-2742 (e- Book PDF) pp 427

UNIT 3 CONCEPTUAL FRAMEWORK FOR AQUATIC ENVIRONMENTAL MANAGEMENT

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- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Meaning of aquatic environment management
 - 3.2 Benefits of aquatic environment management
 - 3.3 Strategies for protecting the aquatic environment
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

The aquatic ecosystems can be defined in terms of water quality, water quantity, habitat and aquatic species. Protection of the aquatic environment will be achieved through the active management and regulation of the activities and water uses that affects the four elements. The objectives of the protection of the aquatic environment must be understood and considered in the development of any water management plan or any other resource planning activities.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Understand the meaning of aquatic environmental management
- The benefits of aquatic environmental management in aquaculture
- The strategy for protecting the aquatic environment.

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 MEANING OF AQUATIC ENVIRONMENT MANAGEMENT

Aquatic Environmental Management can be defined as the management of the interaction and impact of human activities on the natural environment. Aquatic environmental management further aims to ensure that aquatic ecosystem services and biodiversity are protected and maintained for equitable use by future generations, and also, maintains ecosystem integrity as an end in itself by taking into consideration ethical, economic, and scientific (ecological) variables. Environmental management tries to identify the factors that have a stake in the conflicts that may rise between meeting the needs and protecting the environment.

Improved aquatic ecosystem management depends on understanding the impacts of management actions (fisheries, habitat, nutrients /contaminant management) in relation with other drivers of change such as climate, water levels, and species invasions. Recently, emphasis has been placed on the development of dynamic predictive nutrient, ecosystem, and habitat models to understand the relative importance of these influences. Ecosystem models are being used to assess the compatibility of multiple objectives and identify critical knowledge gaps. There is recognition that goals set separately and not as part of an ecosystem framework are unlikely to be compatible and likely to be counterproductive when implemented in the real world. As a result, there is greater understanding that fisheries management and habitat plans, traditionally developed separately, should be reconciled.

3.2 BENEFITS OF AQUATIC ENVIRONMENT MANAGEMENT

The social, economic and environmental benefits associated with the aquatic environmental management includes the following:

Social: Increased access to water points (domestic, fisheries and livestock use), improved aesthetics of water, decrease in disease outbreaks (bilharzias, cholera, malaria, etc.), increase in riparian-based trade, and enhanced women empowerment;

Economic: Increased fish catches, stable transportation costs, enhanced tourism, release of intakes for irrigation, hydroelectricity generation, and water supply systems and potential (~~possible~~) use of harvested floating weeds;

Environmental: Less water loss, improved water quality, decreased potential for siltation andflooding, and stability of biodiversity and aquatic life.

3.3 STRATEGIES FOR PROTECTING THE AQUATIC ENVIRONMENT

A strategy for the protection of the aquatic environment is a shared responsibility of the people and the government. The following are the basic strategies that can be adopted in the protection of the aquatic environment:

- Maintenance of the existing conditions of the environment is a key part of the government commitment to protection of the aquatic environment. It is easier and less expensive to protect the existing resources from degradation than to restore after deterioration.
- Restore where aquatic environment is stressed beyond its limit, it may be both desirable and feasible to change condition to near its initial state than to return it back to its natural conditions
- Improve present condition to beyond what occur naturally to maximize the potential of the aquatic environment to support certain activities, such improvement are based on the human values or needs, example is the aeration of lakes to prevent fish kills or biological control of excessive aquatic weeds by introducing herbivorous fish species.

Self-Assessment Exercise

1. Discuss the economic benefits of the management of the aquatic environment
2. Highlight the basic features of the strategies used in the management of the aquatic environment.

4.0 CONCLUSION

In this unit, you have learned what is meant by aquatic environmental management and the strategies for protecting the aquatic environment. You should now be able to define and explain the management concept and also the benefits of managing the aquatic environment.

5.0 SUMMARY

This unit has explained the management of aquatic environment and the strategies for managing the aquatic ecosystem. You can now discuss and mention some of management strategies as well as the benefits of managing the aquatic environment.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of aquatic environment management, try to answer the following questions:

1. Discuss the various management strategies of the aquatic environmental management.
2. Briefly discuss the benefits of managing the aquatic environment.

7.0 REFERENCES/FURTHER READINGS

Mailu, A.M. (2001). Preliminary Assessment of the social, economic and environment impacts of water hyacinth in the Lake Victoria basin and the status of control. Biological and Integrated Control of Water Hyacinth, Proceedings 102, 2001.

OCAR2, ADB. (2003) Integrated Control of Floating Weeds Project, Economic Community of West African States – ECOWAS Multinational. Preparation Report. 2003.

MODULE 2 INTRODUCTION TO FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT AND HISTORY OF EIA

- Unit 1** Definition and scope of Fisheries Environmental Impact Assessment
- Unit 2** The history of Environmental Impact Assessment
- Unit 3** The participants and their roles in Environmental Impact Assessment

UNIT 1 DEFINITION AND SCOPE OF FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT

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- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Definition of Fisheries Environmental Impact Assessment
 - 3.2 Scope of Fisheries Environmental Impact Assessment
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

This unit will define Fisheries Environmental Impact Assessment (FEIA). You will be acquainted with the definition and be able to understand the scope of Fisheries Environmental Impact Assessment (FEIA).

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Define Fisheries Environmental Impact Assessment (FEIA).
- Discuss the scope of Fisheries Environmental Impact Assessment (FEIA).

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 DEFINITION OF FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT

A fisheries impact assessment is part of an environmental impact assessment (EIA) study for a proposed development which may affect fishing and aquaculture activities, fisheries resources

and habitats, and aquaculture sites. It aims at providing sufficient and accurate data to allow a complete and objective predictions and evaluation of the potential fisheries impacts.

An environmental assessment is an examination of the environmental impacts of fishing activities authorized under a proposed fishery management strategy. The term 'environmental' includes biological, economic and social aspects. The environmental impact statement will predict the impacts of fishing on target species, by-catch species, important fish habitat, the broader ecosystem, and economic and social issues. It also considers the impact on the resource from other fishing activities and other non-fishing activities.

The purpose of fisheries environmental impact assessment is to identify, assess and describe the likely impact of proposed activities on the environment, analyze the possibilities for the prevention and mitigation of such impact and make proposals regarding the choice of the most suitable solution.

3.2 SCOPE OF FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT

EIA is a management tool. It provides information upon which decisions may be taken. It must involve the participation of various groups or stakeholders, such as project proponent or developer, investor, regulators, planners, local communities, non-governmental organizations, and politicians who will make decisions about a proposed major activity. It is increasingly a requirement for international assistance for grants and loans from some major donors, investors and various financial and development organizations such as the World Bank, European Union, and African Development Bank among several others. The potential scope of a comprehensive EIA process is considerable and could include the appraisal of policies, plans, programmes and specific development projects. The primary purpose is to encourage the consideration of environmental issues in the planning and decision-making in order to ensure that the action is compatible with the environment.

Worldwide EIA is the most commonly utilized tool for evaluating environmental concerns, sustainability issues and developing mitigation measures for new development projects. The EIA system must recognize the interlinked way and complexity of impacts on the environment and social system sometimes yielding unexpected effects. It must recognize that some of the key impacts of developments are found away from the project site: elsewhere in the ecosystem, outside in the community or are linked to parallel developments in the supply chain.

EIA serves at least three main purposes:

- Inform a consenting or licensing decision;
- Identify mitigation measures which will minimise any possible environmental impacts;
- Provide the framework for the follow up.

EIA was developed for other sectors but has been adapted for Aquaculture. The requirements and implementation of aquaculture EIAs varies from country to country, depending on the technology and systems applied (intensive vs. extensive, large-scale or small-scale, fed vs non-fed etc.). EIA is most commonly applied to intensive marine finfish and shrimp culture and to

proposals for large-scale shrimp farm developments. However, some countries do not apply EIA to aquaculture development, but rather rely on a range of alternative environmental management procedures. Full EIA is not applied to the bulk of global aquaculture production. This is because most production is small-scale, and in many cases is a traditional activity. It is important to recognize that many small scale aquaculture activities could have significant impacts on the recipient water body and therefore some form of strategic environmental impact assessment is needed to cover such added effects. Properly implemented EIA seeks to:

- Concentrate on significant environmental impacts, taking into account the issues that matter;
- Adjust to the realities, issues and circumstances of the project proposals based on the best available information;
- Provide appropriate opportunities to inform and involve the interested and affected parties, and their inputs and concerns should be addressed explicitly;
- Be a clear, easily understood and open process with public consultation;
- Apply the “best doable” methodologies to address the impacts and issues being investigated;
- Identify measures for impact mitigation that work and can be implemented;
- Be carried out with rigour, fairness, objectivity and impartiality;
- Impose the minimum cost burden on proponents consistent with meeting process requirements and objectives;
- Provide the framework for assessment of impacts during operation and adjustment to minimize these when appropriate.

Self-Assessment Exercise

1. Mention the purpose of undertaking EIA in fisheries.
2. Explain why full EIA is not implemented on aquaculture and why do you think it will be necessary to implement the EIA?

4.0 CONCLUSION

In this unit, you have learned what is meant by FEIA. You should now be able to define and explain the concept and its nature in simple words. You have also appreciated the purpose of EIA with respect to compatibility of project, plan or programme with the receiving environment.

5.0 SUMMARY

This unit explained the need for consideration for the environment in the development of fisheries and aquaculture projects, plans, and programmes. You have learnt the basic definition and purpose of EIA. You can now discuss and mention some features of an EIA. You can now also state the primary purpose of an EIA.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of Fisheries Environmental Impact Assessment and the scope, try to answer the following questions.

1. What is Fisheries Environmental Impact Assessment?

2. Briefly discuss the scope of environmental impact assessment
3. Mention 3 purposes of undertaking an EIA.

7.0 REFERENCE/ FURTHER READINGS

Ahmad, Y. J. and Sammy, G. K. (1985). Guidelines to EIA in Developing countries. Hodder and Stoughton Ltd, London, Britain.

White, P., Soto, D., and Isyagi, N. (2013). Report of the Training Manual on Environmental Impact Assessment and Environmental Management for aquaculture Managers.
Report/Rapport:

UNIT 2 THE HISTORY OF ENVIRONMENTAL IMPACT ASSESSMENT

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- 2.0 Objectives
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 - 3.1 History of Environmental Impact Assessment
 - 3.2 Trend of Environmental Impact Assessment
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

This unit will discuss the history of Fisheries Environmental Impact Assessment (FEIA). You will be acquainted with the history and be able to understand the trends of Environmental Impact Assessment (EIA).

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Discuss the history of Environmental Impact Assessment (EIA).
- Discuss the trend of Fisheries Environmental Impact Assessment (FEIA).

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 History of Environmental Impact Assessment

Rapid industrialization and urbanization in western countries were causing rapid loss of natural resources before the First World War. This continued to the period after the Second World War giving rise to concerns for pollution, quality of life and environmental stress. In the early 60s, investors and people realized that the projects they were undertaking were affecting the environment, resources, raw materials and people. As a result of this, pressure groups formed with the aim of getting a tool that can be used to safeguard the environment in any development. The United States of America (USA) decided to respond to these issues and established a National Environmental Policy Act in 1970 to consider its goal in terms of environmental protection. The USA became the first country to enact legislation on EIA. This was the first time that EIA became the official tool to be used to protect the environment. The United Nations Conference on the Environment in Stockholm in 1972 and subsequent conventions formalized EIA. At present, all developed countries have environmental laws whereas most of the

developing countries are still adopting it (Lee, 1995). Multilateral and bilateral lenders have included EIA requirements in their project eligibility criteria (OECD, 1996).

Until recently, EIA as a new concept was not readily understood and accepted as a tool in developing countries. Developers resisted and argued that it was anti-development because laws and policies supporting it dictated that lands developments causing negative impacts should be discontinued. Concisely, EIA was considered just another bureaucratic stumbling block in the path of development. Furthermore, it was conceived as a sinister means by which industrialized nations intend to keep from breaking the vicious cycle of poverty. Finally, the experts in the developing countries were foreigners who were viewed as agents of colonization. The need for EIAs has become increasingly important and is now a statutory requirement in many developing countries.

Traditionally, the choice of new projects was primarily based on one criterion: economic viability. In the present day, a second and a third choice criteria, environmental and social impact, have become a strong yardstick, hence the triple bottom-line approach (economic, environmental and social) to project viability (Modak and Biswas, 1999). Over half the countries in the world now have formal EIA systems.

3.2 Trend of Environmental Impact Assessment

The introduction and early development began between early 1970-1975 with the mandate and foundations of EIA established in the USA, then adopted by a few other countries (e.g. Australia, Canada, New Zealand) while basic concept, procedure and methodology still apply.

This was then followed by increasing scope and sophistication in the mid-70s to early 80s where more advanced techniques (e.g. risk assessment); guidance on process implementation (e.g. screening and scoping); social impacts consideration; public inquiries and reviews drive innovations in leading countries. The practice of EIA is still limited but includes developing countries (e.g. China, Thailand and the Philippines).

Process strengthening and integration came up in the early 80s and 90s with review of EIA practice and experience; scientific and institutional frameworks of EIA; updated coordination of EIA with other processes, (e.g. project appraisal, land use planning); ecosystem-level changes and cumulative effects began to be addressed; and attention given to monitoring and other follow-up mechanisms. Many more countries have adopted EIA; the European Community and the World Bank respectively, established supra-national and international lending requirements.

Strategic and sustainability orientation began in the early 90s. To date, in this regards EIA aspects are enshrined in international agreements, laws, policy and institutional arrangements); marked increase in international training, capacity building and networking activities; development of Strategic Environmental Assessment (SEA) of policies and plans; inclusion of

sustainability concepts and criteria in EIA and SEA practice; with EIA applied in all OECD countries and large number of developing and transitional countries. (Sadler, 1996)

Self-Assessment Exercise

1. EIA was first established in which year and where?
2. Why was the EIA resisted in the developing countries initially?

4.0 CONCLUSION

In this unit, you have learned about the history of EIA. You should now be able to discuss the brief history of EIA and the developmental trend over time.

5.0 SUMMARY

This unit briefly discussed the history and early trend of the environmental impact assessment. You can now discuss the history and trend in the development of the EIA.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of the history of environmental impact assessment, try to answer the following questions.

1. Discuss the trends of development of the environmental impact assessment?
2. Briefly discuss the history of environmental impact assessment

7.0 REFERENCES/ FURTHER READINGS

Ahmad, Y. J. and Sammy, G. K. (1985). Guidelines to EIA in Developing countries. Hodder and Stoughton Ltd., London, Britain.

International Association for Impact Assessment (IAIA) (1999) Principles of Environmental Impact Assessment Best Practice, UK. 20pp

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Modak, P. and Biswas, A. K. (1999). Conducting Environmental Impact Assessment for Developing Countries, United Nations University press.

White, P., Soto, D., and Isyagi, N. (2013). Report of the Training Manual on Environmental Impact Assessment and Environmental Management for aquaculture Managers Report.

UNIT 3 THE PARTICIPANTS AND THEIR ROLES IN ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 The participants in Environmental Impact Assessment
 - 3.2 The roles of participants in Environmental Impact Assessment
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

Previous units have looked at the meaning of EIA and its purposes. This unit seeks to describe the roles of a team of cross-functional professional which are usually involved in the conduct of an EIA process; however, this may vary depending on institutional frame work and the role of EIA in planning and decision making.

2.0 OBJECTIVES

At the end of this unit you should be able to know:

- The various participants in Environmental Impact Assessment
- The roles of the participants in Environmental Impact Assessment

3.0 MAIN CONTENTS

Please read this simple text and pay attention to the simple explanation given after

3.1 The participants in Environmental Impact Assessment

The participants involved in an EIA include the following:

1. The project proponent or developer
2. Decision- Maker
3. Expert adviser
4. Environmental consultant(s)
5. The public and media
6. Reviewer

3.2 The roles of participants in environmental impact assessment

The following represents the participants and the role each play in the EIA process:

The project proponent/developer: This is either a private or government agency that intends to undertake a project and wants a decision on its proposed activities.

Decision-Maker: This is government agency which could be local, State or Federal government who are designated official to oversee the activities of the proponents

Expert adviser: This may be private or government with the special knowledge of project activities or EIA with the responsibility of advising the proponent.

Environmental Consultant(s): These are the person(s) or agency responsible to carry out the EIA

The public and Media: These are special groups e.g. NGOs, Environmental Agencies, labour unions who have roles in identifying specific environmental concerns.

The Reviewer: These are agency responsible for reviewing environmental impact summary such as Impact Assessment Agency IAA.

Self-Assessment Exercise

1. Mention any 4 participants in EIA process and state their various roles

4.0 Conclusion

In this unit, you have learned about the participants and their roles in an EIA. You should now be able to discuss the brief roles of various participants in an EIA.

5.0 SUMMARY

This unit briefly discussed the roles of various participants in an environmental impact assessment process. You can now discuss the various roles of the participants in the development of the EIA process.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the roles of various participants in an environmental impact assessment, try to answer the following questions:

1. Identify any five participants in the environmental impact assessment process and state their individual functions?

7.0 REFERENCES/ FURTHER READINGS

- Modak, P., and Biswas, A. K., (1999). Conducting Environmental Impact Assessment for Developing Countries, United Nations University Press.
- White, P., Soto, D., and Isyagi, N. (2013). Report of the Training Manual on Environmental Impact Assessment and Environmental Management for aquaculture Managers. Report/Rapport:

MODULE 3 LEGAL AND INSTITUTIONAL FRAMEWORK FOR FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT

UNIT 1 The legal and institutional framework for Fisheries Environmental Impact Assessment

UNIT 2 The main features of the legal and institutional frame work of an EIA

UNIT 3 Process and procedural framework in an EIA

UNIT 1 THE LEGAL AND INSTITUTIONAL FRAMEWORK FOR FISHERIES ENVIRONMENTAL IMPACT ASSESSMENT

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 The legal and institutional framework for Fisheries Environmental Impact Assessment

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

This unit will discuss the legal and institutional framework for Fisheries Environmental Impact Assessment. The provision for FEIA may be made through legislation, administrative order or policy directive. Many countries have now enacted some type of EIA legislation, which generally can be classified into either a comprehensive or enabling statute. Clear and specific legal provision is internationally accepted as the most appropriate basis for EIA. In many cases, regulations (mandatory rules) and procedural guidance (advisory interpretation) elaborate how EIA legislation is to be implemented.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Discuss the legal and institutional framework for Fisheries Environmental Impact Assessment.

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 The legal and institutional framework for Fisheries Environmental Impact Assessment

Nigeria has developed its legislative framework for environmental management over a number of years, and was one of the first African countries to give significant emphasis to specialized environmental institutions. The Federal Environment Protection Agency (FEPA) Act of 1988 and the principle of environmental protection was enshrined in the Federal Constitution of 1999 which contains provisions for the protection and improvement of the environment and safeguarding of water, air and land, forest and wildlife of Nigeria (Makinde and Ayanbule, 2006). According to Anago (2002) Nigeria's National Policy on Environment sets out the following goals:

- Securing the quality of the environment for health and wellbeing;
- Conserving and using the environment and natural resources for the benefit of present and future generations;
- Restoring, maintaining and enhancing the ecosystem and ecological processes essential for the functioning of the biosphere to preserve biological diversity and the principle of optimum sustainable yield in the use of natural resources;
- Promoting public awareness on the link between development and the environment;
- Co-operation with countries and international organizations in the protection of the environment.

The Federal Government of Nigeria has promulgated different laws and regulations to safeguard the environment. These include the following of relevance to EIA in aquaculture, although there are overlapping statutes and guidelines which apply mainly to the oil industry:

1. Federal Environmental Protection Agency Act of 1988 (FEPA Act). The following Regulations were made pursuant to the FEPA Act:
 - (i) National Environmental Protection (Effluent Limitation) Regulations;
 - (ii) National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations; and
 - (iii) National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations.
2. Environmental Impact Assessment Act of 1992 (EIA Act).
3. Harmful Wastes (Special Criminal Provisions etc.) Act of 1988 (Harmful Wastes Act).
4. The National Environmental Standards and Regulations Enforcement Agency Act 2007 (NESREA Act).

The different States within Nigeria also have the power to make laws to protect the environment within their respective jurisdictions; e.g. the Environmental Protection Agency Law Cap 47 and Cap L23 Laws of AkwaIbom and Lagos States of Nigeria, 2000 and 2003.

Nigeria has extensive statutory instruments in place with which to implement and enforce many aspects of environmental management. The key statute in this regard is the Environmental Impact Assessment Act of 1992 (FAO, 2006-2008 NALO Nigeria).

Nigeria is also committed to a wide range of international environmental and biodiversity agreements that could affect the way choices are made for aquaculture development in general, as well as the particular aspects of an EIA (Anago, 2002).

Self-Assessment Exercise

1. What are the laws promulgated by the Nigerian government to safe guard the environment?

4.0 CONCLUSION

In this unit, you have learned about the legal and institutional framework for Fisheries Environmental Impact Assessment and also the main features of the EIA legal and institutional frameworks.

5.0 SUMMARY

This unit has highlighted the various legal and institutional frameworks for Fisheries Environmental Impact Assessment.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the benefits of EIA, try to answer the following questions.

1. Mention any 5 goals set out by the Nigerian National Policy on environment to safe guard the environment.
2. State the laws promulgated by the Nigerian government to safeguard the environment.

7.0 REFERENCES/FURTHER READINGS

1. Federal Ministry of Environment website [http://www.nigeria-law/org/Environmental Impact Assessment Act No. 86 1992.htm](http://www.nigeria-law/org/Environmental%20Impact%20Assessment%20Act%20No.%2086%201992.htm).
2. Department of Petroleum Resources (1991). Environmental Guidelines and Standards (EGAS) of 1991.
3. Echefu, N. and E. Akpofure (1998). Environmental Impact Assessment in Nigeria: regulatory background and procedural framework. UNEP EIA Training Manual, Law, policy and institutional arrangements. Case Study 7. Case studies from developing countries. p. 63-74.

UNIT 2 THE MAIN FEATURES OF THE LEGAL AND INSTITUTIONAL FRAMEWORK OF AN EIA

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 The main features of the EIA legal and institutional frameworks

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

This unit will discuss the main features of the EIA legal and institutional frameworks for Fisheries Environmental Impact Assessment. Institutional arrangements involve the establishment and empowerment of a designated authority to require EIA and administer the process in any country. Generally, the institutional arrangements are very similar in various countries but with peculiarities depending on the country and the stage of their EIA requirement and development. This unit will familiarize you with the institutional arrangements for EIA in Nigeria.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- The main features of the EIA legal and institutional frameworks

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 The main features of the EIA legal and institutional frameworks

The main features of EIA legal framework are:

Basic responsibilities

The proponent normally carries out the EIA in accordance with directions given by the competent authority (usually the agency which makes the final decision on the proposal but in certain cases an independent commission or panel). An environment agency (or in some cases a specialized EIA body) oversees the process and reviews the study with inputs from other government departments. Usually, EIA studies are carried out by an interdisciplinary team,

which is appointed specifically for the task and has an appropriate range of scientific, economic and social expertise.

Scope of application

Some EIA systems are relatively limited in coverage; e.g. limited to projects of a specified type and size. Others have a broader responsibility, for example encompassing all proposals that have potentially significant adverse environmental impacts. In addition, the environment is defined broadly; for example to include social, health and cumulative effects. The inclusion of these broader aspects of EIA is now accepted as the international standard of good practice and their coverage should be mandatory.

Consideration of alternatives

Consideration of alternatives is mandatory in some EIA systems but discretionary in others. Different provision is made for including a range of alternatives to a proposal, and there are different requirements for the evaluation and comparison of alternatives as part of the EIA process. At a minimum, explicit provision should be made for the consideration of the main or a reasonable alternative to a proposal (including no action). This component is a critical determinant of effective EIA.

Public involvement

This is a cornerstone of EIA and most systems include provision for public involvement. However, there are marked differences in specific requirements; e.g. regarding access to information, procedures for notification and involvement of the public, the stage of the EIA process at which these are applied and third party rights of appeal. At a minimum, public involvement should take account of the concerns of those directly affected by a proposal.

3.2 INSTITUTIONAL /ADMINISTRATIVE FRAMEWORK

Institutionally, the application of the EIA statute has been the responsibility of the Federal Environmental Protection Agency (FEPA) over most of the time since 1992. This was an independent agency, attached to the Federal Presidency. Recent institutional changes have occurred which moved the agency into the Federal Ministry of the Environment, and in 2007 FEPA was abolished and replaced by the National Environmental Standards and Regulations Enforcement Agency (NESREA). The NESREA Act repealed the FEPA Act and established the NESREA in its place (Nigeria, 2007).

The new agency has responsibility to enforce compliance with environmental standards, regulations, rules, laws, policies and guidelines. NESREA is also responsible for the protection and development of the environment, biodiversity conservation, sustainable development and the development of environmental technology (Awogbade *et al.*, 2008). Under the Act, FEPA published various sectoral EIA procedures together with EIA Procedural Guidelines in 1995. The liability of aquaculture projects to EIA is determined by the priorities given to different categories of development activity by the Nigerian government.

The Act defines three categories High Risk, Low Risk and No Significant Impact. In theory fisheries and aquaculture can be interpreted as being in either category.

Self-Assessment Exercise

1. When was NESREA established?
2. What are the three categories defined by the EIA Act in Fisheries EIA, in which of the categories is aquaculture placed?

4.0 CONCLUSION

In this unit, you have learned about institutional and administrative framework for Fisheries Environmental Impact Assessment.

5.0 SUMMARY

This unit has highlighted the institutional framework for Fisheries Environmental Impact Assessment.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the institutional and administrative framework, try to answer the following questions:

1. What are the responsibilities of NESREA as an environmental protection agency?

7.0 REFERENCES/FURTHER READINGS

1. Federal Ministry of Environment website [http://www.nigeria-law.org/Environmental Impact Assessment Act No. 86 1992.htm](http://www.nigeria-law.org/Environmental%20Impact%20Assessment%20Act%20No.%2086%201992.htm).
2. Department of Petroleum Resources (1991). Environmental Guidelines and Standards (EGAS) of 1991.
3. Echefu, N. and E. Akpofure (1998). Environmental Impact Assessment in Nigeria: regulatory background and procedural framework. UNEP EIA Training Manual, Law, policy and institutional arrangements. Case Study 7. Case studies from developing countries. P.63 74.

UNIT 3 THE PROCESS AND PROCEDURAL FRAMEWORK IN FEIA

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
- 3.1 The process and procedural frameworks of the FEIA

Self-Assessment Exercise

- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

This unit will discuss the process and procedural frameworks of Fisheries Environmental Impact Assessment. The EIA Decree No. 86 of 1992 is an additional document with the same aim of protecting the Nigerian environment. It is particularly directed at regulating the industrialization process with due regard to the environment. By this Decree, no industrial plan/development/activity falling under the FEPA's mandatory list can be executed without prior consideration of the environmental consequences of such a proposed action, in the form of an environmental impact assessment.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to understand:

- The process and procedural frameworks of an FEIA

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

PROCESS AND PROCEDURAL FRAMEWORK IN FEIA

The fisheries EIA process is the various stages the project undergoes from proposal to approval for implementation, resulting in the issuing of an Environmental Impact Statement (EIS) and certificate. The term contains several stages, which includes the following:

- I. Determining if FEPA environmental laws/regulations have been initiated
- II. Screening a project for potential environmental effects;
- III. Scoping to determine the spatial and temporary dimension of environmental effects;
- IV. Carrying out detailed base line studies to determine the environmental condition prior to project implementation;
- V. Preparing a detailed assessment report;
- VI. Carrying out a panel review of the EIA report if this is necessary; and

VII. Obtaining authorization/approval, where appropriate.

For FEPA, the Director General/Chief Executive was the responsible officer. Presently, the Minister for the Environment, upon recommendation by the Ministry's Department of EIA is the sole authorizing officer. The National Procedural Guidelines show practical steps from project conception to commissioning. The steps are:

- a. project proposal
- b. initial environmental examination (IEE)/preliminary assessment
- c. screening
- d. scoping
- e. EIA study
- f. Review
- g. decision making
- h. Monitoring, and
- i. Auditing.

The proponent initiates the process in writing to the responsible officer. A notification form is duly completed with all relevant information on the proposal. Using the criteria of:

- i. magnitude-probable severity of each potential impact;
- ii. prevalence/extent and scope-extent to which the impact may eventually extend;
- iii. duration and frequency-is activity short term, long term or intermittent;
- iv. risks-probability of serious environmental effects;
- v. significance/importance-value attached to a specified area; and
- vi. mitigation-measures available for associated and potential environmental effects

The department for EIA does the internal screening (IEE) to determine the project's category under the mandatory study activities list. Where no adverse environmental effects exist, the EIA is issued an approval and the project commences with appropriate mitigation and monitoring measures. Otherwise within ten working days of receipt of the proposal, the screening report is sent to the proponent for scoping and the preparation of Terms of Reference (ToR).

The ToR embodies the scope of the proposed EIA study and this is examined and the scope of the study defined accordingly by the department for EIA. The proponent carries out the EIA study, generally using consultants, and the draft EIA report in 15 copies is submitted to the department. For this draft report to be complete it must record, as an annex, the results of public participation in a public forum. Within 15 working days of the receipt of the draft report, the department for EIA concludes evaluation of the draft and determination of the review method that it communicates to the proponent in writing. The four methods are:

- In-house review.
- Panel review (sitting may be public).
- Public review – an elaborate display of the report for 21 working days with appropriate display venues chosen by the Department for EIA for the convenience of the public stakeholders and communities. Through newspaper advertisement the Department invites interested groups/persons to participate.
- Mediation.

Within one month of the review process, review comments are furnished to the proponent. In this review stage, the public participates only when the Department's chosen method of review guarantees its participation. The final EIA report, addressing and proffering answers to

review comments, is submitted within three to six months to the Department. At this early stage, and on mutual agreement, the Department and the proponent set conditions establishing a follow-up program (mitigation, compliance and monitoring plan), a monitoring strategy and audit procedure.

A 'no project' decision is communicated to the proponent if the review comments are adverse and/or improperly addressed in the final report and the final EIA report is unsatisfactory. The recommendation making body is the Ministry's department for EIA. Within one month of the receipt of a final EIA report which has been adjudged as satisfactory, the Department obtains the Minister's approval and issues the Environmental Impact Statement (EIS) followed by certification by the responsible officer complete with appropriate conditions and with a validity period. Armed with the certificate, the proponent commences the project subject to the conditions and specifications contained in the EIS. If the project is not commissioned within the validity period on the certificate a revised and updated EIA report becomes necessary for revalidation. The progress of the project is monitored to ensure compliance with all conditions and mitigation measures in the Environmental Monitoring Plan. Environmental audit, assessing both positive and negative impacts of the project, is also carried out periodically.

Self-Assessment Exercise

1. Highlight any five relevant criteria required by the proponent to write a proposal to the Federal Ministry of Environment?
2. The National Procedural Guidelines show practical steps from project conception to commissioning. Mention these steps.

4.0 CONCLUSION

In this unit, you have learned about the process and procedural framework for Fisheries Environmental Impact Assessment.

5.0 SUMMARY

This unit has highlighted the process and procedural framework for Fisheries Environmental Impact Assessment, the relevant criteria required by the proponent in writing a proposal for an EIA and the practical guidelines from the conception to the commissioning of the project.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the institutional and administrative framework, try to answer the following questions:

1. Highlight any five relevant criteria required by the proponent to write a proposal to the Federal Ministry of Environment?
2. Mention the various stages the project will undergo from proposal to implementation in EIA.

7.0 REFERENCES/FURTHER READINGS

1. Federal Ministry of Environment website [http://www.nigeria-law.org/Environmental Impact Assessment Act No. 86 1992.htm](http://www.nigeria-law.org/Environmental%20Impact%20Assessment%20Act%20No.%2086%201992.htm).

2. Department of Petroleum Resources (1991). Environmental Guidelines and Standards (EGAS) of 1991.
3. Echefu, N. and E. Akpofure (1998). Environmental Impact Assessment in Nigeria: regulatory background and procedural framework. UNEP EIA Training Manual, Law, policy and institutional arrangements. Case Study 7. Case studies from developing countries. P.63-74.

MODULE 4 KEY ELEMENTS OF ENVIRONMENTAL IMPACT ASSESSMENT

UNIT 1 Scoping

UNIT 2 Screening

UNIT 3 Identifying and evaluating project alternatives

UNIT 4 Mitigating Measures

UNIT 5 EIA report writing and certification

UNIT 1 SCOPING

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Definition of Scoping

3.2 Importance of Scoping

3.3 Major steps involved in Scoping

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

This unit will define scoping and highlight the importance of scoping in EIA. You will be acquainted with the major activities involved in scoping and be able to identify different techniques in scoping.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Define the term Scoping
- Identify the importance of scoping in EIA
- Identify major steps involved in scoping

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 Definition of Scoping.

Scoping is also known as the early planning phase of an EIA. It determines the environmental impacts of the proposed project; brings into consideration alternative means of carrying out the project, including technical and technological alternatives; identifies the potential effects on the sustainability of resources in the project area and clarifies the mitigation measures that will be analyzed in the EIA process. Scoping should specify the project and its alternatives in sufficient detail to identify potential direct and indirect impacts, including cumulative effects. Furthermore, scoping should set realistic temporal, spatial and jurisdictional boundaries for the assessment, and specify key environmental criteria to be addressed and methods to be used in the assessment.

3.2 Importance of Scoping

- It enables integrated project planning.
- It helps to identify key issues and environmental concerns in the early project planning stage, and minimizes requests for further information at a late stage in the EIA process.
- It helps in confining the study to an essential set of important environmental parameters thereby allowing judicious allocation of time and money for assessing relevant environmental issues.
- It reduces the possibility of a deficient EIA.
- Identifies key issues to be addressed; and helps to identify additional project options;
- It is a legal requirement.
- Identifies mitigation measures; and may assist the screening process.

3.3 Steps in a Scoping Process

The following are steps in scoping process and they include:

1. Identify the activities of the proposed project and the location
2. Identify key environmental issues of concern that are likely to be triggered by the project
3. Identify available information source
4. Identify baseline data requirement, it is recommended to carry out a detailed primary data collection program only if secondary data do not provide adequate information required for impact analysis.
5. Compile information on environmental setting at the site
6. Consider scenario for impact analysis
7. Prepare a term of reference (ToR) for the EIA study.

Self-Assessment Exercise

1. What is scoping in an EIA exercise
2. Identify 5 importance of scoping in an EIA exercise

4.0 CONCLUSION

In this unit, you have learned about scoping in EIA, the importance of scoping and the various steps involved in scoping. You should now be able to explain how scoping exercise is carried out in an EIA.

5.0 SUMMARY

This unit has discussed scoping and identifies the importance in an EIA as well as the techniques involved in scoping.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of scoping in an EIA, try to answer the following questions:

1. Mention any 5 benefits of undertaking a scoping exercise for an EIA before embarking on an aquaculture projects.
2. Briefly discuss the steps involved in Scoping

7.0 REFERENCES/FURTHER READINGS

1. Sadler, B. (1996). *Environmental Assessment in a Changing World: Evaluating Practice to Improve Performance*. International Study of the Effectiveness of Environmental Assessment. Final report. Canadian Environmental Assessment Agency and International Association for Impact Assessment, Ottawa, Canada.
2. UN Conference on Environment and Development (UNCED)(1992). *Agenda 21*. UNCED, New York.
3. United Nations Economic Commission for Europe (UNECE) (1998). *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*. United Nations, Geneva.
Available from: <http://www.unece.org/env/pp/documents/cep43e.pdf>.

UNIT 2 SCREENING

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Definition of Screening
 - 3.2 Importance of Screening
 - 3.3 Types of Screening
 - 3.4 The specific methods used in Screening
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

The decision as to whether EIA is required, and at what level of detail, is often formalized in a process referred to as Screening. This is meant to ensure that EIA is only applied where necessary, and is usually based on some form of environmental risk assessment. In many countries, aquaculture development requires EIA if it meets certain thresholds in terms of area, production or water use. In Asia for example, these thresholds typically vary between 10 and 50 ha, although there may be differing provision for pond and cage farms, and for freshwater or marine. In most cases the practical effect of this is to include most significant intensive marine finfish developments, and to exclude small-scale and extensive production, shellfish farming, and most farming in freshwaters. The EU guidance (European Commission, 2001) notes the need to apply screening with care so as not to undermine smaller and more routine projects.

Some countries have lists of activities for which differing approaches are required. Thus Egypt has three lists: black, white and grey lists. Aquaculture is in the grey list, meaning that EIA may be required. However, if it is to be sited in an environmentally-sensitive area, it becomes a “black list” activity and automatically requires full EIA. In Nigeria EIA is required if close to coral reef, mangrove swamps or wetlands, or if it involves significant drainage and irrigation. This unit will define Screening and highlight the importance of Screening in EIA. You will be acquainted with the major activities involved in Screening and be able to identify different techniques in Screening.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Define the term Screening

- Identify the importance of screening in EIA
- Types of Screening
- Identify the specific methods used in screening

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 Definition of Screening

Screening and preliminary assessment

This is the first stage of the EIA process which helps to separate types of projects that need further clearance, from those which are not likely to cause serious environmental problems. This separation can be achieved by considering criteria such as size or location of project, comparing proposals (projects requiring EIAs and those which do not) and predicting general impacts. If the project is not automatically cleared, the developer may be asked to undertake a preliminary assessment. Some research and expert advice will be required at this stage to:

- identify key impacts,
- predict and describe extent of impacts, and
- evaluate their importance to decision-makers.

This may be used as an early warning signal of questions such as suitability of location for project and serious environmental issues which may arise. If a full EIA is required by the competent Authority in the country, they will also formulate the technical guidelines or Terms of Reference (ToRs).

The conduct of screening thus involves making a preliminary determination of the expected impact of a proposal on the environment and of its relative significance. A certain level of basic information about the proposal and its location is required for this purpose. The time taken to complete the screening process will depend upon the type of proposal, the environmental setting and the degree of experience or understanding of its potential effects. Most proposals can be screened very quickly (in an hour or less) but some will take longer and a few will require an extended screening or initial assessment. Similarly, the majority of proposals may have few or no impacts and will be screened out of the EIA process. A smaller number of proposals will require further assessment. Only a limited number of proposals, usually major projects, will warrant a full EIA because they are known or considered to have potentially significant adverse impacts on the environment; for example, on human health and safety, rare or endangered species, protected areas, fragile or valued ecosystems, biological diversity, air and water quality, or the lifestyle and livelihood of local communities. The screening process can have one of four outcomes:

- no further level of EIA is required;
- a full and comprehensive EIA is required;

- a more limited EIA is required (often called preliminary or initial assessment); or
- further study is necessary to determine the level of EIA required (often called an initial environmental evaluation or examination [IEE]).

3.2 Importance of screening

Screening establishes the basis for scoping, which identifies the key impacts to be studied and establishes Terms of Reference (ToR) for an EIA. Many EIA systems have formal Screening and Scoping procedures. In some cases, however, these terms may be used differently or applied at the discretion of the proponent.

3.3 Types of Screening

Initial environmental evaluation or examination (IEE)

An IEE is required in some EIA scheme when the potential environmental impacts of a proposal cannot be established by the application of standard screening procedure. Typically, an IEE is a relatively low-cost analysis that makes use of already available information. It is carried out using EIA procedures and methods, which are scaled to purpose. For example, key issues can be identified by a rapid scoping exercise, based on consultation with local people and agencies. A site or area visit should take place to survey the current situation and obtain baseline information. Simple methods, such as a checklist or matrix, are used in impact identification and often focus on appropriate mitigation measures. Depending on its findings, the IEE report can be used either as a scoping document when a proposal is referred to a full EIA or to support environmentally sound planning and design when a proposal does not require further review.

An IEE is a preliminary EIA study that:

- describes the proposal and the environmental setting;
- considers alternatives to improve the environmental benefits;
- addresses the concerns of the local community;
- identifies the potential environmental effects;
- identifies measures to mitigate adverse impacts; and
- describes, as necessary, environmental monitoring and management plans.

Environmental Overview

The Environmental Overview was developed by UNDP as an in-house tool to integrate environmental considerations into its proposed activities at either the project or strategic level. The Environmental Overview is not equivalent to a preliminary EIA study. However, it is based on similar steps, involves key stakeholders and leads toward the same ends. An Environmental Overview can be completed quickly through the interaction of a mix of specialists. It follows a structured sequence of questions, draws primarily on the more important data sources and conforms to strict guidelines on the organization and length of the final document.

The Environmental Overview is used by UNDP in the stage of formulating proposals. It leads to early identification of the following:

- the environmental and social baseline conditions of the target area;
- the major environmental and socio-economic impacts and opportunities associated with the implementation of the proposal;

- the modifications or alternatives to the draft proposal; and
- the measures that are necessary to address the environmental impacts and issues.

The purpose of the overview is to incorporate environmental objectives into the design of the proposal, rather than produce a report. Recently, the Environmental Overview has been promoted as an effective tool for programme design, and, specifically, one that is designed to overcome the checklist mentality of EIA. So far, however, the Environmental Overview has been subject to little testing outside of UNDP initiatives.

Class screening

A class screening may be undertaken for any type of project or activity where there is a reasonably sound knowledge of the environmental effects and the mitigation measures are well established. This approach is used in certain countries, notably Canada (at both federal and provincial levels), and aspects are also evident in the EIA procedure of the World Bank. It is applicable to small-scale projects that are routine and replicable, such as dredging, installation of culverts and realignments to an existing road.

A class screening will document the accumulated information on their likely impacts and standard mitigation practices. This report then serves as a model in the conduct of future screening of other projects of the same type. It does not relieve a proponent or competent authority of its responsibility for screening and, where necessary, of factoring additional information on site-specific and cumulative effects into a class assessment report or preparing a separate document if a project does not meet all of the previously agreed requirements for mitigation. However, in such cases, class assessment can greatly simplify and streamline the screening process.

3.4 Specific methods used in screening

The specific methods used for screening exercise in an EIA include the following:

- legal (or policy) definition of proposals to which EIA does or does not apply;
- inclusion list of projects (with or without thresholds) for which an EIA is automatically required; exclusion list of activities which do not require EIA because they are insignificant or are exempted by law (e.g. national security or emergency activities); and
- criteria for case-by-case screening of proposals to identify those requiring an EIA because of their potentially significant environmental effects.

Self-Assessment Exercise

1. Define the term screening in an EIA exercise
2. Mention any four outcome of a Screening exercise
3. Identify the 3 methods used in Screening

4.0 CONCLUSION

In this unit, you have learned that screening is that part of the EIA process which determines whether an EIA is required for a particular project. You should now be able to identify the various types of screening methods to adopt.

5.0 SUMMARY

This unit defines screening and highlights the importance of screening in EIA. You were also acquainted with the major activities involved in screening exercise and can now be able to identify different techniques in screening.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of screening, try to answer the following questions:

1. Why is screening important in an EIA before embarking on an aquaculture projects.
2. Discuss the various types of screening exercise in an EIA

7.0 REFERENCES/FURTHER READINGS

1. DFID (1999). Environmental Guide. London: Department for International Development (DFID).
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3. Wood, C.M. (1995). Environmental Impact Assessment, A comparative review. Longman Group Ltd, London, UK, pp. 337.

UNIT 3 IDENTIFYING AND EVALUATING PROJECT ALTERNATIVES

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Identification and selection of alternatives

3.2 Evaluation and presentation of alternatives

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

One of the techniques in conducting EIA is ability to explore and examine different alternative options that can be applied to ensure that the project, if implemented can proceed in an environmentally sound manner. In this unit you will learn about how to identify and select alternative for an EIA as well as evaluation and presentation of the project alternatives.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to understand:

- Identification and selection of alternatives:
- Evaluation and presentation of alternatives

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 IDENTIFICATION AND SELECTION OF ALTERNATIVES

The identification and consideration of alternatives is one of the key aspects of impact assessment. This step provides the means by which the action's assumptions, goals and needs may be examined. A range of alternatives provide the basis for a comparative assessment of the different means to achieve the stated objective of the development action. In an assessment of alternatives, decision makers should be provided with the information on how each option compares in respect to the relative costs and benefits for each impact. One common difference between large-scale projects and small-scale projects is that large-scale projects usually pose a full range of alternatives. If any alternative is proposed by a small-scale project, it is the 'no action' alternative. The identification and selection of alternatives usually involves three questions:

- How should alternatives be identified'?
- What is the reasonable range of alternatives to be considered?
- What level of examination should be applied to each alternative?

3.2 EVALUATION AND PRESENTATION OF ALTERNATIVES

The consideration of alternatives to a proposal is a requirement of many EIA systems. It lies at the heart of the EIA process and methodology. During the scoping process, alternatives to a proposal can be generated or refined, either directly or by reference to the key issues identified. A comparison of alternatives will help to determine the best method of achieving project objectives while minimizing environmental impacts or, more creatively, indicate the most environmentally friendly or best practicable environmental option.

Often, however, the consideration of alternatives is a superficial rather than a meaningful exercise. This is particularly true of private sector proposals, where the requirement to analyze alternatives is less than for comparable public sector proposals. It is also true of all proposals that are submitted to EIA when planning is nearly complete and the components and location are fixed already. This practice is becoming less and less acceptable as EIA matures and as sustainability issues and cumulative effects take on greater importance.

The consideration of alternatives is likely to be most useful when the EIA is undertaken early in the project cycle. Depending on timing, the type and range of alternatives open to consideration might include:

- demand alternatives (e.g. using energy more efficiently rather than building more generating capacity);
- input or supply alternatives (e.g. where a mix of energy sources permits);
- activity alternatives (e.g. providing public transport rather than increasing road capacity);
- location alternatives, either for the entire proposal or for components (e.g. the location of a dam and/or irrigation channels);
- process alternatives (e.g. use of waste-minimizing or energy-efficient technology); and
- scheduling alternatives (e.g. for airport and transport operations, reservoir drawdown).

The World Bank recommends a tiered approach to the analysis of alternatives, which broadly corresponds to the headings above. It is designed to bring environmental considerations into all stages of development planning. This approach, ideally, begins with Strategic Environmental Assessment (SEA) to analyze broad alternatives within a sector (such as power) or for a region. When this framework is not in place, as is frequently the case, the key alternatives are examined as part of a project-specific EIA. Certain alternatives will have been foreclosed by earlier stages of decision-making. However, some alternatives may remain open and a preliminary scan can help to identify them. Normally, a retroactive analysis of alternatives is not considered to be

good practice unless circumstances warrant; for example a proposal may be well advanced but have a potentially significant impact on the environment or involve the relocation of large numbers of people.

The development of feasible alternatives, to meet the overall objectives of the proposal calls for certain types of information and knowledge. During this process, for example, reference may be made to: available technology, policy objectives, social attitudes, environmental and site constraints and project economics. It is important to make sure that the alternatives chosen for comparison with a proposal can be implemented cost-effectively. Stakeholder input can be helpful in the generation and analysis of viable alternatives, but this needs to be used selectively.

The range of alternatives selected for analysis routinely includes the “No action” alternative. The relative impact of each alternative is compared against the baseline environment (with versus without project) to select a preferred alternative, including taking no action (which may not correspond exactly to maintaining baseline conditions because changes result from other actions).

In many EIA studies, the preferred alternative will be the most closely examined, and may be the only alternative to be considered in detail. However, it is not uncommon for several alternatives to be investigated at the same level of detail during the impact analysis and evaluation phases, prior to selecting from among them.

Self-Assessment Exercise

1. Mention any 5 (five) types and range of alternatives open for consideration in an EIA process.
2. The identification and selection of alternatives usually involves three questions what are these questions?

4.0 CONCLUSION

In this unit, you have learned about the identification and consideration of alternatives in impact assessment as well as the evaluation and presentation of an alternative in an EIA process.

5.0 SUMMARY

This unit has highlighted the processes involved in identification and consideration of alternatives in impact assessment as well as the evaluation and presentation of an alternative in an EIA process. You can now clearly discuss the identification and consideration of alternatives in impact assessment as well as the evaluation and presentation of an alternative in an EIA process.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the identification and consideration of alternatives in impact assessment as well as the evaluation and presentation of an alternative in an EIA process. Try to answer the following questions:

1. Mention the 3 (three) questions usually asked in the identification and selection of alternatives in impact assessment.
2. What are the five (5) alternatives open for consideration in an EIA process?

7.0 REFERENCES/FURTHER READINGS

Boyle, J. (1998). Cultural influences on implementing EIA: insights from Thailand, Indonesia and Malaysia, *EIA Review*, 18(2) 95-116.

Campbell, K. (1993). The Future of EIA in Developing Countries, discussion paper presented at the UNEP Consultative Meeting, Paris, 27-28 October 1993.

UNIT 4 MITIGATING MEASURES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Definition of mitigation
 - 3.2 Objectives of mitigation
 - 3.3 Elements of mitigation
 - 3.4 Methods used in mitigation
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Besides the identification of impacts and their sources, the basic premise of an EIA is the ability to provide mitigation measures for the identified potential impacts. This unit therefore seeks to introduce you to the techniques of impact mitigation, and to the range of methods for mitigating and managing environmental impacts of projects.

2.0 OBJECTIVES

At the end of the unit you should be able to understand

- The meaning of mitigation
- The objectives of mitigation
- The elements of mitigation
- Methods used in mitigation

3.0 MAIN CONTENTS

Please read the following and the contents there in

3.1 DEFINITION OF MITIGATION

Mitigation is the action taken to avoid or lessen the adverse effects of an activity of a proposed project. Mitigation may address ecological, economic or socio-cultural effects. Project planning and implementation may include mitigation in several ways:

- Plan the location or timing of an activity to avoid affecting specific resources or sensitive areas.
- Include mitigation measures in project design to reduce the impact. For example, pipelines can be designed to allow for passage of migratory animals.

- Undertake a mitigation program concurrently with a project to alleviate impacts. A program for inhibiting thawing of permafrost would be an example.
- Undertake a mitigation program after an activity to restore an affected resource or area or to replace lost or damaged resources in the affected area or elsewhere. For example, damaged freshwater fisheries can be mitigated by stocking of fish or restoring river habitats.

Mitigation is a critical component of the EIA process. It aims to prevent adverse impacts from happening and to keep those that do occur within an acceptable level. Opportunities for impact mitigation will occur throughout the project cycle.

3.2 OBJECTIVES OF MITIGATION

The objectives of mitigation are to:

- find better alternatives and ways of doing things;
- enhance the environmental and social benefits of a proposal;
- avoid, minimise or remedy adverse impacts; and
- ensure that residual adverse impacts are kept within acceptable levels.

Hence it is important that, early links be established between the EIA and project design teams to identify mitigation opportunities and incorporate them into consideration of alternatives and design options. In practice, mitigation is emphasized in the EIA process once the extent of the potential impact of a proposal is reasonably well understood. This typically takes place following impact identification and prediction, and recommended measures for mitigation will be an important part of the EIA report. Usually, these measures will be incorporated into the terms and conditions of project approval and implemented during the impact management stage of the EIA process.

3.3 ELEMENTS OF MITIGATION

The elements of mitigation are structured into an order of actions:

- To avoid adverse impacts as far as possible by use of preventative measures;
- To minimise or reduce adverse impacts to as low as practicable levels;
- To remedy or compensate for adverse residual impacts, which are unavoidable and cannot be reduced further.

Key principles for the application of mitigation measures consistent with the above framework include the following:

- give preference to avoid and prevent measures;
- consider feasible alternatives to the proposal and identify the best practicable environmental option;
- identify customized measures to minimise each of the main impacts predicted;
- ensure they are appropriate, environmentally sound and cost-effective; and
- use compensation or remedial measures as a last resort.

EIA good practice in mitigation requires a relevant technical understanding of the issues and the measures that work in the circumstances.

3.4 METHODS OF MITIGATION

Mitigation can be carried out by either:

Structural measures: such as design or location changes, engineering modifications and landscape or site treatment. These are measures well established for certain types of projects, such as dams, roads, and oil and gas exploration and development. In some cases, industry codes of good practice will be available. However, these need to be applied with regard to the nature and severity of environmental impacts; for example taking account of nearby protected areas, patterns of wildlife mitigation or constraints imposed by natural hazards. Other projects involving new technology may require non-standardized or even untried measures to mitigate the adverse impacts. These need to be given special attention during impact management.

Non-structural measures: such as economic incentives, legal, institutional and policy instruments, provision of community services and training and capacity building. These measures can be applied to reinforce or supplement structural measures or to address specific impacts. For example, many types of social, community and health impacts are addressed by non-structural measures and their use is becoming broader and frequent. Generally, as project design becomes more detailed, the opportunity for impact avoidance narrow and the concern is to minimise and compensate for unavoidable impacts. However, these distinctions are not rigid and opportunities for creative mitigation should be sought at all stages of EIA and project planning.

Step One: Impact avoidance. This step is most effective when applied at an early stage of project planning. It can be achieved by:

- not undertaking certain projects or elements that could result in adverse impacts;
- avoiding areas that are environmentally sensitive; and
- putting in place preventative measures to stop adverse impacts from occurring, for example, release of water from a reservoir to maintain a fisheries regime.

Step Two: Impact minimization. This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

- scaling down or relocating the proposal;
- redesigning elements of the project; and
- taking supplementary measures to manage the impacts

Step Three: Impact compensation. This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

- rehabilitation of the affected site or environment, for example, by habitat enhancement and restocking fish;
- restoration of the affected site or environment to its previous state or better, as typically required for mine sites, forestry roads and seismic lines; and
- replacement of the same resource values at another location, for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.

Self-Assessment Exercise

Answer True or False

1. Mitigation is the action taken to avoid or lessen the adverse effects of an activity of a proposed project. (True/ False)
2. Mitigation aims to prevent adverse impacts from happening and to keep those that do occur within an acceptable level. (True/ False)
3. Opportunities for impact mitigation will occur throughout the project cycle. (True/ False)

4.0 CONCLUSION

In this unit, you have learned about the techniques of impact mitigation, and the range of methods for mitigating and managing environmental impacts of projects. You should now be able to identify the various elements and methods used in mitigation.

5.0 SUMMARY

This unit highlighted the meaning of mitigation as the practical phase of the EIA process. It is concerned with preventing or remedying the adverse impacts and optimizing the environmental and social benefits of a proposal.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of mitigation, try to answer the following questions:

1. What is mitigation?
2. Briefly discuss the structural and non-structural measures applied in mitigation.
3. State any four (4) objectives of mitigation in an EIA process.

7.0 REFERENCES/FURTHER READINGS

Canter, L. and Sadler, B. (1997). Methods for Effective EIA Practice A Tool Kit Approach, Environment and Ground Water Institute, University of Oklahoma, Norman OK, USA.

Green, K. and Raphael, A. (2002). Third Environmental Assessment Review (FY 96-00), Environment Department, World Bank, Washington DC.

Hilden, M. (1997). Evaluation of the significance of environmental impacts, In:Report of the EIAProcess Strengthening Workshop, Environment Protection Agency, Canberra.

UNIT 5 EIA REPORT WRITING AND CERTIFICATION

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Contents of EIA reports writing

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

The EIA Report writing should be concise and limited to significant environmental issues.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Write the EIA report in the right sequence.

3.0 MAIN CONTENTS

Please carefully read the following sequence of EIA report writing format.

3.1 CONTENTS OF EIA REPORT WRITING

The FEIA report should conform to Federal Ministry of Environment reporting format which is summarized as follows:

- Chapter One – Introduction - Background information, Administrative and Legal framework, Terms of reference, Declaration
- Chapter Two – Project Justification - Project background, project objectives, need for the project, value of the project, envisaged sustainability, alternatives considered (including no project alternative), development options considered, site selection.
- Chapter Three - Project Description, - Type of project, scope, location, material input/output and by-products, waste generation, technical layout and process, operation and maintenance, schedule.
- Chapter Four – Description of the biophysical, socio-economic and health environment, - Study approach, literature review, baseline data acquisition method, geographical location, field data, climatic conditions, air quality, noise level, vegetation cover characteristics, land use and landscape pattern, ecologically sensitive areas, terrestrial fauna and wildlife, soil studies, aquatic

studies including hydrobiology and fisheries, ground water resources, social, economic and health studies, prediction of changes in the baseline condition without the development in place. Consultation: Identification of stakeholders, consultation with regulators, consultation with communities, community concerns and observations, and use of Participatory Rural Appraisal (PRA) methodology.

- Chapter Five - Associated and Potential Environmental Impacts, - Scoping, impact prediction methodology, impacts of project activities (site clearing, dredging, construction, transportation, excavation, sand filling, etc.), impacts on resource utilization, process impacts (operation), short term/long term impacts, reversible/irreversible impacts, cumulative impacts, direct/indirect impacts, adverse/beneficial impacts, risk assessment, social impacts, health impacts, etc.

- Chapter Six-Mitigation Measures and Alternatives-Control technology, compensation, alternative site, alternative access routes or locations, and compliance with health and safety hazards requirements.

- Chapter Seven - Environmental Management and Community Development Plans,-Guidelines for specific project activities, emergency response procedures, mitigation plan, costing of alternatives and budget requirements, monitoring programme (scope, parameters, frequency, location, methodology), auditing and inspection procedures, waste handling procedures , and roles and responsibilities.

- Chapter Eight - Conclusions and Recommendations

Self-Assessment Exercise

1. What are the contents of Chapter One and Two of the EIA report writing?

4.0 CONCLUSION

In this unit, you have learned about the various steps in which the final Fisheries EIA report writing in various chapters can be written. You should now be able to identify the various contents and how to sequentially report them in each chapter in simple words. You have also been able to know that FEIA report should be written in accordance to the rules of the Federal Ministry of Environment or the competent authority for approval.

5.0 SUMMARY

This unit has highlighted the various chapters and the contents of each chapter when writing a final FEIA report. You can now clearly write an EIA report following the write sequence in any fisheries and aquaculture development project.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the benefits of EIA, try to answer the following questions:

1. Discuss the basic components of the first and second chapters of the EIA report writing

7.0 REFERENCES/FURTHER READINGS

Petts, J. (ed.) (1999). *Handbook of Environmental Impact Assessment* (2 Volumes), Blackwell Scientific, Oxford, UK.

Sadler, B. (1996). *Environmental Assessment in a Changing World* (Final Report of the International Study of the Effectiveness of Environmental Assessment), Canadian Environmental Assessment Agency and International Association for Impact Assessment, Ottawa.

Sadler, B. and McCabe, M. (eds.) (2002). *UNEP EIA Training Resource Manual*, UNEP, Geneva.

MODULE 5 THE BASIC GUIDELINES AND PROCEDURES OF EIA

- UNIT 1** Preliminary activities
- UNIT 2** Impact identification
- UNIT 3** Impact evaluation
- UNIT 4** Baseline study
- UNIT 5** Documentation, decision making and Post audits

UNIT 1 PRELIMINARY ACTIVITIES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
- 3.1 Preliminary Activities in an EIA
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

Certain proposals may be subject to an extended screening or initial assessment (also called a preliminary EIA). Such an approach can be used when the requirement for EIA could not be reasonably determined by the application of the screening procedures described earlier; for example when a proposal involves use of a new technology or is located in a near natural or frontier area or involves discharges into a water body that may exceed health or environmental standards. Often, this process, itself, may be sufficient to complete the requirement for EIA established by a particular country. In this case, a screening report should describe the results and identify any mitigation measures or actions that need to be taken. In this unit you will be acquainted with need for preliminary studies for an EIA in a proposed project.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Understand the need for preliminary studies in EIA.
- The information that may be required for a preliminary EIA study

3.0 MAIN CONTENTS

Please carefully read the following sequence of EIA report writing format.

3.2 PRELIMINARY ACTIVITIES IN AN EIA

Preliminary activities include the defining of the Terms of Reference (ToR) for the project and also the determining of the personnel required for the assessment. A brief summary of the project is extremely helpful at this stage. The summary should be clear and explicit and should list exactly what the development project entails. The existing laws and regulations that are applicable to the project should also be reviewed along with the regulating authorities.

The same procedure must be adopted for technical, financial and managerial resources available for the project. It is very important to identify the team that will carry out the EIA procedure along with a Coordinator and the Decision maker who will read the final report. Members of the EIA team usually have the specialized professional expertise of different areas related to the various aspects of the project. Thus, an EIA team might include an engineer, an economist, a physical geographer and a sociologist, with a senior government official to play the role of a coordinator. All these need to be identified and declared before the actual EIA process may begin. The composition of the EIA team varies from country to country. In the United States, the developer carries out the functions of both the EIA preparation and the decision-making with the Environmental Protection Agency (EPA) involved only in reviewing and monitoring the project. In other countries, a government organization may actually carry out the EIA process. Some countries may not have the appropriate means and facilities for this purpose, and therefore, in such cases, a team of consultants may be employed to help with the assessment. This often turns out to be an expensive proposition. A team partly of local government personnel and partly of consultants might serve the purpose very well in such cases. Similarly, the decision-maker may be a person, a committee, or a number of organizations, etc.

Information that may be required for a preliminary EIA study includes:

- A description of the proposal;
- Applicable policies, plans and regulations, including environmental standards and objectives;
- The characteristics of the environment, including land use, significant resources, critical ecological functions, pollution and emission levels etc.;
- The potential impacts of the proposal and their likely significance; the degree of public concern and interest about the proposal.

Self-Assessment Exercise

1. What are the preliminary activities required in a Fisheries EIA?

4.0 CONCLUSION

In this unit, you have learned about the preliminary activities in an EIA and also the information required in the process. You should now be able to discuss the purpose of the preliminary studies.

5.0 SUMMARY

The need for a preliminary assessment in an EIA was discussed.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the preliminary assessment in an EIA, try to answer the following questions.

1. What is a preliminary assessment in an EIA?
2. Highlight the information that may be required when carrying out a preliminary assessment in an EIA

7.0 REFERENCES/FURTHER READINGS

Glasson, J., Therivel, R. and Chadwick, A., (1994). Introduction to environmental impact assessment, principles and procedures, process, practice and prospects, UCL Press, London.

World Bank Environmental Department, (1991). Environmental Assessment Sourcebook, 2 volumes, World Bank Technical Papers No. 139 and 140, Washington, D.C.

UNIT 2 IMPACT IDENTIFICATION

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Identify the methods of impact identification
 - 3.2 Advantages and disadvantages of impact identification methods
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

A logical and systematic approach needs to be taken to impact identification. The aim is to take account of all of the important environmental/project impacts and interactions, making sure that indirect and cumulative effects, which may be potentially significant, are not inadvertently omitted. This process begins during screening and continues through scoping, which identifies the key issues and classifies them into impact categories for further study.

2.0 OBJECTIVES

At the end of this unit you should be able to identify:

- The methods used in impact identification
- Advantages and disadvantages of impact identification methods

3.0 MAIN CONTENTS

3.1 THE METHODS USED IN IMPACT IDENTIFICATION

The most common formal methods used for impact identification are:

- checklists;
- matrices;
- networks;
- overlays and geographic information systems (GIS);
- expert systems; and
- professional judgment

CHECKLISTS

Checklists interpret the environmental features or factors that need to be addressed when identifying the impacts of projects and activities. They can vary in complexity and purpose, from

a simple checklist to a structured methodology or system that also assigns significance by scaling and weighting the impacts (such as the Battelle Environmental Evaluation System). Both simple and descriptive checklists can be improved and adapted to suit local conditions as experience with their use is gained. Checklists provide a systematized means of identifying impacts. They also have been developed for application to particular types of projects and categories of impacts (such as dams or road building). Sectorial checklists often are useful when proponents specialize in one particular area of development. However, checklists are not as effective in identifying higher order impacts or the inter-relationships between impacts, and therefore, when using them, consider whether impacts other than those listed may be important.

MATRICES

A matrix is a grid-like table that is used to identify the interaction between project activities, which are displayed along one axis, and environmental characteristics, which are displayed along the other axis. Using the table, environment-activity interactions can be noted in the appropriate cells intersecting points in the grid. Entries are made in the cells to highlight impact severity or other features related to the nature of the impact, for instance:

- ticks or symbols can identify impact type (such as direct, indirect, cumulative) pictorially;
- numbers or a range of dot sizes can indicate scale; or
- descriptive comments can be made.

An early, well-known example is the Leopold interaction matrix. This is a comprehensive matrix, which has 88 environmental characteristics along the top axis and 100 project actions in the left hand column. Potential impacts are marked with a diagonal line in the appropriate cell and a numerical value can be assigned to indicate their magnitude and importance. Use of the Leopold matrix is less common than its adaptation to develop other, less complex matrices.

NETWORKS

Networks illustrate the cause-effect relationship of project activities and environmental characteristics. They are, therefore, particularly useful in identifying and depicting secondary impacts (indirect, cumulative, etc). Simplified networks, used in conjunction with other methods, help to ensure that important second-order impacts are not omitted from the investigation. More detailed networks are visually complicated, time-consuming and difficult to produce unless a computer programme is used for the task. However, they can be a useful aid for establishing ‘impact hypotheses’ and other structured science-based approaches to EIA.

OVERLAYS AND GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Overlays can be used to map impacts spatially and display them pictorially. The original overlay technique, popularized by McHarg, is an environmental suitability analysis in which data on topographic features, ecological values and resource constraints are mapped onto individual transparencies and then aggregated into a composite representation of potential impacts. This approach is useful for comparing site and planning alternatives, for routing linear developments

to avoid environmentally sensitive areas and for landscape and habitat zoning at the regional level. Disadvantages of this approach relate to the lack of precision in differentiating the likelihood and magnitude of impacts and relating them to project actions. Also, the overlay process can become cumbersome in its original form. A modern version of the overlay method is the computer-based geographical information system (GIS). In simple terms, a GIS stores, retrieves, manipulates and displays environmental data in a spatial format. A set of maps or overlays of a given area provide different types of information and scales of resolution. The use of GIS for EIA purposes is not as widespread as commonly imagined. The main drawbacks are the lack of appropriate data and the expense of creating a usable system. However, the potential application of GIS to EIA is widely acknowledged and its use is expected to increase in the future, particularly to address cumulative effects.

EXPERT SYSTEMS

Expert or knowledge-based systems are used to assist diagnosis, problem solving and decision-making. A number of such computerized systems have been developed for use in EIA, primarily at the early stages of the process. For example, screening and scoping procedures have been automated using a number of rules and a data system, which encodes expert knowledge and judgment. The user has to answer a series of questions that have been systematically developed to identify impacts and determine their 'mitigability' and significance. From the answer given to each question, the expert system moves to the next appropriate question. Like GIS systems, expert systems are an information-intensive, high investment method of analysis. As such, they are limited in their current use and application, especially by many developing countries. However, they also have the potential to be a powerful aid to systematic EIA in the future, not least because they can provide an efficient means of impact identification. Expert systems also can be updated by building in experience gained over time.

PROFESSIONAL JUDGEMENT

Although not strictly a formal method, professional judgment or expert opinion is widely used in EIA. Knowledge and expertise gained from previous EIA work can be used to systematically develop data banks, technical manuals and expert systems, thereby assisting in future projects. The successful application of the formal methods of impact identification described above rests upon professional experience and judgment. Expert opinion and professional judgment can be focused by the use of interactive methods, such as Delphi techniques and science workshops, to identify impacts, model cause-effect relationships and establish impact hypotheses. No single impact identification methodology is suited to use on all occasions; nor is it necessary to use only one method at a time. Combining the useful aspects of two different techniques may be the best approach to take. As noted above, EIA checklists, matrices and networks can have added value when applied by experts in an interactive process. Note, also that some of the methods perform other functions that may be useful to the EIA team (e.g. the Battelle checklist can be used to determine significance).

The choice of methodology can depend upon a number of factors including:

- the type and size of the proposal;
- the type of alternatives being considered;
- the nature of the likely impacts;
- the availability of impact identification methods;
- the experience of the EIA team with their use; and
- the resources available – cost, information, time and personnel.

3.2 ADVANTAGE AND DISADVANTAGES OF IMPACT ASSESSMENT METHODS

METHODS	ADVANTAGES	DISADVANTAGES
Check list	<ul style="list-style-type: none"> • easy to understand and use • good for site selection and priority setting • simple ranking and Weighting 	<ul style="list-style-type: none"> • do not distinguish between direct and indirect impacts <ul style="list-style-type: none"> • do not link action and impact • the process of incorporating values can be controversial
Matrices	<ul style="list-style-type: none"> • link action to impact • good method for displaying EIA results 	<ul style="list-style-type: none"> • difficult to distinguish direct and indirect impacts • have potential for double-counting of impacts
Networks	<ul style="list-style-type: none"> • link action to impact • useful in simplified form for checking for second order impacts • handles direct and indirect impacts 	<ul style="list-style-type: none"> • can become very complex if used beyond simplified version
Overlays	<ul style="list-style-type: none"> • easy to understand • focus and display spatial impacts • good siting tool 	<ul style="list-style-type: none"> • can be cumbersome • poorly suited to address impact duration or probability
GIS and computer expert systems	<ul style="list-style-type: none"> • excellent for impact identification and spatial analysis • good for ‘experimenting’ 	<ul style="list-style-type: none"> • heavy reliance on knowledge and data • often complex and expensive

Self-Assessment Exercise

1. State any 5 (five) common methods used in environmental impact identification

2. Mention the advantage and disadvantages of GIS and computer expert system in impact identification

4.0 CONCLUSION

In this unit, you have learned about the various methods used in impact identification and have seen the advantages and disadvantages of the various methods discussed.

5.0 SUMMARY

This unit has highlighted the different methods of impact identification with relevant examples and also the advantages and disadvantages of the various methods.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of impact identification and the methods used, try to answer the following questions:

1. Mention any 5 methods used in impact identification and discuss any of the two methods.
2. State two the advantages and disadvantages each, of the matrix and network methods used in impact identification.

7.0 REFERENCES/FURTHER READINGS

Wood, C. (1999). Comparative evaluation of environmental impact assessment systems, in Petts, J. (ed.) *Handbook of Environmental Impact Assessment*, Volume 2 (pp.10-34), Blackwell Scientific, Oxford, UK.

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UNIT 3 EVALUATION OF IMPACT SIGNIFICANCE

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 What is evaluation of impact significance?
 - 3.2 The key elements of assessing the significance of impacts
 - 3.3 Guiding principles for assessing impact significance
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

Once the impacts have been analyzed, they are evaluated to determine their significance. As noted earlier, the attribution of significance begins early, during screening and scoping, and extends throughout the EIA process. There is a gradually ‘narrowing cone of resolution’ on questions of impact significance as more complete information becomes available. Following impact identification and prediction, impact evaluation is the formal stage at which a test of significance is made.

2.0 OBJECTIVES

At the end of this unit you should be able to know:

- What is meant by evaluation of impact significance?
- The key elements of assessing the significance of impacts
- Guiding principles for assessing impact significance.

3.0 MAIN CONTENTS

3.1 WHAT IS EVALUATION OF IMPACT SIGNIFICANCE?

The purpose of impact evaluation is to assign relative significance to predicted impacts associated with the project, and to determine the order in which impacts are to be avoided, mitigated or compensated. The significance of impacts may be determined during many phases of an assessment; however, determination usually occurs during impact prediction. Consideration of impact significance could affect the scoping exercise, and monitoring results could lead to a reevaluation of impact significance. Decisions on impact significance should be presented clearly, and in the case of disagreement, the different points of view on significance should be presented.

3.2 THE KEY ELEMENTS FOR ASSESSING THE SIGNIFICANCE OF IMPACTS

Decisions on significance should be based on existing standards, discussions, judgment and agreement. These decisions should take into account the characteristics of the impact such as the number of affected persons, and the magnitude, extent, duration and reversibility of the impact. The applied methods and the criteria used for ranking significance should be clearly presented. The key elements for assessing the significance of impacts include:

- level of public concern;
- scientific and professional judgment;
- measure of disturbance to ecological systems;
- impacts on social values and quality of life;
- existence of environmental standards, that is, international, national and local agreements; and
- availability of mitigation practice and technology to ameliorate impacts.

3.3 GUIDING PRINCIPLES FOR DETERMINING IMPACT SIGNIFICANCE

The guiding principles for the determination of the significance of impact include:

- The use of procedure and guidance established by the jurisdiction;
- The adaptation of other relevant criteria or identified points of reference from comparable cases;
- To assign significance in a rational, defensible way;
- To be consistent in the comparison of alternatives; and
- To document the reasons for the judgments made.

A test of significance can be applied by asking three questions:

- Are there residual environmental impacts?
- If yes, are these likely to be significant or not?
- If yes, are these significant effects likely to occur e.g. are the probability high, moderate or low?

Significance criteria

Criteria to evaluate whether or not adverse impacts are significant include:

- Environmental loss and deterioration;
- Social impacts resulting directly or indirectly from environmental change;
- Non-conformity with environmental standards, objectives and guidelines; and
- Likelihood and acceptability of risk;

Criteria to evaluate adverse impacts on natural resources, ecological functions or designated areas include:

- Reductions in species diversity;

- Depletion or fragmentation on plant and animal habitat;
- Loss of threatened, rare or endangered species;
- Impairment of ecological integrity, resilience or health e.g.
 - Disruption of food chains;
 - Decline in species population;
 - Alterations in predator-prey relationships.

Criteria to evaluate the significance of adverse social impacts that result from biophysical changes include:

- Threats to human health and safety e.g. from release of persistent and/or toxic chemicals;
- Decline in commercially valuable or locally important species or resources e.g. fish, forests and farmland;
- Loss of areas or environmental components that have cultural, recreational or aesthetic value;
- Displacement of people e.g. by dams and reservoirs;
- Disruption of communities by influx of a workforce e.g. during project construction; and
- Pressures on services, transportation and infrastructure.

Environmental standards, objectives and targets to evaluate significance include:

- Prescribed limits on waste/emission discharges and/or concentrations;
- Ambient air and water quality standards established by law or regulations;
- Environmental objectives and targets contained in policy and strategy; and
- Approved or statutory plans that protect areas or allocate, zone or regulate the use of land and natural resources.

Self-Assessment Exercise

1. What are the key elements for assessing the significance of impact in an EIA?
2. What are the criteria to evaluate the adverse impacts on natural resources and ecological functions of designated areas?

4.0 CONCLUSION

In this unit, you have learned about the evaluation of impact significance of a project on the environment.

5.0 SUMMARY

This unit discussed the evaluation of the impact of a developmental project on the environment and the criteria for the analysis of these impacts.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the evaluation of the impact of a developmental project on the environment, try to answer the following questions:

1. State 5 (five) guiding principles for the determination of the significance of impact in an EIA exercise.
2. Mention 5 (five) key elements for the determination of impact significance in an EIA.

7.0 REFERENCES/FURTHER READINGS

Battelle.(1978).The Selection of Projects for Environmental Impact Statement. Brussels, Belgium: Commission of the European Communities, Environmental and Consumer Protection Service.

Carpenter, R. A. and J. E. Maragos, (eds). (1989). How to Assess Environmental Impacts on Tropical Islands and Coastal Areas: South Pacific Regional Environment Programme (SPREP) Training Manual. Honolulu, Hawaii: Environment and Policy Institute, East-West Center.

UNIT 4 BASE LINE STUDIES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 What is baseline information
 - 3.2 Purpose for a base line information
 - 3.3 Data source for base line studies and methods of collection
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

Impact predictions are made against a 'baseline' established by the existing environment (or by its future state). Known as baseline studies, the collection of data on relevant biophysical, social and economic aspects provides a reference point against which the characteristics and parameters of impact related changes are analyzed and evaluated. In many cases, it is likely that the current baseline conditions will still exist when a project is implemented.

2.0 OBJECTIVES

At the end of this unit you should be able to know:

- What is base line information?
- The Purpose for base line information
- Data source for base line studies and methods of collection

3.0 MAIN CONTENTS

3.1 WHAT IS BASE LINE INFORMATION

Baseline information characterizes the conditions at the time the project is proposed. Some of the baseline information can be quantitative, for example, concentrations of heavy metals in organisms. Other baseline information is qualitative, illustrating socio-cultural conditions or general features of landscapes.

Baseline information is needed on all central issues in the assessment, taking into account a broad definition of the environment. Baseline information provides a reference for all assessments, and for the comparison of alternatives and mitigation measures. It is used as a

starting point in the prediction of likely impacts resulting from the project and of naturally occurring changes in the environment.

Baseline information is found in documents and data banks, but field studies and interviews with indigenous and other local people are often necessary. Existing scientific programs may be too general to give sufficiently detailed data for specific projects. It is important to assess the availability and quality of data and information sources so that the compilation of baseline information for a specific project can be linked to other monitoring and baseline programs, including their techniques and methodologies.

3.2 PURPOSE FOR BASE LINE INFORMATION

There are two main purposes for the collection of base line information in an environmental impact assessment studies these includes:

1. To provide a description of the status and trends of environmental factors (e.g., air pollutant concentrations) against which predicted changes can be compared and evaluated in terms of importance.
2. To provide a means of detecting actual change b monitoring once a project has been initiated.

3.3 DATA SOURCE FOR BASE LINE STUDIES AND METHODS OF COLLECTION

The data for the base line studies can be sourced from either -

- Primary sources: These data can be obtained by undertaking field visit or survey, the result of the field and laboratory data are analyzed directly using standard procedures and quality control measures. Quality assurance report is recommended to support the results.
- Secondary sources: These are data collected indirectly from published records or documents such as project documents, village profile, maps, photos, internet sources etc

The methods of data collection includes:

- General methods: Literature review, map interpretation, checklists (e.g. scaling and questionnaire checklists, matrices etc)
- Resource-based methods: Scientific instruments and techniques (inventory, species area curve, sampling techniques, PRA, RRA)

Self-Assessment Exercise

1. What are the purposes of base line studies?
2. What is a base line study in an EIA exercise?

4.0 CONCLUSION

In this unit, you have learned about the concept of the base line studies in Fisheries EIA. You should now be able to identify the purposes of the base line studies and the various methods of sourcing and collection of data for base line studies.

5.0 SUMMARY

This unit discussed the base line information, its purpose and the various sources of base line information and the methods of collection of base line data. You can now discuss the concept of base line information in a fisheries development project.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the benefits of EIA, try to answer the following questions:

1. What is base line information?
2. Differentiate between primary and secondary sources of data

7.0 REFERENCES/FURTHER READINGS

Taylor, N., Goodrich, C. and Bryan, H. (1998). Social Assessment in Porter A and Fittipaldi, J. (eds) *Environmental Methods Review: Retooling Impact Assessment for the New Century* (pp. 210-218). The Press Club, Fargo, USA.

Wathern, P. (1988). An Introductory Guide to EIA in Wathern, P. (ed) *Environmental Impact Assessment: Theory and Practice* (pp.1–28) Routledge, London.

World Bank (1991). *Environmental Assessment Sourcebook*. Volume 1. World Bank Technical Paper No. 139, Washington, D.C.

UNIT 5 DOCUMENTATION, DECISION MAKING AND POST AUDITS

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.3 Documentation, decision making and post audits

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

Documentation is usually prepared to describe the work done in the EIA. A working document is prepared to provide clearly stated and argued recommendations for immediate action. The working document should contain a list of project alternatives with comments on the environmental and economic impacts of each. This is then followed by the decision-making which commence when the working document reaches the decision maker, who will either accept one of the project alternatives, request further study or reject the proposed action altogether. The post audits are made to determine how close to reality the EIA predictions were.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- Understand the process of documentation, decision making and post audits in EIA.

3.0 MAIN CONTENTS

Please carefully read the following sequence of EIA report writing format:

3.1 DOCUMENTATION, DECISION MAKING AND POST AUDIT

DOCUMENTATION

Preparation of the final document should meet the following two objectives.

- First is to prepare a complete and detailed account of the EIA.
- The second is to prepare a brief summarized account for a decision-maker, who may not be a technical person.

The detailed document is usually called as the reference document. This document is used by the technical personnel associated with the project. It also serves as a reference for preparing future EIAs in the same geographical area, or for the same type of project in a different area. The referred part usually contains the technical calculations, graphs, and the results of field and laboratory measurements. The summarized non-technical account is usually known as the

working document, which is written clearly without using technical language to communicate to the decision-maker the findings of the EIA team. The main objective of this document is to enable the non-technical decision-makers to properly understand the findings and recommendations of the EIA team so that they can take (a) well-informed and correct decisions promptly.

DECISION MAKING

Decision-making is the process which starts after the scoping and screening exercise and other steps of EIA are completed. Usually the decision is taken by a manager or a committee, or personnel from the concerned ministry who had not been associated with the EIA during its preparation. Technical and economic aspects of project alternatives are thoroughly considered but, at times, political expediency and project feasibility control the final choice. In general, a decision-maker has three choices:

- Accepting one of the project alternatives
- Returning the EIA with a request for further study in certain specific areas
- Totally rejecting the proposed project along with alternative versions.

As pointed out by Ahmad and Sammy (1985), EIAs are expected to aid decision making; and therefore, preparation and drafting of an EIA should always be carried out with this clear objective in mind.

POST AUDITS

This type of audit (monitoring) focuses on evaluating effectiveness and efficiency, but is applied to projects in order to determine the relative success or failure of projects after completion. Success is measured in economic, social and environmental terms. This type of audit provides valuable management information regarding the environmental success of projects, the findings of the audit can be used to suggest areas of concern or where further investigative work is required. Post project audits are considered a high-level programme audit.

The post-audit can begin at once with existing EIAs on completed projects. Post audits are also conducted to determine how close to reality the EIA predictions were. The environmental success and failure of the projects could be assessed at the stage of post auditing. The successes will represent areas to be strengthened while failures will represent areas for improvement. Post project audits are in themselves a type of corrective action, as the findings of the audit will lead to continuous improvement.

Self-Assessment Exercise

1. Why is post audit required in an EIA exercise?
2. What are the two objectives that documentation in an EIA requires?
3. What is reference document in an EIA?

4.0 CONCLUSION

In this unit, you have learned about the need for documentation, decision making and the post audit in an EIA procedure.

5.0 SUMMARY

This unit explained the concept of documentation, decision making and the post audit in an EIA procedure.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the concept of documentation, decision making and the post audit in an EIA procedure, try to answer the following questions:

1. What are the two main objectives of documentation in an EIA procedure?
2. Briefly state the three choices the decision maker has to make in selecting a project after an EIA.

7.0 REFERENCE/ FURTHER READINGS

Clark, R. and Richards, D. (1999). 'Environmental Impact Assessment in North America', in Petts, J. (Eds). *Environmental Impact Assessment in Practice: Impact and Limitations*. Volume 2. *Handbook of Environmental Impact Assessment*. Blackwell Science Ltd. UK.

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MODULE 6: THE CONCEPT OF INTEGRATED ASSESSMENT.

UNIT 1 THE INTEGRATED ASSESSMENT OF ENVIRONMENTAL RESOURCES

UNIT 2 CONDUCTING AN INTEGRATED ASSESSMENT OF ENVIRONMENTAL RESOURCES

UNIT 3 THE COST OF UNDERTAKING AN EIA

UNIT 4 THE BENEFITS OF UNDERTAKING AN EIA

UNIT 1 THE INTEGRATED ASSESSMENT OF ENVIRONMENTAL RESOURCES

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 What is Integrated Environmental Impact Assessment?

3.2 Types of integrated environmental assessment

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

The concept of Integrated Environmental Assessment (IEA) as a discipline is relatively new, and some of the ideas involved are quite novel. It is also a recent term for a relatively old activity. Frequently, when trying to solve an environmental problem, the concepts of IEA arise naturally. These concepts have been reinvented and applied to assessments in an ad-hoc manner over the years. It is only relatively recently, however, that people have recognized that these ideas can be abstracted and formalized, and a rigorous discipline of IEA created. Although the name has quickly become well-established, there is still widespread uncertainty about what the discipline actually is, what its benefits and drawbacks are, what special skills are required, how and where it can be applied, and how it interacts with other activities. A small but growing band of workers have attempted to answer these questions, to develop IEA as a discipline, and to determine and propagate best practice in IEA.

2.0 OBJECTIVES

At the end of this unit you should be able to know:

- What is an integrated environmental assessment?
- Types of integrated environmental assessments

3.0 MAIN CONTENTS

Please read this simple text and pay attention to the simple explanation given after

3.1 WHAT IS INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT

Integrated Environmental Assessment (IEA) is increasingly recognized as an important technique for managing the environmental impacts of human actions. IEA may be defined as the interdisciplinary process of identification, analysis and appraisal of all the relevant natural and human processes which affect the quality of the environment and environmental resources. The objective of IEA is to facilitate the framing and implementation of optimal policies and strategies, accounting for both environmental effects and other priorities (e.g. cost constraints). Two points worth emphasizing about IEA are that it is:

- Practical-the purpose is to facilitate making a decision;
- Comprehensive-all relevant aspects which might affect the decision should be incorporated.

Integrated Environmental Assessments provide information to help decision makers to draw conclusions about the state of environmental resources and relate the findings to appropriate management issues. IEA can help managers and decision makers to:

- solve environmental planning and management problems;
- improve their understanding of environmental conditions;
- design protective or remedial strategies.

3.2 TYPES OF INTEGRATED ENVIRONMENTAL ASSESSMENT

There are two main types of integration

1. The vertical or end-to-end integration. This incorporates the whole of the causal chain of socioeconomic driving forces, pressures on the environment, the resulting state of the environment, the impacts and the required managerial responses. A good way to understand end-to-end integration is to use the Driving forces, Pressures, State, Impact and Response (DPSIR) framework. DPSIR summarizes the end-to-end cycle. It provides a framework or conceptual model that gives the assessor a high-level view of the problem. This means that it structures the assessor's thinking, helping to ensure that he/she has a good understanding of the dynamics of the system. It can help to ensure that the assessment is properly comprehensive, addressing the whole end-to-end problem. In addition, the DPSIR model could be used for high-level organization of the assessment process, perhaps with one team of assessors concentrating on one of the five steps each. DPSIR treats the environmental management process as a feedback loop controlling a cycle consisting of five stages: Driving forces, Pressures, State, Impact and Response.

- I. **Drivers** are the underlying causes which lead to environmental pressures. Examples are the human demands for agriculture, energy, industry, transport and housing. These driving forces lead to:
- II. **Pressures** on the environment, for example the exploitation of resources (land, water, minerals, fuels, etc.) and the emission of pollution. The pressures in turn affect the:
- III. **State** of the environment. This refers to the quality of the various environmental media (air, soil, water, etc.) and their consequent ability to support the demands placed on them (for example, supporting human and non-human life, supplying resources, etc.). Changes in the state may have an:
- IV. **Impact** on human health, ecosystems, biodiversity, amenity value, financial value, etc. Impact may be expressed in terms of the level of environmental harm. The task of managers or decision makers are to assess the driving forces, pressures, state and their ultimate impact. From the impact they must determine appropriate:
- V. **Responses**, in order to direct the final impact in the desired direction (a reduction in environmental harm). These responses will influence the **drivers, pressures** and **states**, thus completing a feedback loop. Examples of responses might be:
 - Introducing “green taxes” to reduce public demand (response acting on a driver);
 - Requiring industry to reduce pollution emissions (response acting on a pressure);
 - Implementing programs to clean contaminated land (response acting on a state).

The decision-maker is trying to produce a certain desired impact (typically, a reduction in environmental harm to a given level). He/she does this by applying responses that directly or indirectly influence the driving forces, pressures and state.

2. The horizontal integration is broadening the study across disciplines within a single link of the causal chain. For example, there are many types of environmental pressures: they may be broken down in terms of types of activities, economic sectors, types of emission, location and time (Parson and Fisher-Vanden 1995). Similarly, impacts include impacts on human health, ecosystems, biodiversity, amenity value, financial value and resource availability. In addition, a geographical study area will typically include several different media, such as air, groundwater, lakes, rivers, estuaries and seas; studying these makes different demands and requires different skills, and so they are often tackled separately. A horizontally integrated assessment will include many or all of the pressures, many or all of the impacts and many or all of the geographical media.

Other aspects of integration for IEA have been identified by (Rothman and Robinson, 1997).

These are, in brief:

- Consideration of feedbacks and dynamics.
- Allowing for human adaptation to environmental change and policies to address this change.
- Recognizing multiple base-lines -i.e. recognizing that the system under study will depend on other systems which may change for independent reasons.

- Integration of quantitative and qualitative dimensions.
- Integrating policy and scientific objectives in an assessment.
- Involvement and participation of the various stakeholders in the assessment process.

Clearly, integration falls on a continuous spectrum. There is no separation between integrated and non-integrated assessments, it is a relative term. All assessments require some degree of integration across disciplines, and it is usual to consider more than one link in the causal chain. On the other hand, it is often not necessary to consider the whole end-to-end chain. Similarly, horizontally integrated assessments are often able to discount some areas without in-depth study. Some IEAs are “more integrated” than others. Moreover, an IEA will normally employ both end-to-end and horizontal integration to some extent. On a higher level of integration the “grand integrated assessment” would look at the whole field of activity, for example considering the whole question of energy consumption and its impacts. This would be an enormous effort, an order of magnitude greater than the current international climate change project. Finally, the ultimate in integration would be to answer the question “How can we optimize the total impact of our lives on the environment?”

Self-Assessment Exercise

1. How can Integrated Environmental Assessments help managers and decision makers?
2. Briefly describe the horizontal integrated assessment.

4.0 CONCLUSION

In this unit, you have learned what is meant by integrated environmental assessment. You should now be able to define and explain the concept of integrated environmental assessment. You have also have been exposed to the different types of integrated environmental assessments.

5.0 SUMMARY

This unit explained the concept of integrated environmental assessment. You have learnt the basic definition and importance of integrated environmental assessment. You can now discuss and mention the types and features of an integrated environmental assessment.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of integrated environmental assessment, try to answer the following questions:

1. What is integrated environmental assessment?
2. Briefly state the importance of integrated environmental assessment.
3. Mention the 2 (two) types of integrated environmental assessment.

7.0 REFERENCE/ FURTHER READINGS

DOE (UK Department of the Environment), (1995). Preparation of Environmental Statements for planning projects that require Environmental Assessment: A good practice guide. London: HMSO.

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UNIT 2: CONDUCTING AN INTEGRATED ASSESSMENT OF ENVIRONMENTAL RESOURCES

CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 The need for planning in an Integrated Environmental Impact Assessment

3.2 The roles of the public in integrated environmental assessment

3.3 The relationship between decision-maker and scientist in Integrated Environmental Impact Assessment

Self-Assessment Exercise

4.0 Conclusion

5.0 Summary

6.0 Tutor-Marked Assignment

7.0 References/Further Readings

1.0 INTRODUCTION

This section gives some guidance on how to ensure an assessment is successful. A successful assessment will therefore, be scientifically sound (as far as reasonably practical, given unavoidable constraints on time, money and knowledge). Be publicly defensible and offer concrete advice on courses of action and their consequences. Probably the single most important factor in obtaining a satisfactory conclusion is good project management, the techniques of which are applicable to IEA projects as much as any other.

2.0 OBJECTIVES

At the end of this unit you should be able to know:

- The need for planning in an Integrated Environmental Impact Assessment
- The roles of audience and purpose in integrated environmental assessment
- The relationship between decision-maker and scientist in Integrated Environmental Impact Assessment

3.0 MAIN CONTENTS

Please read this simple text and pay attention to the simple explanation given after

3.1 The need for planning in an Integrated Environmental Impact Assessment

When it is recognized that an assessment is needed, the crucial first step is to decide what exactly the assessment is for. What decisions will it feed into? What questions must it answer? These should provide the ground-rules for the assessment. Having decided this, it is necessary to decide: Who is competent to do the assessment? How long will it take? How much will it cost? In turn, these raise further questions as to:

What level of accuracy and confidence is required? What level of sophistication (including degree of integration) is required? What information and knowledge is required? What is the availability of existing knowledge? How much “pure” research will be required to obtain necessary background information? What suitable off-the-shelf tools for modeling and/or analysis are available?

Nearly always, there will be constraints on either the amount of money available, or the time available before a decision must be made. These may necessitate compromises on the quality of assessment that can be produced.

3.2 The roles of the public in integrated environmental assessment

These are essential and need to be clearly defined at the beginning of the work so that the assessment is focused accordingly. The assessors should consider the amount of authority the audience has, a single individual’s responsibility may be limited in scope, or the audience maybe a coalition of decision or policy-makers with a wide range of responsibilities. The assessment may also be directed at the general public. The assessment should allow for the fact that other priorities or vested interests may conflict with the results of the assessment; ideally such interests should be integrated into the assessment.

Communities have a right to take part in the EIA process. Public participation allows important social and environmental problems to be identified and gain consensus on nature and adequacy of proposed mitigation measures and recommendations.

The role of the public in the EIA process includes contributing information and advice to EIA studies during scoping and public hearing process. The public also advises project developers and the competent authority on approaches to avoid/minimize or compensate for adverse environmental impacts.

3.3 The relationship between decision-maker and scientist in Integrated Environmental Impact Assessment

An important factor in the production of a successful assessment is the development of a good relationship between decision-makers and scientists, with mutual understanding and trust.

Some factors in this are:

- Scientists should concentrate on the problem at hand and remember the practical objectives, restraining their instincts to solve interesting but irrelevant problems. Timescales and reporting requirements must be followed.
- Scientists should explain to their audiences what they are doing and how they draw their conclusions, preferably in a dialogue.
- Decision-makers should use the results presented by scientists fairly and honestly. They should not be distorted or willfully misunderstood if they disagree with prior assumptions or hidden agendas. Nor should policy-makers commission research in the expectation of getting the “right” answer.
- Decision-makers must be aware that uncertainty is inevitable in any assessment. Uncertainty should not be abused by using it as an excuse for inaction. Decisions should be based on best estimates and the precautionary principle.

- Wherever possible, all key reports should be published and made available for scientific peer review (and the public).

Self-Assessment Exercise

1. Why is planning necessary in IEA?
2. Briefly discuss the relationship between decision-maker and the scientist in IEA process.

4.0 CONCLUSION

In this unit, you have learned about conducting an integrated environmental assessment and the need for planning in integrated environmental assessment. You should now be able to know the necessary steps required in conducting an integrated environmental assessment. You have also been able to know the relationship between decision-maker and the scientist in IEA process.

5.0 SUMMARY

This unit gives some guidance on how to ensure an integrated environmental assessment is successful. A successful assessment will therefore, be scientifically sound (as far as reasonably practical, given unavoidable constraints on time, money and knowledge). Be publicly defensible and offer concrete advice on courses of action and their consequences.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the meaning of integrated environmental assessment, try to answer the following questions:

1. What are the roles of the public in an EIA exercise?

7.0 REFERENCE/ FURTHER READINGS

DOE (UK Department of the Environment), (1995). Preparation of Environmental Statements for planning projects that require Environmental Assessment: A good practice guide. London: HMSO.

Dowlatabadi, H. (1995). Integrated Assessment Models of climate change: An incomplete overview. *Energy Policy*, **23**, 289. Also online at <http://hdgc.epp.cmu.edu/public/publications/abstracts/overview.html>

Dowlatabadi, H. and Morgan, M.G., (1993). "Integrated assessment of climate change". *Science*, **259**, 1813-1932.

UNIT 3: THE COST OF UNDERTAKING AN EIA

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 The cost of undertaking an EIA
 - 3.2 Types of tropical aquatic environment
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

This unit will briefly discuss the cost of undertaking an EIA exercise and highlight the estimates of the cost.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- To know how to cost an EIA process

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 THE COST OF UNDERTAKING AN EIA

It can be difficult to determine the exact costs of an EIA because major projects typically require a large number of investigations and reports, often for closely related purposes (e.g. engineering feasibility studies of hydrology and surface materials). The World Bank notes that the cost of preparing an EIA rarely exceeds one per cent of the project costs and this percentage can be reduced further if local personnel are used to do most of the work. For Bank projects, the relative cost of an EIA typically ranges from only 0.06 per cent to 0.10 per cent of total project costs. Generally speaking, the costs and time involved in EIA should decrease as experience is gained with the process and there is a better understanding of the impacts associated with different types of projects and the use of appropriate methods. Over a longer timeframe, the availability of baseline data should also increase.

Self-Assessment Exercise

1. What is the relative range of the cost of an EIA?

4.0 CONCLUSION

In this unit, you have learned about the cost of undertaking an EIA exercise. You should now be able to define the cost of an EIA.

5.0 SUMMARY

This unit has explained the cost of undertaking EIA. You have learnt how to cost the EIA activities. You can now discuss and mention how this cost can be ascribed to a project.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the benefits of an EIA, try to answer the following questions:

1. How can you cost an EIA exercise?

7.0 REFERENCES/FURTHER READINGS

Glasson, J., Therivel, R. and Chadwick, A., (1994). Introduction to environmental impact assessment, principles and procedures, process, practice and prospects, UCL Press, London.

World Bank Environmental Department, (1991) Environmental Assessment Sourcebook, 2 volumes, World Bank Technical Papers No. 139 and 140, Washington, D.C.

UNIT 4 THE BENEFITS OF UNDERTAKING AN EIA

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 The types of benefits of undertaking an EIA
 - 3.2 The benefits that can be achieved in an EIA
- Self-Assessment Exercise*
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

1.0 INTRODUCTION

This unit will briefly discuss the benefits of undertaking an EIA exercise and highlight the various benefits that can be achieved.

2.0 OBJECTIVES

On successful completion of this unit, you should be able to:

- To know the direct and indirect benefits to be achieved in an EIA program
- To understand the general benefits of an EIA.

3.0 MAIN CONTENT

Please read this simple text and pay attention to the simple explanation given after

3.1 THE CLASS OF BENEFITS OF UNDERTAKING AN EIA

The benefits of EIA can be classified into two viz:

- The direct benefits, will enhance improved design or location of a project,
- The indirect benefit will raise environmental awareness of the personnel involved in the project design.

3.2 THE BENEFITS OF UNDERTAKING AN EIA

The benefits of undertaking an EIA are as follows:

- Better environmental planning and design of a proposal. This is feasible because EIA entails an analysis of alternatives in the design and location of projects. This will invariably lead to the selection of an improved technology, which lowers waste outputs or an environmentally optimum location for a project. A well-designed project can minimize

- risks and impacts on the environment and people, and thereby avoid associated costs of remedial treatment or compensation for damage.
- Ensuring compliance with environmental standards, these helps to reduce harm to the environment and disruption to communities. It also avoids the likelihood of penalties, fines and loss of trust and credibility.
 - It saves capital and operating costs, by avoiding the undue costs of unanticipated impacts. These can escalate if environmental problems have not been considered from the start of proposal design and require mitigation later.
 - It reduces time and costs of approvals of development applications. This can be achieved if all environmental concerns have been taken into account properly before submission for project approval, and will forestall delays as a result of decision-makers asking for additional information or alterations to mitigation measures.
 - It increases project acceptance by the public, this can be achieved by an open and transparent EIA process, with provision of opportunities for public involvement of people who are most directly affected by and interested in the proposal, in an appropriate way that suits their needs.

Self-Assessment Exercise

1. Differentiate between direct and indirect benefits of undertaking an EIA exercise.

4.0 CONCLUSION

In this unit, you have learned about the various benefits of undertaking an EIA exercise before embarking on any developmental project. You should now be able to identify the various benefits and explain the concept in simple words. You have also been able to know that EIA has both direct and indirect benefits.

5.0 SUMMARY

This unit has explained the various benefits of an EIA. You have also learnt the about the direct and indirect benefits of EIA. You can now discuss and mention the benefits of undertaking an EIA before any development project.

6.0 TUTOR-MARKED ASSIGNMENT

To evaluate your understanding of the benefits of EIA, try to answer the following questions:

1. Mention any 4 benefits of undertaking an EIA before embarking on an aquaculture projects.
2. Differentiate between direct and indirect benefits of an EIA

7.0 REFERENCES/FURTHER READINGS

Glasson, J., Therivel, R. and Chadwick, A., (1994). Introduction to environmental impact assessment, principles and procedures, process, practice and prospects, UCL Press, London.

World Bank Environmental Department, (1991). Environmental Assessment Sourcebook, 2 volumes, World Bank Technical Papers No. 139 and 140, Washington, D.C.