THE IMPACT OF TOURIST DEVELOPMENTS ON THE ENVIRONMENT DURING CONSTRUCTION AND AFTER OPERATION

By

MEDHAT MAHMOUD ETMAN

Al Azhar University
Faculty of Engineering
Architectural Engineering Department

جامعة الأزهر
كليـة الهندسـة
قسم هندسـة العمارة

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تأثير المشاريع السياحية على البيئة أثناء الإنشاء وبعد التشغيل

By

MEDHAT MAHMOUD ETMAN
المقدم من
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لجنـة الإشراف والمناقشة والحكم

Professor Ezz El-Din Fahmy
Faculty of Engineering
Al-Azhar University, Cairo, Egypt

الأستاذ الدكتور/ عز الدين فهمي
الأستاذ بقسم العمارة
كلية الهندسة - جامعة الأزهر - مصر

Associate Professor Ahmed Sherif
Construction Engineering Department,
College of Architecture,
The American University in Cairo, Egypt

الأستاذ الدكتور / أحمد شـريـف
أستاذ مساعد بقسم هندسة التشييد
كليـة الهندسة
الجامعة الأمريكية بالقاهرة - مصر

Professor Andrew Wheatley
Department of Civil and Building Engineering
Loughbrough University, Loughbrough, Uk

الأستاذ الدكتور / أندرو ويتلي
قسم الهندسة - جامعة لافبـرا
لافبـرا -المملكة المتحـدة

Professor Samia Galal Saad
Head of Department Health Institute
أستاذة البيئة Alexandria University, Egypt

الأستاذة الدكتورة / سامية جلال
جامعة الإسكندرية - مصـر

Professor Muhmed Medhat Hassen Dorra
مدحت درهFaculty of Engineering
Cairo University, Cairo, Egypt

الأستاذ الدكتور/
الأستاذ بقسم العمارة
كلية الهندسة - جامعة القاهرة - مصر

To my wife and children…

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Abstract

In recent years, environment became on the top of the world agenda representing one of the global economy cornerstones, where world tourism success in the future will be dependent on the environment and tourism is one of the major industries that gears the economical development worldwide. However, concerns arise that more development would mean environmental destruction with the current on going practices. This research highlights the link between sustainability and development, as they should be two faces for one coin, pointing out that development could exist in harmonious pattern with the surrounding environment.

Sustainability relies on three major components, economical, environmental and social; these three components should be acceptable on all fronts. An emphasis is made within the research that each type of development would need its own tailored type of environmental management system.

The study is based on a theoretical phase and a practical phase, aiming to produce a framework that would assist the stakeholders within the tourism industry a better insight within the related environmental aspects. The first section is tackling three areas; Sustainability within tourism industry, Environment impact assessment along with Environmental Management Systems, and Sustainability within design, through to construction.

In order to fulfill the study aim, which is the intended framework; the latter section was structured on the grounds of accomplishing three objectives. The three objectives are; current practice assessment, factors affecting decision-making and local alternative environmental approved materials. The objectives are worked out through carrying out questionnaires and interviews that are amalgamated with the literature review outcome.

The fieldwork findings are analyzed and discussed, where an initial framework is produced, piloted, refined, and validated through conducting case studies by the Red Sea coast, Hurghada-Egypt, to provide the final framework.

The research concludes that designers when taking into account the environmental required measures embracing a cradle-to-cradle approach; successful and highly attractive aesthetically pleasing buildings could be provided. Furthermore, the concept of sustainability should be implemented through the whole project life cycle, in other words; from inception during the design process, and within the construction process up to the product demolition. Either in the adopted construction methods, materials selected, or even the waste management systems applied.

Moreover, aware far-sighted developers would obtain sustained revenues if the surrounding environment is properly used and not misused, as the host environment represents a major asset for the tourism industry.

Finally, the study prime aim is to contribute to the Egyptian economy a tool that would add to the country's GNP.

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Abbreviations

AT	Alternative tourism
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CBA	Cost-benefit analysis
CEA	Cost effectiveness analysis
CFCs	Chloroflurocarbon
CIOB	Chartered institute of Builders
CIRA	The Construction Industry Research and Information Association-
DOE	Department of environment-UK
EC	European Commission
EEAA	Egyptian Environmental Affairs Agency
EEC	European Economic Community
EES	Environmental evaluation system
ECES	Egyptian center for economical studies
EPA	Environmental Protection Agency,
EIA	Environmental impact assessment
EIS	Environmental impact statement
EMS	Environmental management system
EPA	US Environmental Protection Agency
EPM	Environmental preference method
ESs	Environmental Statements

FONSI	Finding of no significant impact
GNP	Gross National Product
GOE	Government of Egypt
HFCs	Hydrofluorocarbons
HMSO	Her Majesty's Stationary Office
IDEA	IDEA The International Design and Environment Activities
ISO	International Organization for Standardization
ITO	International Tourism Organization
IUA	Impact Assessment Unit
IUCN	International Union for Conservation of Nature and Natural Resources
LCA	Life cycle analysis
LDCs	Less developed countries
LHS	Left hand side
MDCs	More developed countries
MDF	Medium density fiberboard
MDI	Methylene bisphenyl di-isocyanate
NEPA	US National Environmental Policy Act
NGOs	Non-governmental organizations
PPP	Policy, plan or program
PUR	Extruded polystyrene and polyurethane
PVC	Polyvinyl chloride
RA	Risk assessment

RHS	Right hand side
SAGE	Strategic Advisory Group of Environment
SEA	Strategic Environmental Assessment
TDA	Tourism Development Authority
UNCED	United Nations Conference on Environment and Development
UNECE	UN Economic Commission for Europe
UNEP	United Nations Environment Program
VOC	Volatile organic compounds
WTTC	The World Travel and Tourism Council-

Glossary

Agenda 21: in 1992, at the Earth Summit a comprehensive program of action was carried out providing a blueprint for securing the sustainable future of the globe.

Alternative tourism: is usually based on small locally owned accommodation units, and reflecting local values and ways of life of the local community. It seeks to feature and protect local culture, and to involve the community in such ways that local people benefit.

Carrying capacity: the carrying capacity of an area, attraction or facility is reached when further visitors would damage the environment. It is mostly a question of both measurement and judgment of what the attraction or place can withstand without threat of damage or deterioration. Carrying capacity, whether national, regional or local, denotes how much tourism is sufficient to yield positive returns and avoid its blights.

Deconstructivism: is an anti-world view, it deconstructs or eliminates the ingredients necessary for a world view, this type of postmodern, deconstructive thought results in relativism even nihilism.

EA-Environmental assessment: describes a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead.

Ecotourism: is tourism that merge traveling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestation (both past and present) found in these areas.

EIA-environmental impact analysis: a process having the ultimate objective of providing decision-makers with an indication of the likely consequences of their actions. However, EIA is not a procedure for preventing actions with significant environmental impacts from being implemented. Rather the intention is that actions are authorized in the full knowledge of their environmental consequences.

EIA-environmental impact assessment: seeks to assess the impacts of planned activity on the environment in advance thereby allowing avoidance measures to be taken: prevention is better than cure.

EMS-Environmental management system: an EMS functions by bringing together many separate elements, placing them in a framework. The coordination of these components provides companies with a systematic way to understand and control the many elements of environmental management. Although EMS does not set performance requirements, it sets up a management system that ensures that certain activities are undertaken; at the correct times or frequency, and that those activities are documented and reviewed.

Environmental audit: Environmental auditing is a systematic, documented, periodic, and objective review by regulated entities of facility operations and practices related to meeting environmental requirements.

Environmental management program: Environmental management program in the standard relates singularly to a program for achieving objectives and targets and not to what is conventionally considered an environmental management program such as waste management program, air monitoring program, and others. The program must include "the who", "the when", and "the how".

Green buildings: structures, designed constructed operated and demolished in an environmentally enhanced manner.

Mitigation: Ecologist should provide detailed prescriptions for the proposed measures, indicate how they would actually be put in place, and purpose how they might be modified if unforeseen post-project ecological impacts manifest themselves. such measures will always rely on the data collected or provided, from a quality point of view and up-dated information as well.

Monitoring: an activity under taken to provide specific information on the characteristics and functioning of environmental and social variables in space and time. Monitoring involves the measuring and recording of physical, social and economic variables associated with development impacts.

Panacea: universal remedy.

Regenerative tourism: involve the renewal or development of infrastructures that is consistent with the sustainable development of the entire country, not just the tourism sector. By ensuring, for example, that tourist' hotels are equipped with energy saving schemes, a labor-and skill- intensive industry based on local materials and construction techniques could also be promoted.

SEA-Strategic environmental assessment: is defined as "the formalized, systematic and comprehensive process of evaluating the environmental impacts of a policy, plan or program and its alternatives, including the preparation of a written report on the findings of that evaluation in publicly accountable decision making". SEA can ensure that alternatives are adequately assessed, cumulative impacts are considered, and the public is fully consulted. Thus, decisions concerning individual projects are made in a proactive rather reactive manner.

Sustainable design: design must be the bridge between human needs, culture and ecology. Scarcity of materials in our planet made Sustainable design a necessity and a way of life for generations.

Sustainable development: *"Development, which meets the needs of the present generation without comprising the ability of future generations to meet their own needs"*, (Brundtland Report, 1987).

Sustainable tourism: Tourism which is developed and maintained in an area in such a manner and at such a scale that it remains viable over an indefinite period and does not degrade or alter the environment in which it exists to such a degree that it forbid the successful development and well being of other activities and processes.

CHAPTER ONE

INTRODUCTION

Introduction

Environment effectively embraces the conditions under which any individual or thing exits. The environment emerged as a topic for concern in 1960s; scientists have expressed concern at the ecosystem deterioration. Environmental issues are now firmly entrenched at the center of the world stage; the developed ecological understanding over the last few decades makes it clear that the needs of humans in an environment can only be achieved when the needs of other species are also met.

Among environmentalist, the term "development" raises serious questions, where it is mostly received as a tool for destruction of nature more than for human gain. This not the case, diverse sorts of development are possible. The problem is not our effect on the environment so much as it is the relationship with the environment; ecologically harmonious development could be an integral part of the environment. Surviving on a planet with billions of people requires that a shared system of values be arrived at, so that the consequences of any action are anticipated, now and for the future.

Within the current world new order, environment is used as a tool amongst others to allow-or-not-allow countries to export their products to other countries. Environment is a major asset-or an intangible product-that is highly considered within the marketing strategy for countries on the world tourism map, abusing this asset can lead to its destruction. Tourism's impact is usually considered from physical, economical and social perspectives, its effects are visible on the coast's physical environment, as well on the people's economy.

In this country, environment is a term that is widely utilized through the media and through government policies, but it is still a recent used term. Law number 4 and its executive regulations for the environment was issued on 1994, EIA became compulsory for projects on February the 18th, 1995. Due to the impact tourism has on the countries' GNP, the concept of sustainable development is at the center of the current concerns about environment and development, coastal resorts are constructed and developed to receive incoming tourists, design is a key element in providing sustainable coastal resorts, this research is addressing the relation between developments and the environment.

1.1.1 Problem identification

The proper perception for the real essence of the term environment amongst stakeholders is questioned. Hence, the problem identified by this research is the unawareness for a great deal of architects for their design impact on the environment.

Architects unawareness in tackling the environmental issue have different facets, designers or creator of the product itself, have a direct influence on the amount of damage, which will occur at each stage in the process from inception to demolition.

1.1.2 Problem definition

A coastal resort has short-term and long-term impacts; the former are those related to the developments construction phase. The latter is concerned with the design impact through the development life cycle. The misuse of the micro and the macro-environment would lead to an adverse effect on the economy. For example, coral reef, as one of the major attractions of coastal tourism that adds to the Egyptian economy, is in jeopardy; the risk is not created only due to off shore activities but, as well from on shore activities. Destruction of coral reefs would mean the extinction of thousands of marines and the elimination of a primary source of income, employment for millions of people, at which stage of the project life cycle should these impacts be addressed.

The study is focusing on the area of coastal resorts; hence, the research problem has been defined as;

The negative impacts for the tourist resorts on the environment that are not mitigated during the design and the construction phase.

1.1.3 Scope of the study

The study is focusing on an environmental management system section and not the environment in its broadest sense. The research is restricted to the coastal holidays resorts, where virgin lands are developed and transformed into tourists facilities, the study focuses on the design impact during construction and after operation within the South of Hurghada-Red Sea, Egypt. Furthermore, the study is not tackling the impact of the resort utilities on the environment; or any off shore studies, as the impact of marina works or man-made lakes.

1.1.4 Hypothesis

The hypothesis to be tested in the field research is:

The architect has a role to mitigate the tourist projects negative impact on the environment.

1.1.5 Literature review

The literature review is carried out in three areas; (i) Sustainability within tourism industry, (ii) Environment impact assessment-EIA, and (iii) Sustainability within design through to construction.

1.1.6 Aim

The aim is at the research strategic level, and it is considered to be what a researcher would like to do if resource constraints and other constraints did not exist.

The research aims at the development of a framework for stakeholders in order to accomplish environmental friendly coastal resorts, the intended tool is supposed to be an open-system based, accepting feedback, updating, moreover adjustments to fit into the project determinants.

1.1.7 Objectives

Fellows and Liu, (1997) highlighted that objectives are statements within the strategic statement of aim; they are statements at the tactical level. Objectives take the aim of the research and given constraints, translate it into coherent, operational statements. This study has three objectives;

> *Objective one* is to assess the current practices through questionnaires, *objective two* is studying the factors affecting the decision-making process through interviews, and *objective three* is investigating the available local alternative environmental approved materials.

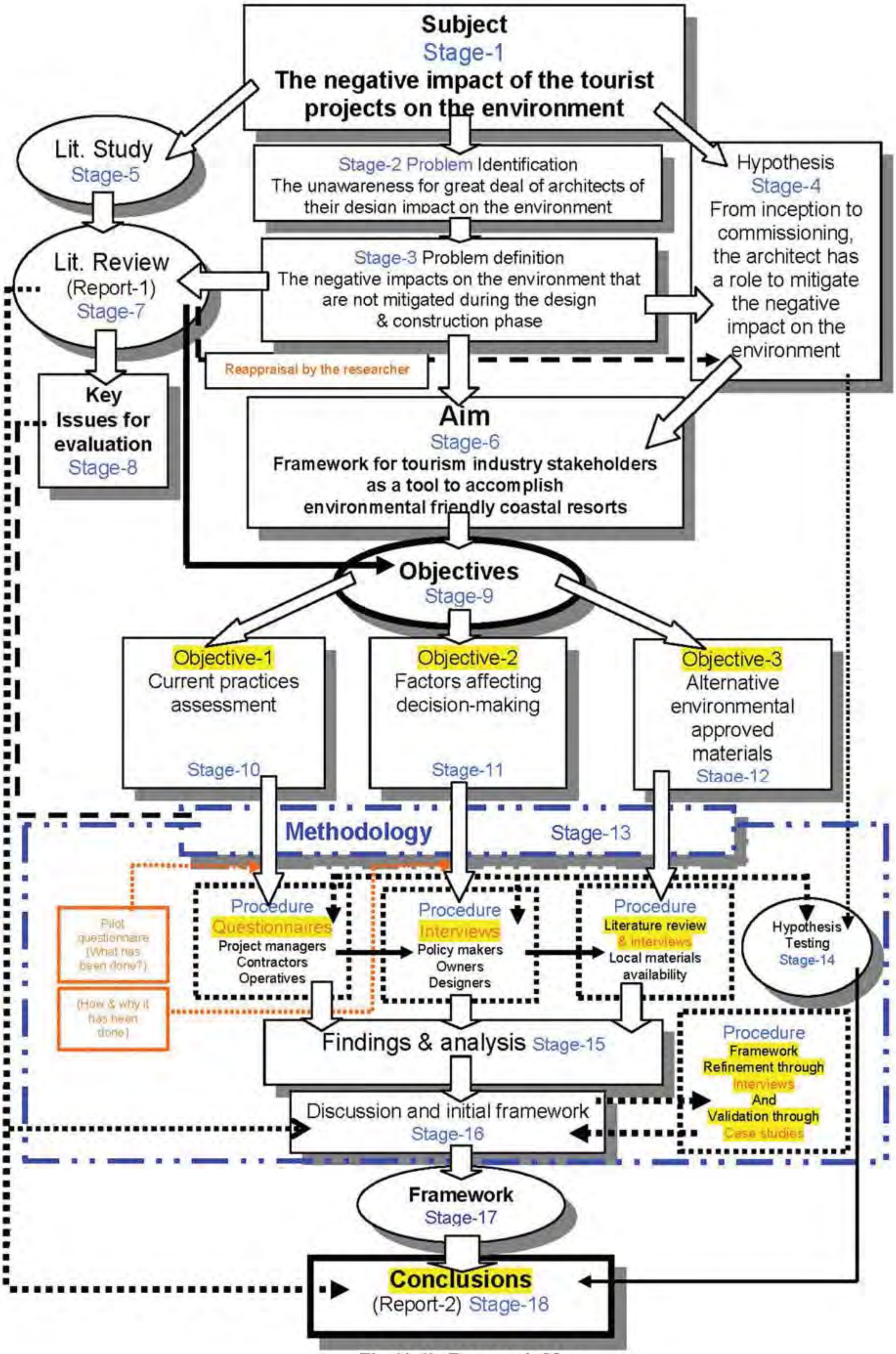


Fig (1-1)- Research Map

1.1.8 Methodology

The research methodology follows 18 stages (see fig. 1.1);

Stage-1 Subject Selection
Stage-2 Problem Identification
Stage-3 Problem Definition
Stage-4 Research Hypothesis
Stage-5 Literature Study
Stage-6 Research Aim
Stage-7 Literature Review (Report-1 handing over)
Stage-8 key Issues For Evaluation
Stage-9 Objectives Phase
Stage-10 Objective One
Stage-11 Objective Two
Stage-12 Objective Three
Stage-13 Fieldwork Methodology-Objectives Procedures
Stage-14 Hypothesis Testing-Through questionnaires & Interviews
Stage-15 Findings & Analysis
Stage-16 Discussion & Initial Framework
Stage-17 Final Framework
Stage-18 Conclusions (Report-2 handing over)

1.1.9 Guide to the dissertation

1.1.9.1 Chapter 1:Iintroduction

This chapter provides an introduction to the research subject, problem, hypothesis, aim, objectives and the intended framework.

1.1.9.2 Chapter 2: Sustainability within tourism industry

This chapter demonstrates an understanding of the *tourism phenomena* and its impacts, pointing to the market dynamic demands variations presenting the different types of tourism. Also, the chapter conveys the concept that the environment is the major resource for the tourism industry; the abuse of this resource can lead to its destruction. Further, the broader definitions of sustainable development, and the sustainable tourism guidelines are highlighted. An emphasis has been made to the closer attention made by the GOE in recent years to the environment, where it became mandatory to conduct an Environmental Impact Assessment (EIA).

1.1.9.3 Chapter 3:Environmnet impact assessment and environmental management systems

This chapter discusses the EIA techniques, the ingredients of the environmental policy are pointed out, and furthermore, the purpose of the EIA-The Bruntland Report, is demonstrated. The key elements, mitigation, monitoring, and alternatives are illustrated within this chapter. Different EMS and auditing systems are studied as useful tools in the decision-making process in order to attain sustainable developments with the tourism industry.

1.1.9.4 Chapter 4: Sustainability within design through to construction

This chapter discusses sustainable development origins, and techniques. Green architecture principals are studied in order to reach sustainable design, also, design considerations and challenges are introduced. EPM-environmental preference method is studied as an important method in materials selection. Different examples for environmental buildings worldwide are illustrated, for the lessons to be learnt from a practical point view. Sustainable construction approach is presented with an emphasis on waste management considerations.

1.1.9.5 Chapter 5: Research methodology

This chapter illustrates the research methodology, the methods by which research has been carried out. The methodology has been given careful consideration at the outset of the research so that the most suitable approaches and research methods are adopted. The research is segmented into two interactive sections, literature review and fieldwork.

1.1.9.6 Chapter 6: Research fieldwork

This chapter illustrates the conducted questionnaires, interviews, findings, analysis, and discussions for the three objectives, where the out put in addition to the studied literature where the base for the initial framework.

1.1.9.7 Chapter 7: Research framework

This chapter is dedicated to presenting the final framework, with more elaboration on each stage. Further illustration is made for the piloting stage, the refinement, and the validation for proposed framework through the carried out case studies.

1.1.9.8 Chapter 8: Conclusions, recommendations, and further research

This chapter is concluding the study, in addition to a group of recommendations that are provided based on the research two sections; the studied literature and the conducted fieldwork; also, notions are pointed for the study limitations and the proposed future research.

CHAPTER TWO

SUSTAINABILITY WITHIN TOURISM INDUSTRY

In this respect, different experiences, pros and cons have been demonstrated for the research better spectrum, with some focus on tourism in Spain, where the Spanish 'model of development' demonstrates the role which foreign currency provided for the economy, as well as, its impact on the environment.

In this respect, it has been argued that the Spanish tourism sector is facing a number of problems due to the strong competition of other environmental friendly destinations with new opportunities, such as the Caribbean. As a result, some well-established tourist destinations, as well as, emerging ones are therefore being faced with new challenges, the following literature would attempt to explore some of the causes and effects that might endanger the fragile environment with their granted direct impacts on the economy.

2.1 Tourism industry

2.1.1 Definitions and concepts

Doswell (1997) pointed out that Wide-scale temporary travel away from home is a relatively new phenomenon. In the past, few people enjoyed leisure time. For ordinary people any time off was usually for "holy-days", early travel was often confined to pilgrimages-hence the word holiday as it is used now a day was originated. Later, as the spas developed, people traveled for health. With the Age of Reason, they started traveling for culture. As a result the famous Grand Tour became popular.

Gradually people were given more time off, meanwhile, forms of transport improved and it became faster and cheaper to get places. England's industrial revolution led to many of these changes. Railways, in the nineteenth century, opened up famous seaside resorts such as Black Pool and Brighton.

Doswell (1997) defined tourism as;

> ... *'Comprising the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes'.*

As a matter of fact, Witt et al (1995) noted that The United Nations Statistical Commission adopted the above-mentioned definition in 1993 on the recommendation of the World Tourism Organization (WTO). Several forms of tourism can be distinguished for a given country: *"domestic tourism"* involves residents of this country traveling only within the country; *'inbound'* tourism involves non-residents crossing international frontiers to travel in the given country; and *'outbound'* tourism involves residents of the given country crossing international frontiers to travel in another country. Inbound and outbound tourism together comprise *"international tourism"*.

Wahab and Pigram (1997) suggested that tourism is a mass phenomenon where all developed countries show very high holiday participation rates. These are an expression of mass tourism. However, there is also sustained growth in what the industry has termed *"quality"* tourism. The move towards quality tourism involves several trends, the over-all direction of which is a move away from the mass beach tourism that often characterized the 1960s and 1970s to a more diverse and specialized tourism industry. Tourists increasingly want to learn about local cultures or develop special interests. Among these special interests is the natural environment, growing interest in which has resulted in a new word being coined-*"ecotourism"*, which would be more explored in this chapter.

As a result for these newly trends, some well-established tourist destinations such as Spain's Costa Brava, which developed to cater for mass tourism, are therefore being faced with new challenges. Other regions are being presented with new opportunities. Hence, there are fairly good reasons to hope that future tourism development will show greater environmental sensitivity than in the past. Firm action by key players in tourism development could effectively counter-balance the negative impacts of the industry's expected future growth, (UNEP, 1992 vol.15).

2.1.2 Types of tourist

France (1997) indicated that it is perhaps here that Poon's (1993) 'old' and 'new' tourists fit most appropriately. 'Old' tourists, with their desire to escape from work and to a sunny destination about which they can later boast to friends and relatives, Cohen and Plog (1972) also assigned as 'mass tourists'. 'New' tourists, whose search is for novel experiences and who wish to be independent. Cohen and Plog affirm the relatively small numbers whose psychology dictates an adoption of Poon's 'new tourism'.

Poon argued that, ultimately, 'new tourists' would become the norm and outnumber those who travel to traditional destinations for motivations of escape in risk-free surroundings. Alternative, more adventurous forms of tourism, like ecotourism, are favored by people whose characteristics place them towards the distinctive end of the tourist spectrum, and who have come to be described as the 'new tourists'.

> Indeed, number of different trends can be identified in international tourism. In the developed Western countries, which are the traditional areas of high consumer demand, old-established tourism patterns continue to exist, alongside newly emergent forms.

2.1.3 Definitions interpretation

It should be noted that it is difficult to reach a consensus concerning either the definitions used, or the criteria employed in arriving to them, bearing in mind the diversity of interests in tourism. The number and variety of interpretations might be as broad and disparate as the backgrounds and interests of all those interested and involved in tourism development. Moreover, the dimensions of time and space are further aspects to complicate such issues, (Cater and Lowman, 1994).

Weaver (1998) emphasizes that the term *tourism* itself is characterized by conflicting interpretations where he pointed out that one of the most frustrating aspects for those studying tourism is the proliferation of ad hoc and personalized definitions among researchers and practitioners.

In the attempt to minimize the gaps between the conflicting interpretations, a more elaborated picture would be explored for the history of tourism and the dramatic growth in the industry worldwide.

2.2 The history of tourism

2.2.1 Growth and impact

After the Second World War, tourism exploded in the developed countries as Doswell (1997) noted. He further added that prosperity, more discretionary income, cheaper and better transport, and more time off, brought new marketing opportunities. Tour operators responded to the demand. The 'package' tour developed along with charter air transport and mass international tourism surged. Different parts of the world started to follow the same patterns of great urban development taking shape by the Mediterranean coastline.

More countries became relatively prosperous, starting to generate substantial flows of outbound tourists. Domestic tourism also expands and many people now take more than one holiday. While new destinations are continuing to emerge, tourism has been the world's largest industry. The World Travel and Tourism Council estimated that, in 1994, tourism generated US$3.4 trillion in revenues, created 204 million jobs (one in every nine), and accounted for just over 10 % of world GDP (WTTC, 1994). Although Witt et al (1995) agreed that the tourism industry is one of the foremost generators of employment, however, they highlighted precise figures are difficult to obtain.

2.2.2 Tourism economical and environmental impact

Obviously, tourism is a source of much-needed foreign exchange for many countries, and is an important contributor to gross national product. Tourism's share of GNP (Gross National Product) in for instance, Tunisia is 6%, in Barbados 32%, and in the Maldives 18% (UNEP 1992 vol.15). It should be mentioned that with the scale of this industry, that its environmental impacts could be realized, where they are receiving attention now after being under-estimated in the past. With the inclusion of some protected areas, many sites around the world have been spoiled. However, the tourism industry is now becoming more aware of the need to maintain a high quality environment and to develop practices that preserve it due to the awareness of its economical equation.

Douglas (1992) noted that the industry is familiar with examples of too much concrete, too much neon and too much plastic, too little regard for waste and emissions, and insufficient attention to carrying capacity, local culture or harmony with nature. Times change, and today we have to get it right, both for present and for future generations. In the Mediterranean basin, tourist demand has led to the rapid and often disorderly urbanization of large stretches of the French, Spanish and Italian coasts.

The understanding of the economical and the market demand equation has lead to the rise of "ecotourism" indicating the increasing number of tourists now preferring to visit attractive natural environments instead of going on traditional city or beach-based holidays. The environment is at the core of the industry; environmental measures are required to put the environmental house in order. World tourism has grown strongly during the 1990s (table2.1A&2.1B). The World Tourism organization predicted a 4% annual growth rate in international tourist arrivals and a 9% annual growth rate in international tourism receipts.

Table2.1A
International Tourists Arrivals by Region (millions)

Region	*1985*	*1990*	*1995*
Africa	9.7	15.1	18.7
Americas	66.4	93.6	110.6
East Asia/Pacific	30.8	53.1	83.0
Europe	213.8	286.7	333.3
Middle East	6.2	7.6	11.1
South Asia	2.5	3.2	4.3

Source: WTO 1996

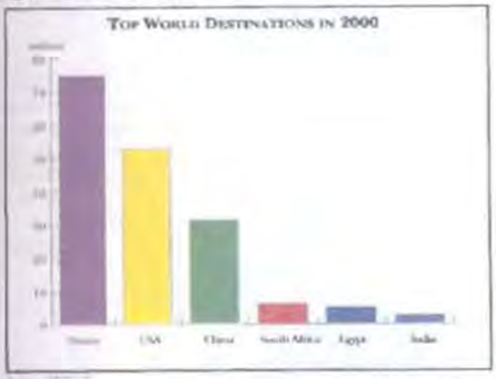
Table 2.1B
International World tourist Arrivals

Year	Number of arrivals (millions)
1950	25.3
1960	69.3
1965	112.9
1970	165.8
1975	222.3
1980	284.3
1985	327.6
1990	455.7
1995	561.0

Source: WTO 1995; WTO 1996

The tourism industry's turnover was expected to pass US$ 3.1 trillion (million-million) in 1992, which is 6 per cent of the world's GNP (gross national product). The industry is also an important Global employer. According to an industry estimate, it employed 130 million people in 1992, (UNEP 1992 vol.15). There are several reasons for this dramatic growth in world tourism. The main ones are increased personal incomes and leisure time, improvements in transportation systems. Improved communications lead to greater public awareness of other areas of the world encouraged the new trend of ecotourism. Despite the fact that a newly environmental aware trend termed "ecotourism" has evolved, it has been argued that it is not a "panacea" for the tourism industry. However organizations and in particular the World Tourism Organization (WTO), is assisting in promoting sustainable tourism development, as called for in *Agenda 21*.

Douglas (1992) indicated that travel and tourism generated more than 7% of total world capital investment. It accounted for more than 12% of worldwide consumer spending. He further adds that each dollar of travel and tourism output produces up to double its value. Growth expectations for the industry are better than for the world economy as a whole. In other words, travel and tourism, widely misrepresented as a secondary activity, it is a primary motor for economic development. Witt et al (1995) agreed on the obvious role tourism is playing in the world economy. Moreover, it has been noticed that international tourism receipts already 'constitute a higher proportion of the value of world exports than all sectors other than crude petroleum/petroleum products, and motor vehicles/parts/accessories' (World Tourism Organization, 1993), and it is forecast that within the 21st century international tourism will be the most important sector in world trade (fig. 2.1A-2.1B).



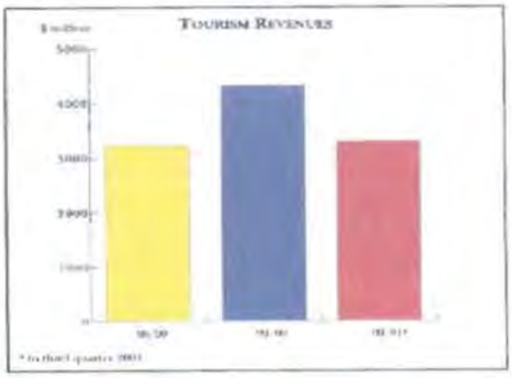


Fig. 2.1A
Top Tourist Destinations
Source: CAPMAS
Fig. 2.1B
Source: Central Bank of Egypt (2001)

Furthermore, the scale of world domestic tourism far exceeds that of world international tourism; in 1993 total domestic tourist arrivals numbered about 5,000 million, whereas total international tourist arrivals numbered 500 million-a ratio of 10:1. When the indirect impacts on the economy are also taken into account the figures of GDP rise to 10% (World Travel and Tourism Council, 1993).

2.2.3 Tourism growth

Doswell (1997) pointed that according to the (WTO) forecast of trends to the year 2000 and beyond, there should have been close to 650 million international tourist arrivals by the turn of the century. Despite a world economic recession, international tourism rose to 500 million arrivals in 1993, and international tourism receipts rose to US$304 billion. These receipts represented 8% of total merchandise exports and 30% of exports of services.

Tourism ranked first among world exports of goods and services, ahead of other major commodities. According to WTO forecasts, world tourist arrivals will increase by 3.8% a year taking the 1990s as a whole, and slightly above 3.5% a year in the first decade of the 21st century (WTO, 1994). Wahab and Pigram (1997) further noted that by the year 2005 it is estimated that the industry will have expanded its global role, generating $7.2 trillion in gross output, creating employment for 305 million people, producing 11.4% of world GDP, investing $1,613 billion in new facilities and equipment, and contributing more than $1,369 billion in tax revenue (World Travel and Tourism Council 1995, these figures where indicated before September the 11th).

2.3 Agenda 21

Agenda 21 is a comprehensive program of action adopted by 182 governments at the 1992 (UNCED), known as the Earth Summit. It provides a blueprint for securing the sustainable future of the planet into the 21st century and is the first document of its kind to achieve widespread international agreement and commitment to work harmoniously towards the conservation of the earth's natural resources (Box 2.1). As Wahab and Pigram (1997) emphasized the travel and tourism industry is considered the world's largest industry, generated in 1995 an estimated US$3.4 trillion in gross output, creating more than 211million jobs, producing 10.9% of world gross domestic product (GDP), investing $693.9 billion in new facilities and equipment.

Box 2.1

Agenda 21 and tourism

Although key *sections* of Agenda 21 address business, industry and trade unions, it is primarily directed at governments and educators. The action taken by the former in particular have a *bearing* on the tourism industry, at both national and local levels. International government agreements may also affect certain tourism sectors. Agenda 21 impinges on tourism in two ways. First, tourism is specifically mentioned as offering sustainable development potential to certain communities, particularly in fragile environments. Second, tourism will be affected by ii. Agenda 21's program of action because its many impacts may be altered by the legal framework, policies and management practices under which it operates. Among other priorities given in Agenda 21, *governments* are urged to:

- Improve and reorientate pricing and subsidy policies in issues related to tourism;
- Diversify mountain economies by creating and strengthening tourism;
- Provide mechanisms to preserve threatened areas that could protect wildlife, conserve biological diversity or serve as national parks;
- Promote environmentally sound leisure and tourism activities, building on
- ...the current program of the World Tourism Organization.

Business and *industry*, including *transnational corporations*, are urged to:

- Adopt. ..codes of conduct promoting best environmental practice;
- Ensure responsible and ethical management of products and processes;
- Increase self-regulation.

Source: Mowforth and Munt (1998)

As the travel and tourism industry has been recognized as a world leader in contributing to sustainable development. Although, Agenda 21 did not mention travel and tourism except in a few sections. For many regions and countries it is the most important source of welfare. How to cope with these negative impacts? The answer is not evident, but three suggestions of great significance are discussed.

First, more staggering of holidays in time, space and product would assist. People are becoming less and less interested in group tourism. *'The consumer'* no longer prevails; instead it is *'this consumer'*, who is becoming more and more interested in specialized products (Weaver 1991).

Second, the public sector should anticipate and avoid a number of costs. Tolerable numbers must be a central issue in the planning of resorts tourist regions. Lack of physical planning is very often the rule.

Third, a better-behaved kind of tourist would be desirable: one with respect for culture, nature, population and higher moral values; one characterized by Krippendorf (1987) as an 'emancipated tourist'.

2.4 Tourism in less developed countries

2.4.1 Developing countries assets

One advantage that developing countries (or less developed countries or Third World countries) still seem to enjoy is their unspoiled nature and their attractive and genuine, though not necessarily modern, way of life. Wahab (1997) highlighted this point as a crucial asset in comparison to what these countries generally suffer from as external indebtedness, scarcity of foreign currency earnings, and under-utilization of some of their major resources, and inadequate development finance and poor quality of life.

> According to Weaver (1998) most international tourism traffic occurs between MDCs, the portion accruing to LDC destinations is steadily increasing. However, LDCs now account for about one-quarter of all inbound arrivals, mostly originating in MDCs. It has been suggested that tourism is growing in importance as a vehicle for the transfer of wealth from the richer to the poorer regions, superficially at least (WTO, 1995).

2.4.2 Patterns of development

It should be noted however, that not all areas within the lesser-developed world, have shared equally in the growth and development of the tourism industry, owing to such factors as the differential priorities set by state and sub national governments, problems of access, lack of internal services and facilities, variable attractiveness and chronic political and social instability within certain areas.

In Weaver (1998) attempt to highlight the reasons leading to uneven growth, he points to the actual geographical pattern as one of extreme concentration, both within the lesser-developed world as a whole and within individual LDCs. At a continental or sub continental scale, 52.6% of Africa's international stay over intake was accounted for by just three states *(Egypt, Morocco and Tunisia)* furthermore, tourism tends to be concentrated in a few major urban centers and coastal resorts.

At a global scale, the most tangible evidence of this unevenness is the emergence of a global region increasingly mobilized to provide sea, sand and sun *(3S)* tourism opportunities. It has become an extremely popular mode of tourism during the latter half of the 2Oth century, and is obviously highly dependent upon the availability of suitable resources.

Any attempt to identify general ecotourism patterns within the LCD is constrained by the fact that this field of study has not yet progressed to a point where anything like a consistent and rigorous database is available within individual destination, however, there has been considerable efforts to set out codes of conduct within the industry as tools of sustainability in tourism.

2.4.3 Codes of conduct

The need for increased self-regulation was recognized at the UNCED earth Summit. For instance, Agenda 21 promotes the use of industry voluntary codes of conduct. In the tourism sector, several governments, and industry associations have produced environmental codes of conduct or guidelines. The WTTC is the industry's principal association, its Environmental Guide-lines are reproduced in full in Box 2.2 (UNEP, 1992 vol.15). Mowforth and Munt (1998) assumed that recent years have seen a rising tide of codes of conduct for use in the tourist industry. Their design, promotion, contents, relevance, uptake, effectiveness and monitoring have become important features of the industry and are all worthy of attention.

Two general points are illustrated that can be made about almost all codes. First, they attempt to influence attitudes and modify behavior. Second, almost all codes are voluntary; statutory codes, backed by law, are very rare (Mason and Mowforth, 1995). Theoretically, many codes of conduct are very impressive in their range of issues and in their depth of discussion and information. Ironically, they can be abused by the industry as marketing ploys or as veils extending over many of its impacts. Egypt is one of those developing countries with unspoiled nature and attractive assets that has genuine attempts towards implementing codes of conducts, in following literature a more focus is to be made on its developing industry.

2.5 Tourism in Egypt

2.5.1 History

During much of the nineteenth century, Italy remained easily the most popular destination for north Europeans heading south and, from the 1860s, the French Riviera became the most visited wintering region in Europe (Pemble, 1987). According to Barke et al (1996) Egypt was also rising in importance, especially by the 1880s, and so Spain, along with Greece, was to remain in the 'third rank' of Mediterranean destinations. They further take the activities of Thomas Cook as an indication of embryonic international tourism industry development, where they noted that his empire organizing package tours to Switzerland (1863), Italy (1864), the USA (1866) and Egypt (1869), on the other hand, until 1872, Spain was not included.

As Egypt has been known to be the cradle of civilization, it should not be surprising then, that tourism has become one of the cornerstones of the national economy. Over the past ten years, the sector has become the biggest single contributor to GDP, as well as by far the biggest generator of foreign currency (fig.2.2A-2.2B). Over the next ten years, tourism is forecasted to grow at 10% annually, far outpacing the most ambitious goals for overall economic growth and solidifying the sector's position as the most vital to the country (Business Today, 2001).

Wahab and Pigram (1997) argue that besides its diversified topographical and cultural attractions, Egypt's tourist endowments are further enhanced by mild weather for at least eight months of the year. The Egyptian tourism sector initially received substantial attention. However, this support has been softened as the development emphasis shifted to the industrial sector. Deterioration of the tourism industry was further aggravated by the war of 1967 and continued hostilities for about ten years until the Peace Agreement. During this period the influx of tourists to Egypt was substantially impaired.

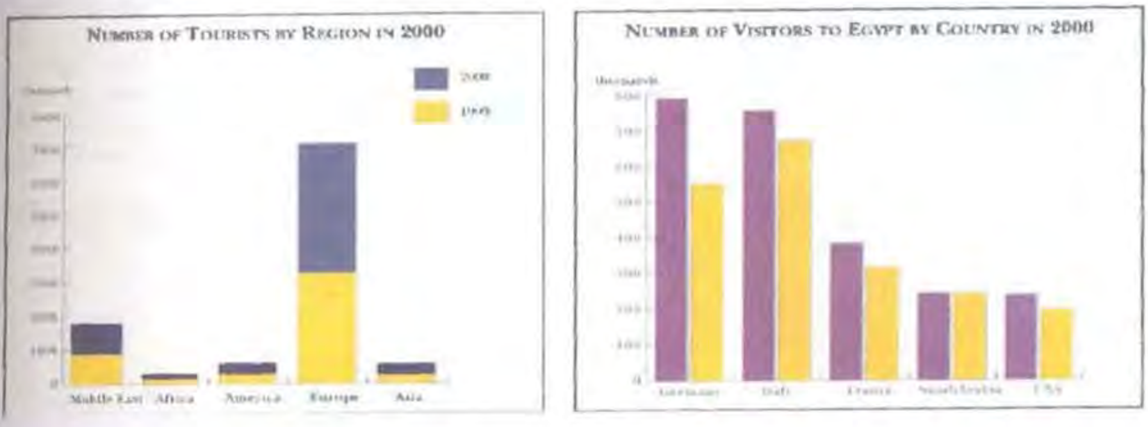


Fig. 2.2A-2.2B
Tourists by Region And Country
Source: Ministry of Tourism (2001)

A change in economic philosophy, coupled with the signing of the Peace Agreement in the mid-seventies, brought with it-increased emphasis on tourism, and as a result the number of arrivals rose substantially relative to previous decades.

2.5.2 The tourism role within the Egyptian economy

Egypt has attracted in 1995 3.2 million tourists, despite this still means less than 1% of the global market of tourism its contribution to the national market is significant (Ministry of Tourism, 1996).

The industry has been placed in second place after workers' remittances, ahead of Suez Canal revenues and revenues from oil exports. The foreign exchange earnings reached about US$700 million in 1986; tourism receipts reached $1.5 billion in 1990 and $2.8 billion in 1995. Tourism has been since 1987 the fastest growing sector in the economy, in response to favorable economic reforms at both macro-and sectoral levels. The opportunities for increasing its contribution to the economy are excellent, given country's unique but under-exploited tourist potential.

In 1998, the year after the Luxor attack, the ministry reported 3.2 million tourist visitors, filling 45% of the country's available rooms (fig. 2.3A-2.3B). The year 2000, 5.5 million tourists came to Egypt and filled 73% of the available rooms. Since the rising occupancy rate has coincided with a boom in the number of rooms available, it's hard to find fault with the ministry's stance that Egypt's tourism potential is still largely unexploited (Business Today, 2001).

2.5.3 Hotel rooms in Egypt

Wahab and Pigram (1997) stated that general average rate of occupancy in 1995 were 67 per cent in rooms and 49 per cent in beds. Egypt's accommodation capacity has been expected to rise to 250,000 beds (130,000 rooms) by the end 1999. The private sector is being encouraged through various incentives introduce area infrastructure in new tourist regions by large investment companies. There were 51,000 hotel rooms in the country in 1990; that number has doubled since the construction boom began in the Red Sea resort areas, to reach 114,000 rooms in 2000 (fig.2.4A-2.4B). The ministry expects the number to double again by 2010. Most of the growth is expected to come from the development of resort areas outside the Nile Valley (Business Today, 2001).

Dr. Belatagui the minister of tourism (2000) stated that the number of rooms in Hurghada-Red Sea has reached 30,149 rooms, which is the highest in Egypt; the projects under construction would reach 2383 rooms. Figures are the precise indications for the impact of the Egyptian tourism participation within the national economy.

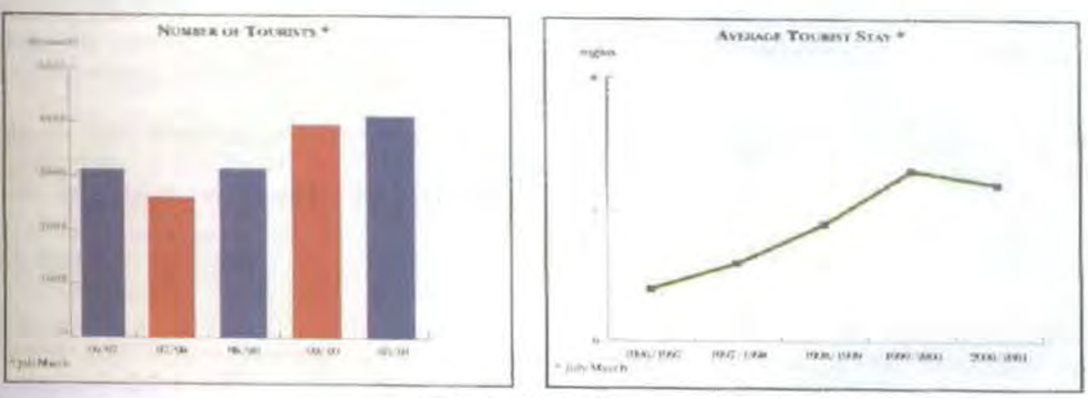


Fig. 2.3A-2.3B
Length of Stay
Source: CAPMAS

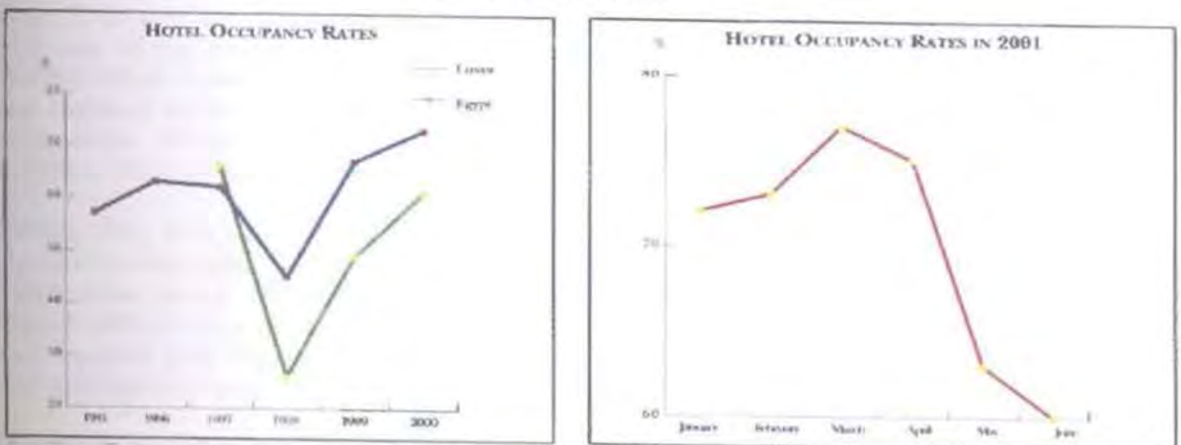


Fig. 2.4A-2.4B
Hotel Room Occupancy Rates
Source: Ministry of Tourism (2001)

2.5.4 Tourism direct and indirect effect on the Egyptian economy

An important study by the Egyptian center for economical studies (ECES) in co-operation with ministry of tourism and the chambers of tourism around "the real effect of the tourism sector on the Egyptian economy" has emphasized that; the tourism sector plays an important role within the Egyptian economy. The study illustrated that there has been enough data related to the number of tourists and there contribution to the economy, however the available information of tourism contribution to the economy with respect to the total figures of employment income figures has been limited and misleading.

The study concluded that the total expenditure generated by the tourist represented about "four" times the contribution of hotels and restaurants within the economy. Also, the direct effect for tourist on the workforce has reached one million people in the year 1996, which represents 5.7% to the total number of workforce.

It has been found that the direct contribution for the tourist expenditure to the GNP-in comparison to other sectors-reaches 2.9%, which exceeds the textiles industry (2.8%) or the garments (1.1%). It should be highlighted that the tourist consumption of for commodities or services is equivalent to exporting these elements and adding to the earnings of economy in hard currency.

According to Dr. Belatagui the minister of tourism Currently, 2.2 million people are employed directly or indirectly by the tourism sector-12% of Egypt's manpower (German Arab Trade Magazine- Gat, vol.52 2001).

2.5.5 The future

For the foreseeable future, the tourism sector will continue to be the focal point for development and the economy will become increasingly reliant on tourism receipts. Having reached \$4.3 billion in 2000, tourism receipts accounted for 11.3% of GDP, covered 37.6% of Egypt's trade deficit, and represented 27% of foreign currency earnings. The ministry expects tourism receipts to reach \$9.5 billion by 2005.

However it should be emphasized that according to the World Tourism Organization, Egypt is one of the tourism leaders in the Middle East, however, the region as a whole lags behind other areas, drawing only 20 million tourists in 2000, Europe is the most popular regional tourist destination, drawing 403.3 million visitors in 2000-74.5 million to France alone. Other tourism powerhouses include the United States, Spain and Italy, all with more than 40 million visitors in 2000.

Mentioning that, it is obvious to compete with those nations may be a distant dream, but nations like Greece and Turkey offer a similar mix of antiquity and seaside resorts, and they each drew about 10 million visitors in 2000 (Business Today, 2001). In order to accomplish such dream an emphasis should be made on the yet unspoiled nature and the genuine features that Egypt still posses, the following literature attempts to explore the issue of environment and tourism in general with some focus made on Egypt.

2.6 Environment and tourism

2.6.1 Impact of Coastal Tourism

In the late 1960s the environment has emerged as a topic for concern. Kirkby (1996) pointed that scientists have expressed concern at what has been seen unacceptable deterioration of inshore waters of the Mediterranean Sea reaching a critical level.

Tourism's impact is usually considered from physical, economic and social perspectives. Its effects are more visible on the coast's physical aspect or environment, rather than on the people's economy or way of life. This seems logical from Wong (1991) point of view as "the environment is the basic resource of tourism; careful exploitation of this resource can lead to its enhancement rather than its destruction." Other ways of classifying the impacts of coastal tourism are:

- Positive and negative, direct and indirect, or
- Short-term and long-term.

Examples of the *negative* effects of tourism on the coastal environment include near shore water pollution from liquid effluents, uncontrolled development of beach front hotels and no proper drainage facilities; the dumping of solid wastes and beach degradation from pollution and erosion.

Short-term impacts are those related to the construction phase of the beach resorts, which includes site clearance or grading, construction activities, labor importation and land-scaping. *Long-term* impacts are those related to the operations of the beach resorts such as solid waste and sewage disposal, land use changes, tourist activities, employment of local residents, employment of immigrant labor and land-scaping.

However Tolba, 1992 argues that as other sectors, tourism has a positive impact on the environment by implementing techniques that might preserve our environment. The natural areas have become attraction points to what is known now by "natural tourism" or "ecotourism".

The relation between tourism and environment is a balance relation between development and environmental protection. Manila declaration (1980) emphasized that the tourism requirements must not damage the social and economical benefits for the inhabitants of the tourists areas and above all the natural environment, which is the main source for attraction. The declaration emphasized that these resources are part of the humanity heritage; the long term environmental planning is a must for the formation of balance between tourism and environment, that tourism would be a sustained development activity.

2.6.2 Impact of tourism on the physical environment

Witt et al (1995) suggests that the impact of tourism on the physical environment needs to be taken into consideration when planning tourism developments. A mass influx of tourists to a destination without regard to the consequences for the physical environment may well destroy the very resource that attracts tourists. Unfortunately, as a result of such tourist mass influx, Priestley et al (1996) argues that some resorts are oversized and optimum land occupation levels have been exceeded to such an extent that not only the natural but also the built environment is highly degraded.

Consequently, an additional problem further aggravates those of degradation of the natural and of the built environments, which is encountering certain problems of a relative loss of demand and economic viability in recent years. Coral reef, which is one of the major attractions of coastal tourism that adds to the economy of tourists' destinations, is in severe danger. Destruction of coral reefs would mean the extinction of thousands of marines and the elimination of a primary source of income, employment, and food for millions of people, (The coral reef Alliance, 12 /96, Berkeley, (A)).

For those reasons, the protection of reef systems is in the national interest of every country-large and small (Osborn and Steve K. 1997). Worldwide, reefs of 93 countries have been damaged by humans' activity, and unless the current trends are reversed, up to 70% of the world's coral reefs may be killed within our lifetime.

Witt et al (1995) indicates that the measurement of the impact of tourism on the physical environment is a difficult task. They suggested that various techniques have been developed to try to assess this impact, but, for example, soil erosion may be a result of other land uses in addition to tourism, and it could be difficult to separate the effects of tourism from those of the other activities.

2.7 Carrying capacity

2.7.1 Carrying capacity versus mass tourism

Wahab and Pigram (1997) considered carrying capacity as a central principle in environmental protection and sustainable tourism development. Where it determines the maximum use of any place without causing negative effects on the resources, on the community, economy and culture, or reducing visitor satisfaction. Tolba (1992) pointed that this industry was the motive behind constructing or upgrading resorts worldwide. Mass tourism which mainly has been noted as 3s tourism has destructed environments worldwide.

2.7.2 Types of carrying capacity

Three types of carrying capacity limitation have been identified (HoIloway, 1985);

1) Physical capacity,
2) Environmental capacity, and
3) Ecological capacity.

Physical capacity is the absolute limit on tourist numbers that a resource can cope with. Environmental capacity is the maximum number of tourists that an area can accommodate without initiating a decline in the general perceived attraction of the area. Ecological capacity is the maximum number of tourists that an area can absorb before ecological decline takes place. It may, however, be possible to increase carrying capacity through the use of appropriate management techniques (Witt et al, 1995).

Doswell (1997) in his attempt to explore the effects of carrying capacity, pointed that carrying capacity of a place can often be increased in still acceptable ways through careful planning and management, and by improving existing tourists facilities. Where he explained that every destination has a limitation to the total number of visitors, which defines its Carrying capacity that could be broken down into five elements; two are quantifiable and three qualitative.

> *Damage.* The number of visitors hosted without causing measurable damage to the environment.
>
> *Delay.* The number of visitors hindered without causing intolerable delays in the use and enjoyment of attractions, with people having to queue or wait in traffic.

Overcrowding. The number of visitors congested without giving a feeling of overcrowding, so that people are not, pushed and squeezed.

Image. The number of visitors in and around a destination without changing its image

Reaction. The number of visitors maintained before there is a strong reaction, on the part of the local population, to the excessive pressures created, and a feeling of cultural invasion is provoked.

A certain Spanish tourism expert, questioned how to judge the optimum carrying capacity of a given tourism destination, he replied, 'when there is no more room for anybody else'. However, this is of course, far too simple an answer that is not considering the impacts caused by the mass on the natural environment and it would just depend on ad-hoc decisions. Doswell argue that the carrying capacity of an area, attraction or facility is reached when further visitors would damage the environment. It is mostly a question of both measurement and judgment of what the attraction or place can withstand without threat of damage or deterioration.

2.7.3 The impact of carrying capacity on development

Planning and policy-making for tourism development have been heavily concerned with the objective of obtaining a balanced relationship between tourism and the environment. Priestley et al (1996) emphasized that the most important issues which stand out in this respect are: assessment of an area's carrying capacity and especially of the limiting factors determining the extent of tourism growth: well-structured planning approaches, ensuring balanced and sustainable tourism development and creating suitable policies for implementing the prescribed planning measures. The development of mass tourism is too recent to produce examples of functional adaptation of mass tourism sites. Such adaptations can be put into practice in resorts, which have been developed for long time.

In recent years, the issue of environmental carrying capacity has featured more frequently in development plans, strategic development projects and the wider planning and management literature in general. This is indicative of the increasing emphasis on environmental issues in planning and management studies and practices.

Within this context, sustainable development would be approached through the idea that there are identifiable capacity limits, which should not be breached, in the interests of both present and future generations. Environmental carrying capacity implies that the permissible amount of development-in this case tourist development-can be defined by the state of the environmental carrying limits and requirements.

Coccossis and Parpairis (1996) assume that the concept of carrying capacity is examined, as a methodological tool to protect resources and respect interest constraints in the course of supporting economic development, including tourism, and to protect the natural and human-made environment, especially in coastal areas. As a consequence of the mass tourism development of the past 30-40 years, coastal areas have faced considerable challenges and pressures for development, which have altered their sensitive coastal and heritage features.

Coccossis and Parpairis indicated that various studies carried out recently noted major changes in the coastal system as a result of the considerable pressure of human activity and particularly of tourism, a sector which is regarded as having important negative effects on the coastal environment mainly because of its mass, the patterns of its geographical distribution and seasonal nature.

2.7.4 Seasonality in Tourism Demand

Seasonality can result in overloading within the context of carrying capacity and abuse of the environment in destinations during part of the year, while for the remainder of the year destination and facilities may be considerably under-used or not used at all, resulting in inefficient use of resources and loss of profit potential, Witt et al (1995) highlighted strategies for managing seasonality through; changing the product-mix, market diversification, differential pricing, and encouragement of holidays staggering.

Changing the product-mix involves the creation and marketing of new different attractions. The construction of all-weather facilities; such as covered leisure complexes for year-round use are a means of extending the season. A highly successful example in Northern Europe is the development of *Center Parcs*, (fig.2.5) where accommodation is clustered around an all-weather leisure area incorporating wave-pool, water slides (fig2.6-2.7), and so on, allowing a 94% occupancy around the year.

Diversification of the market to reach new potential customers may also be used successfully to counteract the effects of seasonality. Priestley et al (1996) assumes that in order to protect the coastal environment in the interests of long-term tourism policy success, future research should address the need for a more holistic and systematic approach to the identification of critical zones.

Fig. 2.5
Center Parcs Layout
Source: Ove Arup (2000)

Fig. 2.6-2.7
All-weather leisure area
Creation of attraction defusing
Carrying capacity all over the year
Ove Arup-site visit (1998)

Obviously developers, in search of personal gain as Priestley (1996) suggested, favor expansion, where municipal councils usually welcome the possibility of increasing revenues. It is perhaps understandable that resorts, which developed during the first phase of expansion of mass tourism in the 1960s and early 1970s, were allowed to grow almost indefinitely. It is not however, so understandable that this trend should continue to the present, in the light of past experience, either locally or globally. Global challenges require big and small steps, which must, however, begin with a small, very personal revolution. In this respect, France (1997) notes that;

> *'Think locally-act globally'* must become just as important as the old motto *'think globally-act locally'*. She adds what is important is the right direction, and the right direction is definitely towards 'environmentally and socially compatible action'.

Wahab and Pigram (1997) in their view, conclude that carrying capacity represents the point beyond which the tourism industry in any destination becomes unsustainable. In other words, carrying capacity, whether national, regional or local, denotes how much tourism is sufficient to yield positive returns and avoid its blights.

A General Report on tourism by the European Commission, 1997 introduces Yield Management as an attempt to manage the natural trade-off between filling all available capacity and accomplishing maximum profits.

2.7.5 Yield management and the demand curve

Effectively, yield management mitigates seasonality of demand, by shifting excess demand away from peak periods and into the off-season. Yield management relies on an understanding and interpretation of the 'demand curve'-i.e. the curve that expresses the relationship between price and demand.

The express aim of yield management is to make the prices and availability of a product or service match demand. The implementation of sophisticated yield management requires a more precise understanding of consumers' needs and behavior than is typically present in comparable tourism businesses, which do not conduct yield management.

2.8 Planning Strategies in tourist zones.

Ramsamy (1992) argued that the application of different tourism development methods could be a source of environmental damage in circumstances where such application is made in absence of sound planning strategies. An emphasis should be made on environment preservation that on short-term economic profitability should constitute the recipe for sustainable tourism growth. The following two examples represent different methods towards the goal of achieving sustainable development; a reaction method towards environmental deterioration in *Calvia-Spain*, while the other a proactive method towards environment preservation in *Nusa Dua-Bali*.

In the recent years, images of controlled blasting down or bulldozing of obsolete hotels in the township of Calvia have appeared frequently in the media (fig.2.8-2.9-2.10). Television footage and reporters' photographs are expressive and draw our attention, but behind these more or less spectacular events lays a whole philosophy of tourist and residential quality, which many call the *"Plan de Esponjamiento"* or De-congestion Plan.

Fig. 2.8, 2.9 & 2.10
Images of controlled blasting down
orbulldozing of obsolete hotels in the township of Calvia
Source: Etorn #8-English version.
Calvia@bitel.es (1996)

In fact, the road to better quality in Calvia began through a series of measures, as designing of green zones (fig.2.11), modernization of businesses and construction of new maritime walks (fig.2.12), urban-planning actions had already been designed to place Calvia in the front line of sustainable development (Calvia Agenda Local 21, 1996).

Fig. 2.11
Designing of green zones

Fig. 2.12
New maritime walks
Better quality in the township of Calvia
Source:http://www.bitel.es/calvia.mallorca

Wong (1991) assumed that because of its effective development control, *Nusa Dua-Bali* is often cited as perhaps the best-planned beach resort in Southeast Asia (fig.2.9). The government-controlled Bali Tourist Development Corporation was established to take charge of the Nusa Dua master plan. The physical development began in 1976, with the initial plan calling for the completion of the construction of the first hotel in 1978 and that of the seventh and last in 1984.

From the perspective of a development strategy, *Nusa Dua* is an enclave resort type (figures 2.13, 13A & 13B). The beach resorts are constructed on previously uninhabited coral islands. Grants were obtained from international lending institutions to evaluate the resort development, its benefits to the local population and its environmental impact. The resort is separated from the rest of the island, properly landscaped, and has good roads and drainage, in general the resort development has been carried out on an integrated and sustainable basis.

Fig. 2.13
Nusa Dua-Bali
The Enclave resort entrance, which comprises sustainable developments
Source: site visit (1998)

Fig. 2.13a
Hayyat Bali entrance
The lobby is dependent on natural ventilation- no Air-conditioning is applied
Source: site visit (1998)

Fig. 2.13b
Hayyat Bali Ariel view
Source: *Phillips* (1993)

Butler (1991) mentioned that "if the primary goal is protection of the environment in an untouched form, then in all likelihood there cannot be tourist development at all, and this applies alike to National parks, world Heritage sites, and Nature Reserves. There is no example of tourist use that is completely without impact".

It has been now realized, however that the primary goal is not the protection and preservation of the environment but the wise use of the available resources. Within the context of tourism development, different schemes have been conducted to assist in the wise use of the countries assets.

2.8.1 Green Flag and Green Globe

The establishment in recent years of several high-profile environmental-monitoring and management programs is indicative of the increased corporate interest in sustainability as has been highlighted by Weaver, 1998. These include Green Flag International, established by the industry in the late 1980s (Sisman, 1994), and Green Globe, established in 1992 by the World Travel and Tourism Council (WTTC), which represents many of the largest companies in the travel and tourism industry.

2.8.2 The European Blue Flag scheme

In an attempt to secure higher standards of water quality, in 1987 the European Blue Flag scheme for recreational beaches and recreational ports was launched. The Foundation for Environmental Education in Europe, the World Tourism Organization and the United Nations Environment Program (UNEP) participated in this scheme, together with central governments ministries, local regional governments and a range of voluntary organizations. An award of the Blue Flag Beach is granted annually is based on four categories; Water quality assessment is based on EU criteria, Beach management beach Quality and the Quality of information and education are the other three categories (Barke et al, 1996).

Dr. Adel Rady-Former Executive Chief for the TDA of Egypt mentioned that a number of environmental guidelines are implemented through this scheme. Amongst these guidelines that the beach should be natural and that no modifications would affect the shoreline. Rest rooms by the beach should be environmentally complied.

He further added that there is a tendency in Europe that by the year 2005, tour operators would not organize holidays for areas that are not environmentally complied. The Blue Flag scheme is a sort of marketing tool as that of the ISO where the certificate is placed at the sites that implement such schemes.

2.9 Environment and tourism in Egypt

The GOE (Government of Egypt) has dynamically promoted tourism development as a vehicle for economic growth, job creation and development. Tourism by the Red Sea coast of Egypt has been seen as a means of redistributing people more evenly over the land of the country instead of the highly concentrated population around the Nile.

Due the country's policy, recent years according to Wahab and Pigram (1997) has seen a rapid expansion in hotels and tourism facilities along the Red Sea coast south of Hurghada. Diving and seacoast tourism has attracted a number of visitors with rapid rates of growth.

There are assurances that the 3s and diving market in this area will be able to compete with compatible Mediterranean destinations such as Morocco, Tunisia, Greece and Turkey. However, Egypt has an advantage over these destinations in terms a longer season, lasting for almost eight months of the year.

Although, it should be emphasized that despite efforts put forth by the GOE to balance development and environment there remains a concern that environmental impacts of this rapid growth development might, on the long run adversely affect its market share global when the areas resources deteriorate.

2.9.1 Environmental policies

In 1994, the Egyptian Parliament approved an environmental law (#4). Salem (1997) pointed to one notable outcome of this law and its executive decrees is that environmental impact assessments (EIAs) became an integral part of project permit process. He further highlights another empowering law, which is #102 of 1983 and its decrees. It provides the Egyptian Environmental Affairs Agency (EEAA) with the necessary legal instruments to:

a) Declare protected areas;
b) Equip these with suitable resource management and conservation measures;
c) Establish and enforce regulations to safeguard protected areas.

EEAA has declared 15 different sites in tile country as protected areas. Environmental protection and resource management objectives of these protected areas are being achieved jointly by EEAA and the European Union since 1989.

David (1997) assumed that now is an opportune time to pursue the goal of environmentally sustainable tourism in the Egyptian Red Sea region: each of the key public agencies involved-the Government, the Tourism Development Authority (TDA), and the Egyptian Environmental Affairs Agency (EEAA)-are firmly committed to the necessary policy and efforts to protect and preserve the environment, which is the basis of their substantial investment in the region.

He further suggests that in the absence of a concentrated effort and public/private commitment, such as described above, a continuation of the haphazard and poorly planned growth that has damaged many of these resources over the past decade can be expected to continue and worsen. Amongst the key problems; Improper and excessive use of fragile natural resources resulting in damage to prime diving sites and desert habitats; Air and water pollution from urban, Visual blight due to uncompleted construction projects, especially along the Hurghada coast.

Ramsamy (1992) emphasized that at a time when tourist tastes and preferences are becoming more sophisticated; those involved in the market should by all means be more environment conscious in order to ensure a healthy growth of the industry. Moreover, the key players within the industry should be fully aware of the emerging types of tourism within the market in order to be on a competitive edge.

2.10 Types of tourism

The rapid growth of the tourism industry, often regarded as a "Passport to development" for countries with few resources apart from sun and sand, has now become a major concern for many environmentalists. Basically, international tourism is often regarded as a relatively harmless form of industrial development compared with most industries. However, Van Droste et al (1992) argued that just getting to one's destination could have a major impact on the natural environment, especially if they involve thousands of people concentrated in time and space. The environment is considered by many to be the biggest challenge to tourism industry (UNEP, 1992). In the industry attempt to be contingent for the market demands it has introduced different forms of tourism over the years.

2.10.1 Mass Tourism

2.10.1.1 Definition

Vanhove (1997) indicated that mass tourism is a notion in common use. However, he further questioned its precise meaning, if it is a package tour, or is it a concentration of tourists in a resort or region, or even a low-profile tourism? These are only some aspects of the phenomenon According to the Swiss author Fink, 1970 the basic elements of mass tourism are:

- Participation of large numbers of people;
- Mainly collective organization of traveling;
- Collective accommodation;
- Conscious integration of the holidaymaker in a traveling group.

It may seem that mass tourism refers to the participation of large numbers of people in tourism, a general characteristic of developed countries in the twentieth century. Mass tourism is essentially a quantitative notion, based on the proportion of the population participating in tourism or on the volume tourist activity (Burkart and Medlik 1974).

2.10.1.2 Evolution of mass tourism

Williams (1996) points that the 1960s were a turning point in the evolution of mass tourism, when the industry effectively became internationalized. The most characteristic and developed product of this new form of tourism supply and demand was the Mediterranean sun and beach holiday, and one count more than an other-Spain-symbolized this new phase.

Morris (1996) adds that initially tourism was in the form of patches, concentrated at just a Jew separate points on the coast of the Costa Brava, where first family hotels and then massive tourism, from about 1960, were developed. Concentration initially was due to the tiny total demand, and later because mass tourism was based on large groups brought in by air to big hotels. In the 1970s, the demand for new tourist space became linear, in other words, strip development along the coast, though still quite concentrated.

The concept is one of an economic activity, which is not sustainable and which moves on from place to place consuming and degrading fixed local resources and then abandoning the area. Although the notion that mass tourism is 'a bad thing' is perhaps rather simplistic, it has been suggested that controlling the volume of tourism might improve the situation (Wheeller, 1990). Increased interest in alternative forms of tourism is perceived as a response to the emphasis placed on exploitation associated with mass tourism, especially in developing countries (France, 1997).

2.10.1.3 Attraction sectors in mass tourism

Theme parks have been among the most successful tourist attractions ever deployed, in particular, Disney World in Florida (which attracts about 20 million visitors per year) and Disneyland in California (which attracts about 10 million visitors per year). Witt et al, 1995 emphasizes that the attraction sector of the tourism industry differs from the accommodation and catering sector and the transport sector in that it is concerned almost wholly with leisure related tourism.

Despite the criticisms of theme parks for there totally artificial character, Van Droste (1992) argues that there is no doubt that they provide the kind of tourism that million of people want, enabling people to "visit" several countries (in a single afternoon!!!) lifting pressure from other areas.

Cater and Lowman (1994) highlight the increasingly awareness of people towards the adverse socio-cultural and environmental impacts of uncontrolled mass tourism. Ecotourism evolved as an ecologically responsible form of tourism; the very incorporation of 'eco' in its title suggests that. The scale of ecotourism activities imply that comparatively low numbers of tourists will arrive. It is vital to remember that any human activity dependent on the consumptive use of ecological resources, such as ecotourism, cannot be sustained indefinitely unless an important principle underpins its organization.

2.10.2 Ecotourism

2.10.2.1 Definition

> *"Ecotourism is tourism that consists in traveling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestation (both past and present) found in these areas".*

In this respect, Weaver (1998) assumes that nature-oriented tourism implies a scientific, aesthetic or philosophical approach to travel, although the ecological tourist need not be a professional scientist, artist or philosopher. The main point is that the person who practices eco-tourism has the opportunity of immersing himself/herself in nature in a manner generally not available in the urban environment. (Ceballos-Lascurain, 1990).

However, because there are no universally accepted definitions of ecotourism or the ecotourist to clearly distinguish this activity from other forms of tourism. Hence, there are no reliable overall data to confirm or disprove the oft-repeated statement that ecotourism is one of the fastest-growing components of the tourist industry. Moreover, some major tourism data compilers, such as the US Travel and Tourism Administration, have not even bothered to collect such data because of the ambiguities (Rymer, 1992).

2.10.2.2 Environmental benefits

In theory, the most prominent direct environmental benefit of ecotourism according to Weaver (1998) is its incentive value for preserving natural environments, which might otherwise be severely altered or removed altogether by activities. As population and economic growth put increased pressure on national parks and other protected areas, ecotourism may be emerging as the single best rationale for establishing and retaining such limited-use zones, mean while allowing destinations to market themselves under the title of ecotourism.

2.10.2.3 Ecotourism in the Caribbean: Belize and Dominica

In this respect, Cater (1996) points that the Central American state of Belize and the Caribbean island of Dominica have both been actively promoting themselves as ecotourism destinations over recent years. Belize is marketed with the use of slogans such as 'Naturally Yours' and 'The Adventure Coast', and Dominica claims to be the 'Nature Island of the Caribbean'. These resources may be regarded as the capital stock.

Ecotourism, with its suggestion of sound environmental management and consequent maintenance of environmental capital, should theoretically, provide a viable economic alternative to mistreatment of the environment.

2.10.2.4 The future for the Caribbean

As Travel and tourism are now the world largest industries and most signet contributor to global economic development. Tourism booming sub sector ecotourism reportedly transfers over $25 billion per year from the developed to the developing countries (Douglas, 1992). These views seem to be supported by research as that conducted by the German BAT leisure Research Institute (Koch 1992), which indicated that German tourists make the largest expenditure on international tourism and that ecotourists are the third most important category of German tourists.

Moreover, the study also found that two out of every five Germans (42%) indicated the islands of the Caribbean as the destination of the nineties, all this helps to reinforce the view that tourism planners in the region should be paying some attention to the development of this sub-sector. It should be highlighted that this notion should not only be limited to the Caribbean, taking into consideration that through the period from January to October 2000, Egypt received 640,295 German tourists, which is an increase of 49.8 % from the same period in 1999. With such a high score, Germany ranks second after Italy in the number of tourist arrivals in the mentioned period-scoring 13.7% of the total tourist arrivals (Gat, 2001). According to Dr. El-Beltagui minister of Tourism-Egypt Italy and Germany are alternating their ranking every year

2.10.2.5 Ecotourism challenges

In essence, one of the most important challenges facing those who desire to provide and mange genuine Ecotourism is to distinguish it from what are often used as synonyms *green tourism* and *sustainable tourism* as George et al, 1997 suggested. The official IUCN definition of Ecotourism gives a clear indication of the issues requiring a considered approach to its planning and management:

> *"Environmentally responsible travel visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features both past and present) that promotes conservation, has low visitor impact, provides for beneficially active conservation, and involvement of local populations"*

'Genuine ecotourism' projects share three common characteristics:

a) Are operated within the natural capacities of the tourist attraction.
b) Contribute to the preservation of the tourist destination, as well as to the welfare of the local communities;
c) Involve local communities in both assisting conservation activities and in contributing to 'the tourist experience' in a variety of ways (such as the provision of craft products, guide, hotel and local transport services).

Ecotourism is noticeable from *'green tourism'*, which is a collective term used to describe those sites which are managed in ways which are sensitive to their ecological and environmental features. Likewise it is distinguishable from' '*sustainable tourism*', which seeks to achieve a longer-term viability for mainstream tourism, in terms of its environmental, cultural and economic impact.

Based on George et al (1997) view, ecotourism features are in essence 'the crème' de la crème' of a country's tourism assets. It has been noted that international tourism in Egypt was based on its archaeological heritage, also, its coasts' assets. A key problem that has been identified was the lack of regional strategies for land-use, which set out long-term objectives and land-use patterns in keeping with the availability of natural resources.

There is a growing concern that not only uncontrolled visitor numbers but also lack of effective or enforced planning controls is eroding the values of the natural assets. Experience suggests that, whilst certain components of the Planning and Management Framework are in place, there are others, which are notable by either their absence or weak provision. The future for the development of ecotourism in Egypt will significantly depend on how the stakeholders would address this form of tourism.

2.10.2.6 2002-The international year for ecotourism

The year 2002 has been announced as the year for ecotourism based on the decision taken by social and economical council (UN). Further, the UN committee for sustainable development invited the governments, NGOs and the private sector within the field of tourism to collaborate with the International Tourism Organization in the preparation of the activities supporting the year of ecotourism.

However, some NGOs especially in developing countries stated their objection to the year for ecotourism where it has been seen as "an attempt from the Northern Hemisphere multinational companies aimed at the continuous destruction of the natural environment and the indigenous cultures for the developing countries". The ITO and UNEP denied this argument; on the basis that it is a chance to expose the positive applications within the field of ecotourism worldwide, in the hope of more benefits for the future communities related to this area, and in order to mitigate the negative impacts on the local environment and culture.

For a further term elaboration, Mowforth and Munt (1998) noted that Ecotourism means more than bird books, native art hanging on hotel walls or ethnic dishes on the restaurant menu. Ecotourism is not mass tourism behind a green mask; it means a constant struggle to defend the earth and to sustain traditional communities. Ecotourism is a cooperative relationship between the non-wealthy local community and those sincere, open-minded tourists who want to enjoy themselves in a Third World setting.

Although, it should be noted that the demand for ecotourism might already exceed the sustainable supply in many parts of the world. A different perspective for mass tourism that has been illustrated by Weaver (1998) indicated that the high profile of ecotourism in at least three case studies (Costa Rica, Kenya and Thailand) is directly dependent upon the existence of well-developed mass-tourism sectors, which accounts for most of the participants. Furthermore, the characteristics of much of the ecotourism market, such as organized group travel, and the actual volume of visitation, suggest that a rethinking of ecotourism as an alternative tourism (AT) may even be necessary to use terms such as 'mass ecotourism', to describe the increasingly common intersection of sustainable mass-tourism and non-consumptive nature-viewing.

2.10.3 Alternative tourism

2.10.3.1 Alternative tourism trends

Doswell (1997) described the new traveler as better-educated, more culturally aware, more environmentally and culturally sensitive, and more curious and analytical. Such people are looking for an alternative to the mainstream trends of the large mass tourism markets. These categories of tourists do not want large, modern hotels constructed and equipped according to international norms. Alternative tourism is usually based on small locally owned accommodation units, and reflecting local values and ways of life of the local community. Weaver (1998) questioned whether alternative tourism should exist as a separate category at all, or whether it should just be included as another special segment.

It should be highlighted that alternative tourism seeks to feature and protect local culture, and to involve the community in such ways that local people benefit fully. Doswell (1997) suggested that it is tourism which aims to be better assimilated and more supportive of local aspirations. Alternative tourism promotes the use of local materials, and the development of a whole range of other participating tourism services.

2.10.3.2 Conflicts

It should be mentioned that growing public awareness of, and interest in, the environment has led pressure groups like Friends of the Earth and Tourism Concern to articulate widespread concern that exerts increasing influence upon commercial and government sections of the industry. France (1997) however, argued that environmental destruction can even occur in those destinations that promote so-called 'alternative' tourism, which is alleged to be more sustainable than other forms of the industry (Burns and Holden 1995). But while emphasis is frequently laid on the negative effects of tourism on the natural and man-made environment, it must be noted that benefits can also accrue.

As previously mentioned, the term ecotourism is surrounded by confusion (Mowforth, 1992), if it is a form of 'alternative tourism', but what is 'alternative tourism'? (Table 2.2) Is it sustainable (however defined)? The list is endless and it is feared, much of the debate would be counter-productive. Cater and Lowman (1994) suggest that it is perhaps helpful to view 'alternative tourism', with all its own difficulties of interpretation generally taken to be alternative to mass tourism, as the generic term. Ecotourism can then be seen as a particular variant of alternative tourism.

Sustainability and sustainable tourism are rich fields of discourse and debate, potentially never-ending for academic community. Even so called "ecotourism" or adventure tourism, which is specifically designed to "exploit" the natural beauty of wilderness areas, can have disastrous effects for the very environment on which it depends. Where occasional hikers once left only their foot pints, thousands of people are new literally loving nature to death! (UNEP, 1992). It is important to think in terms of "regenerative" tourism, using protected areas such as world Heritage sites and other attractions to promote the transition of local and national economies around the world to sustainable development models.

2.10.4 Regenerative tourism

Weaver (1998) notes that '*regenerative tourism,* would also involve the renewal or development of infrastructures that is consistent with the sustainable development of the entire country, not just the tourism sector. By ensuring, for example, that tourists' hotels are equipped energy saving schemes, a labor- and skill- intensive industry based on local materials and construction techniques could also be promoted. It has been noted that training programs to improve the techniques needed to be expanded to include the design and construction of buildings based on traditional architecture concepts.

Table2.2
WTTC Environmental guidelines

Travel and tourism are the world's largest industry. A clean, healthy, and safe environment is essential to further growth. The WTTC commends these guidelines to companies and governments to take them into account in policy formulation.

- Travel and tourism companies should state their commitment to environmentally compatible growth.
- Targets for improvements should be established and monitored.
- The environment commitment should be company-wide.
- Education and research into improved environmental programmes should be encouraged.
- Travel and tourism companies should seek to implement sound environment principles through self-regulation, recognizing that national and international regulation may be inevitable and that preparation is vital.
- Environmental improvement programmes should be systematic and comprehensive. They should aim to:
    1. Identify and minimize product and operational environmental problems, paying particular attention to new projects.
    2. Pay due regard to environmental concerns in design, planning, construction and implementation.
    3. Be sensitive to conservation of environmentally protected or threatened areas, species and scenic aesthetics, achieving landscape enhancement where possible.
    4. Practise energy conservation.
    5. Reduce and recycle waste.
    6. Practice fresh-water management and control sewage disposal.
    7. Control and diminish air emissions and pollutants.
    8. Monitor, control and reduce noise levels.
    9. Control, reduce and eliminate environmentally unfriendly products, such as asbestos, CFCs, pesticides and toxic, corrosive, infectious, explosive or flammable materials.
    10. Respect and support historic or religious objects and sites.
    11. Exercise due regard for the interests of local populations, including their history.
    12. Consider environmental issues as a key factor in the overall development of travel and tourism destinations.

Source: Weaver (1993)

2.10.5 Mass-tourism/ecotourism integration

Essentially, the notion that ecotourism is naturally incompatible with *3s* tourism, or mass tourism, should be discarded. Needless to say, there will be circumstances under which the two do not overlap, as in remote natural areas or the cores of intensive high-rise resort areas. However, between these two extremes are unlimited opportunities for integrated products. From the mass-tourism perspective' this can be achieved by increasing the availability of diversionary ecotourism opportunities even within natural or naturalized sections of the resort property, so that clients are gradually introduced to the concept.

2.11 The future

2.11.1 Future Pressures

Briguglio et al (1996) state that there is every reason to believe that the growth of ecotourism, recently estimated to be around 10 per cent per annum, will be sustained. Meanwhile, it is unlikely that this market segment will grow to take on all the characteristics of a mass market (Fennell and Smale, 1992).

Wahab and Pigram (1997) points that today the number of international tourist arrivals is close to twenty times what it was in 1950, and question if this trend would be expected to continue? The last long term travel forecasts, the fifth set published by the Economist Intelligent Unit (EIU), leave no doubt. Travel is projected, in terms of trips made, from each of the world's thirty leading countries of origin to each of ten standardized major destination regions (e.g. the Caribbean, with twenty-nine destinations), of which the Europe/Mediterranean region is by far the most important (Edwards 1994).

> The EIU's forecasts expected world tourism to grow significantly more slowly in 1989-95 than in the 1980s. This is largely, but not solely due to the impact of the 1991-92 economic recession. During 1995-2000 there should be an appreciably faster growth, but with some slowing after 2000. During 1989-2005 as a whole the forecast overall growth rate of 4.2% per year in terms of trips is expected to be very similar to that experienced during 1980-89, these forecasts would need to be reassessed after September the 11th.

In 1995 the World Tourism Organization published its own global tourism forecasts. They are in line with the projections of Edwards (1994). For the period 1990-2000, WTO predicted a worldwide growth rate 3.8%, and for the next decade, 2000-10, 3.6%. This would to 661 million international arrivals in 2000 and 977 million in 2010.

Basically, Ramsamy (1992) concluded that the world tourism success in the future would be dependent on the environment and on the will to translate the many good intention for environment protection into actions. Consequently, coordinated action for the formulation of the appropriate development strategies, and the adoption of integrated planning techniques at tourist destinations, are necessary to ensure that the development of tourism is made economically viable, socially acceptable and environmentally sound, briefly, sustainable.

2.12 Sustainable Tourism

2.12.1 New terms

Recently there has been increased emphasis on alternative forms of tourism, although none of these options constitute truly sustainable tourism. Even small group alternative tours can be damaging. Enterprising travelers who penetrate new and as yet un-spoilt areas accidentally become the pioneers of tourism development. Cater and Goodall (1997) highlight that green or eco-tourism may satisfy environmentalists, but unless the needs of the local population are also considered there will be no guarantee of sustainability. New linguistic terms have been coined to express new problems. In the last few years, progress and development have begun to be spoken of in a negative sense.

Terms such as "sustainable development " were quite unusual twenty years ago when it occurred to almost no one that the environment is a limited asset that must be respected and not abused. It was only later that people began to question the possibility of maintaining development, but of a sustainable nature and in harmony with the environment. This is not the same as zero growth. Growth must continue but in a balanced and structured manner, and not at any price (Calvia Agenda Local 21, 1996).

Primarily, the 1992 Earth Summit has been responsible for the worldwide increase in awareness of the links between ecologically sustainable developments and environmental management. According to Wahab and Pigram (1997) this has been translated into growing endorsement of sustainability as an essential element in the development and operation of tourist facilities within the tourism industry. Meanwhile, much skepticism remains as to the extent of the commitment to sustainable tourism in a period of unprecedented growth.

Despite the focus made by The Earth Summit and the claims made that tourism is one of the largest world industries and that international financial exchanges involved in tourism are comparable to those involved in oil and armaments, the most referenced document on sustainable development, Our Common Future (World commission on Environment and Development, 1987) does not even mention tourism. Wall (1997) indicates that this is a major oversight and it reflects a lack of appreciation of the tourism industry significance.

2.12.2 Definitions

Salem (1997) notes that the Globe, 90 Conference on Environment and Industry, defined sustainable tourism as,

> *"...The management of tourism resources in such a way that fulfills economic, social and aesthetic needs while maintaining cultural integrity, essential ecological processes, biological diversity and life supporting systems."*

Inskeep (1992) suggested that,

> *Continuous maintenance of environmental resources and cultural integrity, while still bringing equitably distributed socio-economic benefits of tourism to residents of the tourism area, is the essence of sustainable tourism development.*

Sustainable development as France (1997) illustrated has been traditionally defined as development that involves the use of renewable natural resources in away that does not degrade them. Redclift (1987) suggested the term assumed that lessons learned from ecology could be applied to economic practices. As a result, not only should such development preserve environmental quality in the long run, but it should also maintain or increase productivity (Tolba, quoted in Elliott, 1994). It is therefore resource-based or asset-led development, rather than that controlled by purely market forces, that is one of the cornerstones of sustainable development in general and sustainable tourism development in particular (Owen, 1991).

According to Inskeep (1992) sustainable tourism was defined by the Globe, 90' conference on Environment and Industry as:

> *"The management of tourism resources in such a way that fulfills economic, social and aesthetic needs while maintain cultural integrity, essential ecological process, biological diversity and life support systems".*

Butler (1993) who is one of the most articulate critics of sustainable tourism has defined it as follows:

> *'Tourism, which is in a form which can maintain its viability in an area for an indefinite period or time'.*

He further opposed this with a definition of sustainable, development in the context of tourism as;

> *'Tourism which is developed and maintained in an area (community, environment) in such a manner and at such a scale that it remains viable*

over an indefinite period and does not degrade or alter the environment (human and physical) in which it exists to such a degree that it prohibits the successful development and well-being of other activities and processes'.

The distinction is critical in France (1997) view; she added that it is one that is not grasped by many supporters for sustainable tourism. It is essentially the distinction between a single-sector and a multiple-sector approach to development.

The first definition places the emphasis on the continuation of tourism to the neglect of other potential uses of scarce resources. However, tourism competes with other activities for the use of limited resources. The misuse of resources may be in the narrow interests of the tourism industry, but may not be in the best interests of the broader community of interests of which tourism is only a part.

The second definition recognize that tourism is unlikely to be the sole user of resources and that a balance must be found between tourism and other existing and potential activities in the interests of sustainable development. In other words, trade-offs between sectors may be necessary in the interests of the greater good.

2.12.3 Principles of Sustainable Tourism

In a very narrow sense excluding or restricting people from particularly vulnerable areas can achieve ecological sustainability. France (1997) suggests that the only realistic approach in her perception is to agree priorities. If the main aim is agreed to be to satisfy the needs of tourists, then the needs of others are of lesser importance. If conservation of the physical environment is of paramount concern, then the needs of people-both tourists and local inhabitants at the destination-are relatively unimportant. In this respect, MacGregor (1993) listed seven principles, which should be used to guide sustainable development:

1) Do not exceed Carrying capacity;
2) Maintain biodiversity;
3) Minimize depletion of non-renewable resources;
4) Promote development that maintains natural wealth;
5) Encourage equitable distribution of costs, benefits and management responsibilities;
6) Allow effective participation of local communities and other interest groups in the decision-making process; and
7) Encourage others to help promote sustainability.

On the other hand, Muller, is above all concerned with improving the quality of life and distinguishes five interacting variables: economic health; the subjective well-being of the locals; unspoiled nature and the protection of resources; healthy culture; and the optimum satisfaction of guest requirements. He thus places less emphasis on the environment and more on the social and cultural well being of the local inhabitants (Briguglio, 1996). In an attempt, to amalgamate the above-mentioned visions; the achievement would be, meeting the needs of the people without compromising the fragile environmental assets (Box 2.2).

Box 2.2
Sustainable tourism principals and objectives

CHARTER FOR SUSTAINABLE TOURISM
OUTLINE OF PRINCIPLES AND OBJECTIVES

1. Tourism development should be based on the criteria of sustainability. It should be: ecologically bearable; economically viable; and ethically and socially equitable for local communities.
2. Tourism should contribute to sustainable development and be integrated with all aspects of the environment, respecting fragile areas and promoting the assimilation of impacts so that these lie within capacity limits.
3. Tourism must consider its effects on the cultural heritage and traditions of local communities.
4. Participation of all actors in the process is essential.
5. Conservation of the natural and cultural heritage involves cooperation, planning and management.
6. The satisfaction of tourists and preservation of destinations should be determined together with local communities and informed by sustainable principles.
7. Tourism should be integrated into local economic development.
8. Tourism development should improve the quality of life.
9. Planning tourism is important.
10. Equity of the benefits and burdens of tourism should be sought.
11. Special priority should be given to environmentally and culturally vulnerable areas and areas already degraded.
12. Alternative forms of tourism compatible with sustainable principles should be promoted.
13. Research should be promoted.
14. Environmentally compatible management systems should facilitate a sustainable tourism policy.
15. The travel industry should promote sustainable development, exchange experiences etc.
16. Particular attention should be paid to transportation and the use of non-renewable energy.
17. Codes of conduct should be established for the main actors.
18. All necessary measures should be implemented to promote awareness of sustainable tourism among all involved in tourism.

Source: France (1997)

Tourism sustainability is a byproduct of a multitude of factors that contribute to the successful present integration and future continuity of tourism at the macro-and micro-levels in destinations. It should be noted that as all socioeconomic, cultural, political and environmental factors are subject to change in time and space, sustainability is therefore a relative term and not an absolute fact.

2.12.4 Sustainable tourism and sustainable development

In 1973 (Erbes) commented that everything seems to suggest that developing countries look upon tourism consumption as 'manna' from heaven that can provide a solution to all their foreign settlement difficulties. Although this statement was considered by some authors as a simplistic presumption it is, however, a useful introduction to the topic of tourism and development (Wahab and Pigram, 1997).

2.12.4.1 The nature of the development

Development has been illustrated as a slippery term, it is differently perceived by different people, and these meanings are changing over time. The term is value-laden, incorporating a mix of material and moral ideas encompassing; both present and future states; what currently exists and how it came to be; as well as what might be brought into being in the future.

Earlier formulations focused primarily upon economic matters, by the time definitions have tended to be broadened and developments have gradually come to encompass as well as, economic aspects, also, social, environmental and ethical considerations. Moreover, its measurement may incorporate indicator of poverty, unemployment, inequality and self-reliance (table 2.3).

Table 2.3
Sustainable development Components

1. Establishing ecological limits and more equitable standards	'Requires the promotion of values that encourage consumption standards that are within the bounds of the ecological possible and to which all can reasonably aspire.
2. Redistribution of economic activity and reallocation of resources	Meeting essential needs depends in part on achieving full growth potential and sustainable development clearly requires economic growth in places where such needs are not being met.
3. Population control	Though the issue is not merely one of population size but of the distribution of resources, sustainable development can only be pursued if demographic developments are in harmony with the changing productive potential of the ecosystem.
4. Conservation of basic resources	Sustainable development must not endanger the natural systems that support life on Earth: the atmosphere, the waters, the soils, and the living beings.
5. More equitable access to resources and increased technological effort to use them more effectively	Growth has no set limits in terms of population or resource use beyond which lies ecological disaster ... But ultimate limits there are, and sustainability requires that long before these are reached the world must ensure equitable access to the constrained resource and reorient technological efforts to relieve the pressure.
6. Carrying capacity and sustainable yield	Most renewable resources are part of a complex and interlinked ecosystem, and maximum sustainable yield must be defined after taking into account system-wide effects of exploitation.
7. Retention of resources	Sustainable development requires that the rate of depletion of non-renewable resources foreclose as few future options as possible.
8. Diversification of the species	Sustainable development requires the conservation of plant and animal species.
9. Minimise adverse impacts	Sustainable development requires that adverse impacts on the quality of air, water and other natural elements are minimised so as to sustain the ecosystem's overall integrity.
10. Community control	Community control over development decisions affecting local ecosystems.
11. Broad national/ international policy	The biosphere is the common home of all humankind and joint management of the biosphere is prerequisite for global political security.
12. Economic viability	Communities must pursue economic well-being while recognising that [government] policies may set limits to material growth.
13. Environmental quality	Corporate environmental policy is an extension of total quality management.
14. Environmental audit	An effective environmental audit system is at the heart of good environmental management'.

Source: France (1997)

2.12.5 The Growth of Tourism
2.12.5.1 Limits to Growth

Since 1950, destinations around the world have experienced pressures from the growth of tourism demand. In the period 1950-90, the growth of international tourism arrivals has averaged 7.2 % per annum according to Cooper (1997), whilst in expenditure terms (excluding international transport) the annual average increase has been 12.3% (WTO, 1994). In the 1990s the rates of increase have moderated, although they are still positive despite both economic and political constraints in some regions.

Wahab and Pigram (1997) suggested that over-dependence on the growth of tourism is seen as a danger because of its sensitivity and vulnerability to external forces beyond its control. The adoption of the disciplined, long term perspective provided by strategic planning for both destination and markets ensures that tourism becomes a renewable resource at each stage of its life cycle. Sustainable tourism means putting the environment first and enhancing 'new tourism', or the packaging and marketing of non-standardized leisure services, alongside mass tourism.

2.12.6 The 'new' tourism

Sustainability has been perceived and described as a crucial part of the ideology of the 'New World Order' and all the movements and tendencies that are linked with it. Another aspect of relevance to the sustainability of tourism is the recognition in some quarters, that 'mass packaged tours' may be just as sustainable as some of the 'new forms of tourism'. Mowforth and Munt (1998) point that such recognition has been made by organizations such as Tourism Concern, Green Globe and by some in the industry; on the basis that sustainability is not the exclusive concern of new forms tourism. But it is the language and terminology of the new forms of tourism (Box 2.3), which have been used in the attempt to embrace sustainability

Box 2.3
Terminology of tourism new forms
Key themes and key words

Key themes

Key words		*Uneven and unequal development*	*Relationships of power*	*Globalization*	*Tourism and geographical imagination*
	New tourism	Majority of tourists from the first World especially new tourists	First world owns majority of tourism resources	Places drawn into global tourism, and new tourism spread	'Benidorm' v. 'Himalayas' independent v. mass tourism
	Third world	Third world's is structurally disadvantaged-global inequality	Third World required to adjust structurally for First World instructions	Third World increasingly independent with the First World	Third World as poverty stricken Third World as environmental paradise
	Sustainability	First world prescribing solutions: 'think globally, act locally'.	Third World governments and NGOs clash at the Rio Summit over First World	'Think globally, act locally'. Planet Earth-global environmental interdependency	Third World environments as sizeable tourism assesses Third World environments need saving

Source: Mowforth and Munt (1998)

2.12.7 Trade offs

The arguments should be about whether the environment is harmed, and whether development is sustainable, sustainable indicates continuity. Moreover, development is meant to enhance and conserve the world for future generations. On the other hand, Doswell (1997) suggested that there is a danger of using up non-renewable resources and leaving the world a progressively poorer place, this not sustainable. Every time people act, it usually means that something is gained and something is lost. Environmental issues are largely a question of trade offs; development takes place but resources are used.

Essentially then, sustainable development is a trade-off between the needs and aspirations of the present, and those of the future (Archer and Cooper, 1994). Butler (1993) disputed the use of the term *sustainable tourism,* arguing that it might involve the maintenance of tourism itself, whatever its impacts, rather than the maintenance of the human or physical context within which the tourism occurs. However, he supported the term *sustainable tourism development* as:

> *"Tourism which is developed and maintained in an area (community, environment) in such a manner and at such a scale that it remains viable over an indefinite period and does not degrade or alter the environment (human and physical) in which it exists to such a degree that it prohibits the successful development and well being of other activities and processes".*

Thus, sustainable tourism is conceived as a form of tourism that facilitates sustainable development.

2.12.8 Challenges in achieving sustainable tourism development

Basically, there is nothing as practical as a good theory, but too many over-abstract theories do not get us any further either, as a matter of fact; they quickly provoke counter reactions and rejection. In France (1997) point of view, this might be the first challenge. It should be realized by researchers and critics that a *'saturation point'* is about to be reached, where on one hand there are too many 'experts' with too much advice and on the other hand, too few agents with too few resources and too little time to act.

A second possible challenge lies in continuing *'pressure from demand'*. The boom factors in tourism growth, in particular the still expanding leisure budget of many sectors of the population, and ever-greater willingness to travel as a way of giving life a meaning, are producing an increasing flood of travelers.

A probable third challenge of achieving sustainable tourism development lies in the increasing *hedonistic* (pleasure-seeking) *philosophy* of many people. Despite empirical research revealed a growing awareness of responsibility towards future generations or more and more environmental consciousness, however, the trend towards indulging in pleasure and enjoyment and living life to the full continues virtually undiminished.

Fourthly, to achieve genuine environmentally and socially compatible tourism development, jargon and a few isolated changes of attitude are not enough, this calls for a more global *change of pattern.*

In this respect, Inskeep (1992) suggested that sustainable tourism requires and gives the opportunity of reconciling otherwise conflicted interests. Moreover, it works on consensus-based and synchronized type of actions on different fronts. The procedure starts with setting up an appropriate policy for development, management and monitoring, briefly, proper planning.

2.13 Tourism planning, models and scenarios

2.13.1.1 Concepts in planning sustainable tourism

Through the integration of the viewpoints of at least three disciplines, it has been assumed that real progress toward sustainable tourism growth is to be made (Serageldin1993):

a) Those of the *economists* whose methods seek to maximize human welfare within the constraints of existing capital stock and technologies.

b) That of the *ecologists* who stress preserving the integrity of ecological subsystems viewed as critical for the overall stability of the global ecosystem.

c) That of the *sociologists* who emphasize that the key actors are human beings whose pattern of social organization is crucial for devising viable solutions to achieving sustainable development.

The viewpoints of the three disciplines have to be integrated under the guidance of tourist expertise to forecast future demand, inducing values integrating tourism development projects into a sustainable framework that would warrant sustainable tourism growth. Cooper (1997) highlighted that these considerations have to be added to the design criteria and land-resource use conceptualization introduced by the architect-planner.

Planning and management can occur at many different scales. France (1997) emphasized that a piecemeal approach is inevitably less successful than a carefully structured policy defining and applying appropriate principles at every level.

2.13.1.2 Planning as a part of management

Due to the influence of physical planners, tourism planning is often treated separately from management. The term planning has tended to apply historically to the design of buildings and urban areas. The design was completed and then construction took place. This is a project-oriented approach, however, marketing, financial and operational inputs may well influence this design, but not in a continuing way.

> France indicated that design and planning are not seen in an overall management context (fig 2.14). Tourism development master plans are often treated in a similar project oriented way. She further added that planning is not seen as a part of a complex sectoral management process but merely as a forerunner to construction. In order to produce a sense of common purpose people and organizations should focus on the objectives and results they want to achieve-in space and time-from the inception to the commissioning of the development in question.

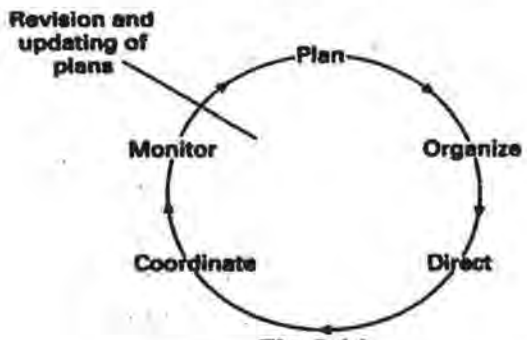


Fig 2.14
Cycle of management
Source: Doswell (1997)

The spectacular scenery and unspoilt coves of the Costa Brava and kilometers of deserted beaches on the Costa Daurada, originally the source of attraction for tourists to Catalonia-Spain, cannot be restored. Development introduced not only transformations but also environmental degradation. In this case, sustainability is questioned as a relevant issue. Needless to say, sustainability defined as 'maintaining a balance between the use and conservation of the natural environment' is obviously not a workable option in this case.

The Catalan coast is the paradigm of rampant, uncontrolled development, and certainly demonstrates the worst contradictions between the classic model of mass tourism development and the environment, aggravated enormously in this case by the superimposition of international mass tourism with domestic residential tourism".

Priestley et al (1996) concluded that the principal lesson to be learnt is the necessity for planning: planning for development, planning for conservation and planning for sustainability. Attention should be paid to the narrow coastal fringe for it is the most vulnerable, the most difficult to regenerate, the most unique and the most valuable tourist attraction. It is crucial to avoid ribbon development, designating some areas for development and others for total protection.

2.13.2 Models

It is apparent for Barke et al (1996) that there are three broad interpretations or models of what sustainable tourism is or should be.

- The first interpretation referred here to as 'shallow' sustainable tourism, focuses on identifying and then minimizing environmental and social impacts at any specific tourist destination. Shallow sustainable tourism tends to address the symptoms of poorly managed tourism rather than the causes (which may lie outside the tourist system).
- The second interpretation is closely aligned to the ideas of alternative tourism, green tourism and ecotourism, ecotourism means greater awareness and understanding of a destination's environmental needs and even taking part in environmental improvement schemes, by developers, operators and visitors, while making profit.
- A third and more radical interpretation of sustainable tourism recognizes that the concept of sustainable development entails every element engaged in the tourist system. 'Deep' sustainable tourism recognizes that the root of the problem lies in the way that stakeholders within the tourism industry have treated the environment as a 'free good', seen to be limitless and exploitable by whoever is willing to make the initial investment.

2.13.3 Scenarios

Consequently, it can be seen that the major role-players in tourism all have a stake in sustainable tourism where there interests are in many ways tied to one another and to sound environmental practice. As mentioned-above, the protection of the environment is an essential part of ecotourism development. Cater and Lowman (1994) emphasized that without sufficient environmental protection ecotourism development precisely, and development prospects generally, are undermined, compromising the present and future prospects of tourism organizations, tourist guests and host destinations alike, they demonstrated different scenarios (fig. 2.15) for development and environment situations.

2.13.3.1 The win-win scenario

This is the situation where the positive links between environment and development result in environmental improvement, with the promotion of income growth. In the field of ecotourism, such situations arise where sound environmental and business practices coincide. The most obvious win-win situation is, perhaps, in the field of energy conservation, a double-edged sword that will reduce consumption of fossil fuels and consequent carbon dioxide emissions and reducing costs and enhancing profits at the same. Hence, Conflicts will occur between the different interests involved, therefore, it is possible to identify three further scenarios in addition to the win-win case.

2.13.3.2 The win-lose scenario

This is represented by the situation where the environment benefits, but where other interests may lose out.

2.13.3.3 The lose-win scenario

This situation occurs when the environment may be downgraded whilst other interests benefit, is a lose-win situation, even if it may only be short-lived. An example of this is the case of coastal tourism development, where short-term profit maximization compromises the environment.

2.13.3.4 The lose-lose scenario

As a result from the degradation of the very resources, which attracted tourists in the first place, all interests are compromised. Indeed, without proper management this is likely to be the end state of the two previous scenarios. A prime example is the destruction of offshore coral reefs. Destruction of the coral reefs not only has an opportunity cost in terms of the loss of the very resource which attracted tourists in the first place, but also results in the loss of a protective barrier against coastal erosion. Ironically, therefore, it may result in the erosion of the sandy beaches which were also part of the tourism attraction, as has been evidenced along the coasts of Tanzania, Bali and Barbados.

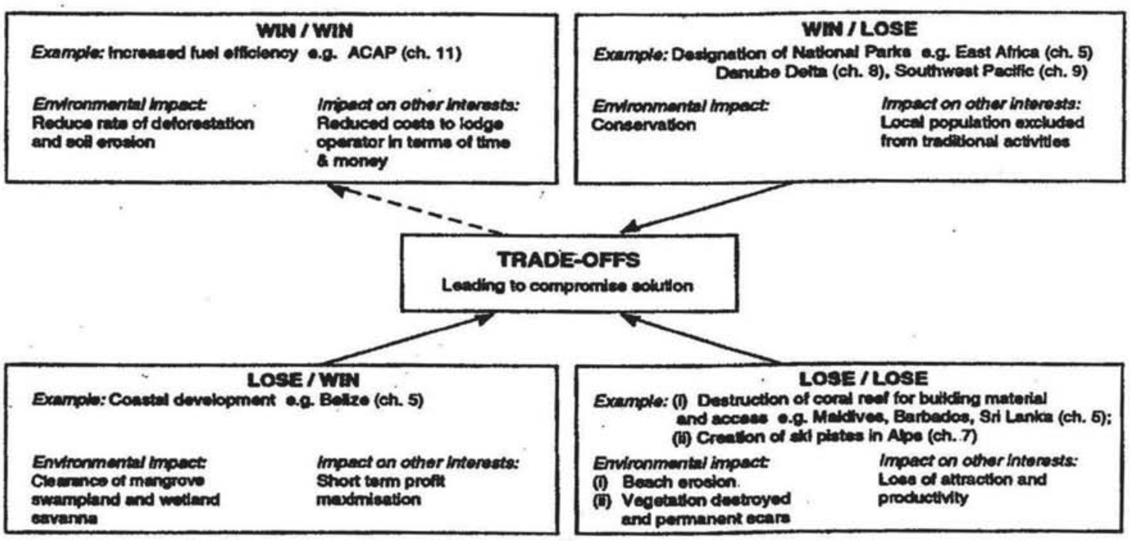


Fig 2.15
Examples of mixed outcome of ecotourism for the environment and development
Source: Cater and Lowman (1994)

2.14 Different experiences

2.14.1 Tourism in Spain

Sustainable tourism is tied in closely with the numerous environmental issues and problems that affect Spain and the common earth resources, but the interface between tourism and the environment is not simply one of cause and effect as Barke et al (1996) assumed. There are numerous examples that serve to illustrate the negative impacts that the tourism development process have upon environment. Planning policies have increasingly sought to meet and maintain environmental standards in the mass tourism resorts.

The Spanish 'model of development' demonstrates the role which foreign currency provided for other sectors of the Spanish economy, however, as Sinclair and Go'mez (1996) argue that the tourism sector is itself facing a number of problems. Other environmental friendly destinations are strongly competing with Spain.

A general report prepared by the European Commission in 1997 featuring the background of the Spanish tourism Industry stated the following:

- Tourism is one of the main sectors of the Spanish economy. It employs over 11% of the population and accounts for approximately 8% of GDP.
- There are extreme variations characterizing the Spanish tourism industry. An urban orientation, with tourism derived from city hotels characterized by short stays. On the other hand, there is the dominant holiday orientation.

There is a general lack of coordination and planning in the tourism sector, and issues are raised about its impact on the environment. Spain has been successful in developing mass holiday tourism, which traditionally has a low level of purchasing power and therefore seeks a low-quality offer. This is incompatible with the specialist, quality tourism which most Spanish organizations have been trying to promote in recent years.

The Spanish tourism experience is generally derived from 'mass tourism'; on the other hand, other destinations introduce themselves as the capitals for ecotourism.

2.14.2 Tourism in the Caribbean

2.14.2.1 The Island of Dominica

The policy developed by the government of Dominica commits the country to tourism based on the full participation of the people of Dominica, so as to improve their quality of life. Douglas (1992) noted that inherent in this policy is the fact that Dominica wishes to attract tourists who enjoy the country as it presently is, rather than those reckoning transformation into another "Caribbean beach resort". Visitors to Dominica could be divided into two groups; "excursionists" or visitors who stay less than one day (primarily cruise ship passengers) and "stay over" visitors who stay more than one day.

The following have been indicated as negative impacts by tourism on the environment by those involved in the industry, although not based on scientific study:

- There is a problem with litter due to the lack of garbage disposal facilities.

- Cruise ships also dump garbage that sweeps ashore and pollutes beaches;
- Soap is used in rivers and natural ponds.
- Flowers and plants are collected in protected areas.
- Cruise ship passengers are considered the biggest offenders in regard to these environmental problems coming in such large numbers.

2.14.2.2 Ecotourism issues

The Dominica case study (Douglas, 1992) highlighted several issues related to Ecotourism that has to be considered;

It is important that government policy clearly articulates a commitment to the protection of the natural resource base and the development of tourism, which is sensitive to the environment. Careful planning to establish carrying capacity levels. There is a very little understanding to this concept resulting in the destruction of the resource by the very people who have come to enjoy it. The management of protected areas that facilitates the possibility of minimizing the negative impacts of tourism. Development of ecotourism would require the involvement of a much wider cross-section of the population, as visitors would no longer be "locked away", but would have to interface with the local population.

Finally, it will be important that ecotourism benefits the local population.

2.14.3 Tourism in the Maldives

Inskeep (1992) suggested that the primary tourist's attractions of these islands are the warm, sunny climate, scenic island beauty, and activities related to the extensive beach and marine environment. The physical configuration of tourism development in the Maldives is a highly unusual one, each resort occupies a separate island and is totally self contained. The resort islands are accessible only by boat from the international airport. The ministry of tourism has the power to close substandard resorts. The coral island and reef ecosystem is extremely fragile, and the government recognizes that both fishing and tourism are dependent upon the preservation of this ecosystem.

2.14.3.2 Education and training for tourism

A public education program has been implemented to educate the local about tourism, emphasizing the economic importance of this sector and raising the environmental consciousness of those involved in it.

The Maldives has taken the approach of careful but flexible planning, including experimentation with different development tourism techniques. Close coordination is maintained between the public and private sector. These approaches have been very successful in achieving sustainable economic benefits while still conserving the natural environment and culture of the people.

2.14.4 Tourism in Mauritius

Ramsamy (1992) identified the principal attractions of the island as the traditional 3s *(sun, sand and sea)*. Maintaining the recreational prestige of a tourist zone in the long term is on top of the tourism development agenda. In order to discourage traffic congestion and ribbon commercial development, the construction of major roads through tourist zones have been avoided. Priority in such areas is therefore given to the construction of more scenic roads.

2.14.4.2 Development in coastal tourist zones:

Development is based on the following requirements, which are approached from environmental point of view;

- No resorts exceed 200 rooms.
- Max height 12 meters, that of a palm tree.
- Water sewage plants are compulsory for hotels above 75 rooms.
- Septic tanks duly approved for less than 75 rooms by the ministry of health depending on their distance from the sea and soil absorption.
- Suitable architectural designs.
- Adequate provision for landscaping.
- Health regulations should be strictly abided with.
- Marine ecosystem should as far as possible remain untouched.

In essence, specific environmental impact control should be exercised to mitigate the possible negative sides of tourism development.

2.14.5 Tourism in Australia

Australian Tourist Commission research indicated that a considerable proportion of the international tourists who came to Australia in 1993 ranked natural phenomena as major factors influencing their choice of Australia as a tourist destination. Jones and Tear (UNEP-1995) highlighted the aims of the National Ecotourism Strategy which were identified by the following three aspects:

1) To identify the major issues that affect, or are likely to affect, the planning, development and management of ecotourism in Australia;
2) To develop a national framework that would guide ecotourism operators, natural resource managers, planners, developers, and all levels of government towards achieving a sustainable ecotourism industry; and
3) To formulate policies and programs that would assist interested parties to achieve a sustainable and viable ecotourism industry.

Contradicting examples have been introduced in the above literature, ranging from 'mass tourism' to 'ecotourism'. It has been highlighted that alongside the many negative impacts associated with tourism, there are also potential gains for the host communities. However, they are not evident in all cases, and where they occur, may often be distributed quite unequally. Local residents achieve more benefits when tourism activities are detached, if local residents have adequate access to the markets for accommodation, catering and transport and if they are allowed to play an important decision making role in tourism related activities. Finally, Shash and Gupta (2000) mentioned that it is clear that the impacts are not static-processes of change and threads of continuity are interwoven into a dynamic process that varies from place to place and over time.

CONCLUSION

Tourism boom after the Second World War was due to high income, cheaper and better transportation systems, and more time off. The 'package' tour developed along with charter air transport and mass international tourism emerged. Clearly, the input of tourism into the world economy is obvious, moreover it has been forecasted that within the 21^{st} century international tourism will be the most important sector in world trade-in hope that the New York (2001) incidents would not severely affect the industry on the long term. In this respect, it is needless to mention the impact tourism has on the Egyptian economy, as a matter of fact, a recent study-above mentioned-concluded that the total expenditure generated by the tourist represents about "four" times the contribution of the hotels and restaurants to the economy.

It has been agreed that the environment is the major resource for the tourism industry; the abuse of this resource can lead to its destruction. In general terms, tourism impacts are perceived from physical, economical and social perspectives. Due to the current environmentally sensitive tourist, it has been evident that the world tourism success in the future will be dependent on the environment and the interpretation for the environmental protection slogans into actions. The procedure discussed is through the adoption of strategic planning techniques within the tourist destinations themselves to guarantee that tourism development is feasible economically, socially satisfactory and environmentally approved, in one word, 'sustainable'.

It has been suggested by Priestley et al (1996) that the key to sustainability in all cases is that the product offered is maintained in such a way that it satisfies consumer expectancies and therefore demand levels are maintained on a long-term basis. However Robinson (1996) suggested that the concept of sustainable tourism remains elusive. The much broader definitions of sustainable development, would undertake it as a process that is driven by the belief in the ability to achieve optimum balance between environmental quality and economic efficiency.

There is a considerable argument however that many, if not all, economic activities have an impact on the environment and that this has a feedback effect on the economy itself, especially in the case of tourism which utilizes the environment as a resource leading to 'spoiling one's own nest'. Hence, the keystone to sustainable tourism is in the recognition of the real essence of the whole course of action, bearing in mind that this would not happen spontaneously.

In this respect, Weaver (1998) argued that there is yet a considerable need for research in the area of sustainability that the current magnitude of sustainable tourism is impossible to estimate, since it is defined by future outcomes, which cannot be predicted in advance, the practices that have been approved sustainable at the present time may prove otherwise in the following decade.

Hence, it should be emphasized that sustainability in Egypt must not become a catchphrase due to its impression, the objective of the environmentally sustainable tourism development strategy, consequently, should be changing the 'tourism management approach' from one of short-term gain and resource depletion, to a longer-term approach for sound environmental management.

Finally, this chapter concludes that to achieve sustainable tourism, certain guidelines suggested by Wahab and Pigram (1997) might have to be adopted, amongst these tourism-planning guidelines, the following:

- A general tourism policy incorporating sustainable tourism objectives at the national, regional and local levels should be followed.
- Parameters established should be cross-sectional and integrated.
- Primary consideration should be given to the protection country assets.
- The distribution of tourism development projects,
- Public awareness for the tourism industry benefits,
- Throughout tourism planning stages, a scientific assessment program should be implemented in order to respond to markets changes.

In recent years the GOE has been paying closer attention to the environment. It is now mandatory to conduct an Environmental Impact Assessment (EIA). As Wong (1991) indicated that although the EIA refers to a formal document, it is actually a process to predict the future state of an environment arising from a certain economic activity.

An assessment is conducted so that environmental considerations are incorporated while a project is still at its planning stage. It has been noticed though that currently many EIAs might be based on outdated fieldwork, hence newly tourism market studies should be conducted where as to give the environment its due place in the decision making process by clearly evaluating the environmental consequences of a proposed activity. The following chapter further explores the EIA process, alternatives, monitoring and the mitigation of impacts as procedures within the tourism industry towards validated environmental conservation.

CHAPTER THREE

ENVIRONMENT IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT SYSTEMS

Introduction

The meaning of the word 'environment' essentially, and in its broadest sense embraces the conditions or influences under which any individual or thing exits, lives, or develops. The European Commission (EC) has defined the environment as 'the combination of elements whose complex inter-relationships make up the settings, the surroundings and the conditions of life of the individual and of society, as they are or as they are felt' (Giplin, 1995).

The world gradually became more aware of the global environmental degradation starting in 1972, when it became possible to conduct the first UN environment conference in Stockholm, the second in Nairobi, Kenya, and the third in Rio de Janeiro in 1992.

It has been highlighted by Wood (1996) that a systematic and integrative scheme notified as Environmental Impact assessment (EIA) was first developed in the USA according to the National Environmental Act of 1969 (NEPA) for considering possible impacts prior to a decision being taken on whether or not a proposal should be given approval to proceed. NEPA requires the publication of an environmental impact statement (EIS) describing in detail the environmental impacts likely to arise from an action.

In accordance with the environmental global awareness, the UN Economic Commission for Europe (UNECE)-1987 has stated that the purpose of the Environmental Impact Assessment (EIA). Where is to give the environment its due place in the decision making process by clearly evaluating the environmental consequences of a proposed activity before action is taken. The concept has ramifications in the long run for almost all development activity because sustainable developments depend on protecting the natural resources, which is the foundation for further development.

Glasson et al (1996) points that there has been a remarkable and refreshing interest in environmental issues over the past few years. The 1987 Report of the World Commission on the environment and Development (the Brundtland Report) provided a major momentum: the Rio Summit in 1992 sought to accelerate this momentum. Much of the discussion on the environmental issues and on sustainable development is about the better management of current activity in harmony with the environment.

Environmental assessment techniques can help both the environmentally sensitive developers, as well as designers to identify the likely development impacts at an early stage, and thus to improve the quality of both project planning and decision-making. Environmental impact assessment has spread worldwide and received a significant boost in Europe with the introduction of an EC Directive on EIA in 1985, which was implemented in U.K. in 1988.

In this respect, those involved in the EIA of coastal developments should have appropriate mitigation measures as one of their main objectives providing prescriptions for the proposed measures. The design team for a carefully planed program, and controlled techniques then uses these measures, where those techniques are further monitored as an important element of EIA.

Moreover, a global federation known as 'ISO' -International Organization for Standardization has promoted international standards that would enhance the quality of the final output. In essence, the ISO standards are totally voluntary and carry no legal requirements. Finally, auditing is explored as a system used to test mitigating and monitoring schemes and checks for policies and practices, which can improve corporate environmental performance.

3.1 Definitions

Definitions range from the oft-quoted and broad definitions of Munn (1979), which refers to the need "to identify and predict the impact on the environment and on man's health and well being of legislative proposals, policies, programs, projects and operational procedures, and to interpret and communicate information about the impacts". Further to the narrow UK Department of Environment (DOE) 1989 operational definition:

> *"The term 'environmental assessment' describes a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead" (Glasson et al 1996).*

Wood (1996) explains that principally EIA should lead to the abandonment of environmentally unacceptable actions and to the mitigation to the point of acceptability of the environmental effects of proposals that are approved. EIA is thus an anticipatory, participatory environmental management tool of which the EIA report is only one part.

3.1.1 Environmental impact assessment (EIA)

EIA as a 'science' or a planning tool has to do with the methodologies and techniques for identifying, predicting, and evaluating the environmental impacts associated with particular development actions. EIA as 'art' or procedure for decision-making has to do with those mechanisms for ensuring an environmental analysis of such actions and influencing the decision-making process (Fig3.1).

In 1988 Wathern has proposed EIA as 'environmental impact analysis' defined as a process having the ultimate objective of providing decision-makers with an indication of the likely consequences of their actions. Over the years it has become increasingly evident that the authorization of proposals is not the sole decision point. There are many decision-makers involved in the evolution of development proposals and the influence of most of them is exerted long before the submission of an application for formal project authorization.

Although the explanation is the same as for 'environmental impact assessment', the latter is commonly used for expressing this definition. However, it should be emphasized that EIA is not a procedure for preventing actions with significant environmental impacts from being implemented. Rather the intention is that actions are authorized in the full knowledge of their environmental consequences.

Basically, environmental impact assessment (EIA) seeks to assess the impacts of planned activity on the environment in advance thereby allowing avoidance measures to be taken: prevention is better than cure.

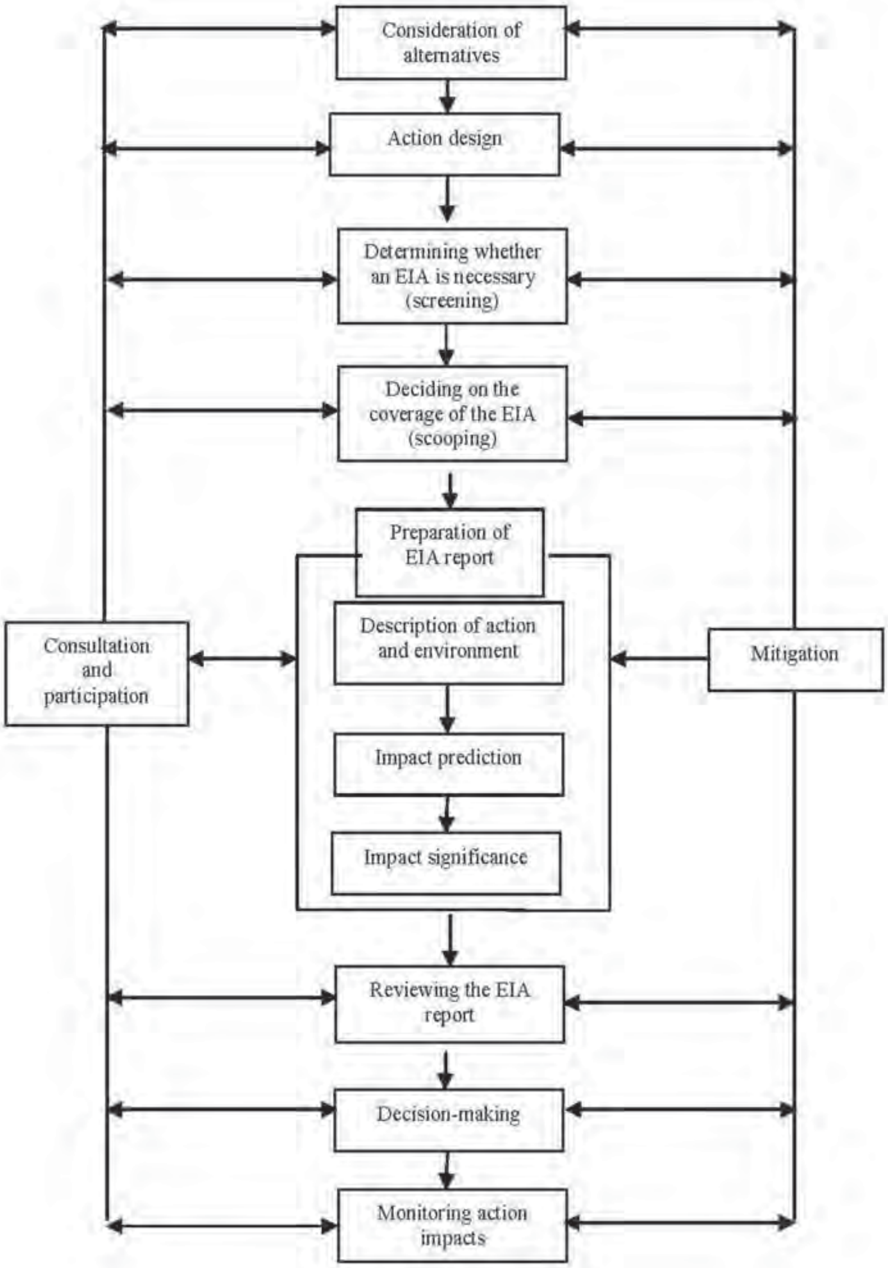


Fig 3.1
The environmental impact assessment process
Source: Wood (1996)

3.1.2 Environmental impact statement (EIS)

The outcome of an EIA is the EIS; environmental assessment and environmental appraisal are commonly adopted synonyms.

3.1.3 Environmental impact

The term 'impact' and effect are frequently used synonymously, although some have advocated differentiating between natural or man-induced changes in the bio-geophysical environment, effects, from the consequences of these changes, namely impacts. Environment systems are not static, but change over the course of time even without the influence of man. Some are very dynamic, while others only change imperceptibly.

3.1.4 Mitigation

Mitigation measures can be defined as measures that avoid, reduce, repair or compensate for a policy, plan or program (PPP) impact. For instance, Strategic Environmental Assessment (SEA) allows sensitive environmental areas to be avoided during plan making, rather than to be considered on 'ad-hoc', reactive basis for each development proposal. It may allow some of the potential negative impacts of one action to be used positively for another development.

3.1.5 Monitoring

Monitoring the PPP (policy, plan or program) has several aims; it tests whether the PPP is achieving its objectives and targets/benchmarks. It identifies any negative impacts requiring remediation. It helps to ensure that mitigation measures proposed in SEA are implemented; it gives feedback to assist in impact predictions for future SEAs. Monitoring thus needs to refer back to the environmental baseline impact predictions and mitigation measures (Therivel et al, 1996).

3.1.6 Other relevant definitions

Strategic environmental assessments (SEA) expand EIA from projects to policies, where the simple definition of SEA is that it is the environmental assessment (EA) of a strategic action: a policy, plan or program. In this respect, SEA should be seen as an EA tool, on a par with other tools such as project EIA, cumulative impact assessment and auditing.

SEA is: "the formalized, systematic and comprehensive process of evaluating the environmental effects of a policy, plan or program and its alternatives, including the preparation of a written report on the findings of that evaluation, and using the findings in publicly accountable decision-making" (Therivel et al, 1992).

Despite the research is focusing on the micro scale, SEA should be demonstrated as a more global view to the design approach. Where, it should be noted that the word 'strategic' in SEA has diverse meanings, in the sequence of decisions, from broad policy visions to quite specific programs of more concrete activities (Partidaro, 1994).

On the micro scale, the establishment of 'environmental policy' is crucial for organizations. The environmental policy is a certain interactive regulations working together, within a framework to accomplish the preset target by the top-level management.

3.2 The environmental policy

Reneger (1992) noted that the European Economic community (EEC) principal objective of the environmental policy is to preserve, protect and improve the quality of the environment. The principals whereby this objective is to be achieved are:

- Prevention is better than cure;
- Asses environmental effects at the earliest possible stage;
- The precautionary principle (i.e. areas of doubt should be determined in favor of the environment);
- The polluter pays principle.

Since 1973 there have been four-action program on the environment and a fifth-program has been proposed by the European Commission to cover the period 1993 to 2000. The program entitled 'Towards Sustainability' emphasizes the need for integration of the environmental considerations into the formulation of other policies and activities so as to retain the 'level playing field' of Europe and to ensure the highest level of protection for the environment. The five sectors, which have been targeted within the fifth-program for particular attention, are:

- Industry;
- Energy;
- Transport;
- Agriculture;
- Tourism.

Woolston (1993) argued that a policy is more than a statement of good intentions. Certainly, it is more than the development of codes of practice or operational guidelines. If an environmental policy does exist amongst some organizations, most probably it would consist of a nicely produced brochure, which is used to say proudly; 'This is what we are doing, our PR people have printed this'.

3.2.1 Environmental policy ingredients

As a matter of fact, prior to introducing environmental policy, a basic question needs to be asked; what is the environment.... there is no really any satisfactory working definition at the moment, according to Woolston. But, the essential ingredients of an environmental policy has been introduced in the following sequence:

- Published statement
- Clear objectives
- A board member should be appointed with environmental responsibility
- It is clear that policy has to be set at the top, and owned at the bottom. As the middle management will be in charge of implementing environmental policy, it is crucial that they are included in the policy making
- A clear communication plan is very important. The Staff needs to be aware of the organization's policy and fully trained to handle their new responsibility.

Finally, the policy should include the environmental, health and safety checks, which are ongoing in most companies anyway.

3.2.2 Environmental policy adoption

In this respect, what does a company have to do in order to adopt such ingredients of the environmental policy? Sppeding et al (1993) point that there are three layers of long-term policy within a company. If the company is looked upon as a building, the three layers represent its foundations, its superstructure and the use of which it is put.

The basic layer-the foundation layer-is found in the memorandum of association of the company. The memorandum sets out the organization's "objectives": the purpose for which it has been formed. The objectives are broadly stated and very rarely changed.

The second layer-the superstructure-consists of policies adopted by the company's shareholders in general meeting. These policies are primarily concerned with structural matters-for example, rights attached to shares, the company name, shares options schemes-and as such, are subject to occasional, but infrequent, alteration and "improvement".

3.2.3 Environmental policy requirements

Setting out an environmental policy and being adopted by organizations, certain requirements should be met, including the following:

- It must be appropriate to the nature, scale, and environmental impacts of the organization's activities, products, and services.
- It must include a commitment to continual improvement and prevention of pollution.
- It must include a commitment to comply with relevant environmental legislation and regulations and with other (voluntary) requirements to which the organizations subscribes.
- It must provide a framework for setting and reviewing environmental objectives and targets.
- It must be documented, implemented, and maintained (Woodside et al, 1998).

3.2.4 Environmental management systems

Sppeding et al (1993) defined the Environmental Management System as, "The organizational structure, responsibilities, practices, procedures, process and resources for implementing environmental management system".

The components of an environmental management system will normally be inextricably linked with an organization's corporate management system. Effective integration and coordination of the relevant areas of the corporate management system are essential to ensure consistent decision-making in relation to environmental matters.

3.2.4 Environmental management systems standard

The British Standard objective-as an example-is to specify requirements for 'the development, implementation and maintenance of environmental management systems. This objective aimed at ensuring compliance with stated environmental policy and objectives'. It is not the role or purpose of the standard itself to lay down specific environmental performance criteria (Renger, 1992).

3.2.4.1 General requirements for EMS documentation

Generally, Woodside et al (1998) viewed the requirements for environmental management system (EMS) documentation as deceivingly simple. Where, in essence, the standard requires the organization to establish and maintain information that describes the core elements of the EMS and their interaction, and to provide direction to related documentation. (Fig. 3.2)

Environment management system documentation pyramid
Fig 3.2
Source: Woodside et al (1998)

3.3 Environmental impact assessment (EIA) origins

EIA is about highlighting the predicted impacts that might occur due to a project implementation, the EIA has been air borne on the basis of the US National Environmental Policy Act and few years later; the EC due to its environmental concern has EIA into the center of its focus.

3.3.1.1 US National Environmental Policy Act (NEPA)

The US National Environmental Policy Act of 1969, also known as NEPA, was the first legislation to require EIAs to be carried out. The EIA is meant to be a proactive approach, where it will aid the decision-making process in its early stages and not to justify a decision already taken.

A "lead agency" is designated that coordinates the EIA process. The lead agency first determines whether the proposal requires the preparation of a full Environmental Impact Statement (EIS), no EIS at all, or a more concise, "Environmental assessment". This in turn would allow the agency to determine whether an EIS is needed or whether the preparation of a "finding of no significant impact" (FONSI) is appropriate.

3.3.1.2 EC directive 85/337

The EC was concerned about the state of the physical environment and eager to prevent further environmental deterioration. The EC's First Action Program on the Environment, (CEC 1973), already advocated the prevention of environmental harm:

> *"The best environmental policy consists of preventing the creation of pollution or nuisances at source, rather than subsequently trying to counteract their effects", and to the end, "effects on the environment should be taken into account at the earliest possible stage in all technical planning and decision-making processes".*

EIA research was commissioned by the EC starting from 1975. Five years later the Commission presented a draft Directive to the Council of Ministers (CEC 1980), which was circulated throughout the member states. In conclusion, and perhaps most challenging, it sought to make EIA requirements flexible enough to adapt to the needs and institutional arrangements of the various Member States, but uniform enough to prevent problems arising from widely varying interpretations of the procedures.

The EC's fifth action program, Towards Sustainability (CEC 1992), has been published. It stresses the importance of EIA, particularly in helping to achieve sustainable development, and the need to expand the remit of EIA. Given the goal of achieving sustainable development, it seems only logical, if not essential, to apply an assessment of the environmental implications of all relevant policies, plans and programs.

It should be pointed out that the directive differs in major respects from NEPA. Since it requires EIAs to be prepared by both public agencies and private developers, whereas NEPA does applies only to federal agencies. It does not require a clearly specified scoping, which NEPA does. Finally, it includes fewer requirements for public consultation than does NEPA (Glasson et al, 1996).

3.3.2 Uncertainty in EIA

A major aspect of management tools is the minimization of uncertainty. Jongh (1988) notes that the management of uncertainty is on one hand a very old component of our lives, daily, everyone takes decisions and in doing so, manages uncertainty. On the other hand, as a specific field, environmental management is a new area of concern. Appropriate management tools seem to be available, these tools need to be contingent to the variety of projects and with respect to their locations as well.

However, Morris and Therivel (1995) suggest that, since the first system of EIA was established in the USA in 1970, and even EIA systems have been worldwide a powerful environmental safeguard in the project planning process. However, uncertainty of what organizations or even groups are expecting from an EIA might still be the case.

The required contents of the EIS according to the EC directive 85/337, which provides the regulatory basis for the methods used in EIA, as following:

- Project description, the physical characteristics of the whole project and land-use requirements during construction and operational phases.
- Alternatives studied by the developer and the reason for his choice

- Description of the aspects likely to be affected, fauna and flora, soil, water, material assets, landscape and the interrelationship between the above factors
- Description of the likely significant effects of the proposed project on the environment resulting from the project, the use of the natural resources, description of the forecasting methods used to assess the effects on the environment
- Description of the measures envisaged preventing, reducing and where possible offsetting any significant adverse effects on the environment.
- Non-technical summary of information provided under the above headings.

Glasson et al (1996) further clarifies the requirements that will minimize the developer uncertainty about what he is expecting from the EIA, in the following sequence:

3.3.2.1 Screening

Further more, a screening mechanism seeks to focus on those projects with potentially significant impacts or where the impacts are not fully known.

3.3.2.2 Scooping

The scope of EIA is the impacts and issues it addresses. The process of scooping is that of determining, from all project's possible impacts and from all the alternatives that could be addressed, those that are the key significant ones.

3.3.2.3 Alternatives

If a project is screened out, and not believed to have potentially significant impacts on the environment, then the EIA is undertaken for the project and ideally for feasible alternatives. The developer, on economic, technical, or regulatory grounds will reject most of the possible alternatives that arise.

The role of EIA is to ensure that environmental criteria are also considered at these early stages. Alternatives are *"the heart of the environmental impact assessment"*, according to the US council on Environmental Quality (CEQ 1978). How such alternatives are addressed by the EIA will determine its relation to the subsequent decision making process.

- Types of alternatives: The "no action" option refers to environmental conditions if the project did not go ahead. Consideration of this option is required in some countries, e.g. the USA. In essence, consideration of the "no action" option is equivalent to a discussion of the need for the project: do the benefits of the project outweigh its costs? This option is rarely discussed in UK.

- Presentation and comparison of alternatives: Overlay maps compare the impacts of various locations in a non-quantitative manner. Checklists or less complex matrices can also be applied to various alternatives and compared; this may be the most effective way of visually presenting the impacts of the alternatives. Some of the other techniques used for impact identification-the threshold of concern checklist, weighed matrix, and an environmental evaluation system (EES), allow alternatives to be implicitly compared.

3.3.2.4 Understanding the development's action

Understanding the dimensions of the project: development description, site information, and the data required in assessing the main impacts, which the development is likely to have on the environment. All projects have a life cycle of activities, and the project description should clarify the various stages in the life cycle, and their relative duration, for the project under consideration. A minimum description would usually involve the identification of construction and operational stages.

In addition, various types of data are used. The life cycle of a project can be illustrated on a linear bar chart. Location and physical presence are best illustrated on a map base, supplemented by aerial photographs according to the issues involved. The form and the sources of data vary according to degree of detail required and the stage of assessment process. The initial brief from the developer provides the starting point; also site visits can be made to comparable projects.

3.3.2.5 Establishing the environmental baseline

This will include both present and likely future state of the environment. Assuming that the project is not undertaken, taking into account changes resulting from natural events and from other human activities. Initial baseline studies may be wide ranging, but comprehensive overviews can be wasteful of resources. The studies should focus as quickly as possible on those aspects of the environment that may be significantly affected by the project, either directly or indirectly.

An example of the content of an EIS for a project.
Table 3.1

Part 1: Methods and key issues
1. Methods statement
2. Summary of key issues; monitoring programme statement

Part 2: Background to the proposed development
3. Preliminary studies: need, planning, alternatives, site selection
4. Site description/baseline conditions
5. Description of proposed development
6. Construction activities and programme

Part 3: Environmental impact assessment – topic areas
7. Land use, landscape and visual quality
8. Geology, topography and soils
9. Hydrology and water quality
10. Air quality and climate
11. Ecology: terrestrial and aquatic
12. Noise
13. Transport
14. Socio-economic
15. Interrelationships between effects

Source:(Glasson et al, 1996)

As with most aspects of the EIA process, establishing the baseline is not a one-off activity. Studies will move from broad-brush to more detailed and focused approaches. The identification of new potential impacts may open up new elements of the environment for investigation; the identification of effective measures for mitigating impacts may curtail certain areas for investigation.

An EIS revealing many significant unavoidable adverse impacts would provide valuable information for the designer that could contribute to the abandonment or substantial modification of a proposed development action (Table 3.1).

3.3.3 Decision-making

As explained earlier, the original intent of EIA was that environmental considerations should be given greater weight in the design proposals and in the decision taken upon them. Wood (1996) suggests that the EIA initially intended to constrain, but not control discussions. Clearly, for a decision on the proposal to be seen to be fair, it is obviously preferable that it should, in general, be made by a body other than the proponent.

Appropriately, the decision about whether to give a 'yes' or 'no' to the EIA systems according to whether or not they meet the decision making criterion is a delicate one. EIA according to Wood was never intended to provide the sole basis for decision-making. However, to meet the criterion, an EIA system needs to demonstrate not only that the decision should be influenced by the EIA, but also in practice the EIA report actually influences the decision. In this respect, Giplin (1995) views EIA in practice, to be the best approaches to making decisions about projects; and is a most important ingredient of democracy in practice, majority rule with respect to minority rights.

Although, one of the basic problems is that in all assessments there are winners and losers. A new resort could mean a negative effect on the marine life or even interrupting the culture of the locals. In other words, many issues have to be balanced not simply development for environment protection as an optimization exercise, but a balance for interests and people welfare. Wathern (1988) points out that the EIA is intended to provide decision-makers with an understanding of the environmental consequences of a proposed action or project. However, major failing of EIA practice has been its common use in obtaining a permit-which is still the case now a day-rather than as a tool to achieve sound environmental management. There is a need for a feedback mechanism in EIA, which involves the transfer of knowledge from actual environmental effects of a project or action to future EIAs. This feedback system could be attained through auditing, which is discussed later.

3.3.4 Environmental impact assessment (EIA) and risk assessment (RA)

In concept, Andrews (1988) explains that; environmental impact assessment (EIA) and risk assessment (RA) have evolved as parallel and sometimes overlapping procedures for rational reform of policy making. However in practice, different disciplinary and professional communities in largely separate policy contexts have nurtured EIA and RA. As a result, they evolved with differences of emphasis, both in substance and in process.

3.3.4.1 Target actions

Environment impact assessments are required for all major governmental actions that might 'significantly affect the quality of the human environment'. Risk assessment, in contrast, is practiced in both public and private sector decision-making processes.

3.3.4.2 Target effects

The selection of target effects also determines the overall scope of analytical effort in both EIA & RA. In practice EIA can include virtually any category of impact that might be of interest. However, EIA have emphasized possible impacts on natural ecosystem & to some extent, human communities, but have paid a little attention to health effects or other risks. Conversely, risk assessments have emphasized human health effects, especially potential mortality due to technological catastrophes.

3.4 The purpose of the EIA-The Bruntland Report

The earth summit held in Rio de Janeiro in 1992, attended by the world leaders, from developed and developing nations, proved that the environment is now at the top of the world agenda. This change in attitude towards the protection of the environment has been described as a 'Green Revolution'.

Although, the earth summit was held in 1992, NEPA required EIA since 1969. After this long interval of time, only very few years ago, it became obligatory element for a permit to be obtained for a tourist development in a country as Egypt. The implementation of this requirement was due to the realization of the EIA necessity as a proactive tool for environmental preservation, where Glasson et al (1996) highlights in the following the significance of its purposes.

3.4.1 The purpose of environmental impact assessment

It has been suggested that the environmental impact assessment has several important purposes, and it provides a systematic way to examine the environmental implications of a proposed action. Amongst these several purposes, the following are highlighted:

- An aid to decision-making.
- An aid to the formulation of development actions
- An instrument to sustainable developments.

3.4.2 The Bruntland Report

The 1987 report of the World Commission on Environment and Development (Brundtland Report) defined Sustainable Development as,

> *"Development, which meets the needs of the present generation without comprising the ability of future generations to meet their own needs",*

(UN World Commission on Environment and Development 1987). Sustainable development means handing down to future generations, "man-made capital" such as knowledge and skills, and also "natural/environmental capital", such as clean air, fresh water, rain forests, the ozone layer and biological diversity.

Gilpin (1995) illustrates the preeminent report, highlighting its recognition for the EIA, as an essential component in the promotion of sustainable development. Further, the report foresee greater public participation in decisions that effect the environment, giving communities an effective say over the use of local resources.

The report also comments that 'when the environmental impact of a proposed project is particularly high, the decision should be subject to earlier public approval'.

It should be noted that, the Bruntland Commission was clearly building on the 1972 Stockholm Declaration, and the 1982 Nairobi Declaration, products of those two UN conferences.

"Agenda 21", an 800-page action plan for the international community into the 21st century, sets out what nations should do to achieve sustainable development. It includes topics such as biodiversity, desertification, deforestation, toxic wastes, sewage, ocean and atmosphere. Unfortunately it is not legally binding. The Rio Conference called for a Sustainable Development Commission to be established to progress the implementation of Agenda 21st (Lovejoy 1992).

For "deep ecologists" or "deep greens", EIA cannot provide the 100% certainty about the environmental consequences of development proposals (Glasson et al, 1996).

3.4.3 The EC experience and the context of the Fifth Environmental Action Program

Based on the thesis of "sustainable development"; proposed by the Bundtland Report. On 27 March 1992, The European commission adopted the fifth of its Environmental Action Programs designed to protect and enhance the quality of the environment in the European Community. As Sppeding et al (1993) mentioned, this Fifth Program is covering the period 1993 to the year 2000, called "Towards Sustainability" represents a departure from the four previous programs. For the first time-as a result of the adoption of the Single European Act in 1987-the Community has a constitutional mandate to take environmental protection measures. Where as this Environmental Action Program is a proactive document.

In brief, the thesis put forward, is that the causes of environmental degradation should be addressed before the problems become so drastic that they could no longer be ignored, clearly this is matching with the environmental impact assessment concept. The whole internal market program could be jeopardized if the natural environment is damaged beyond its limits. As tourism is a major international industry, globally, this might affect our region also.

3.4.4 Opportunities and benefits

The attitude and way of thinking in approaching the environment should change, since it is paying on the long term. Michael Heseltine (environment ex-minister in UK), commented that, 'Business success and environmental success are nearly always found in association with each other'. Small and medium size companies often argue that they simply cannot afford to take the environment on board. Yes, it is expensive, but the opportunities are also there to identify new markets, new products, and to switch to more efficient methods of operating, that has got to be the way forward, (Wooston, 1993).

3.4.5 The process of EIA

In essence, EIA process is a systematic process that examines the environmental consequences of development actions in advance (Glasson et al, 1996). In some cases, the impacts of developments on the environment have been assessed, but invariably not in systematic, holistic and multidisciplinary way required by EIA. Although the steps are outlined in linear fashion, EIA should be cyclical activity, with feedback and interaction between various steps.

Technically, Wathern (1988) suggests that EIA can be thought of as a data management process, as a 'science', it relates to the management of information. Where, it has three components;

a) Firstly, the appropriate information necessary for a particular decision to be taken must be identified and possibly, collected.
b) Secondly, changes in the environmental parameters resulting from implementation must be determined and compared with the situation likely to occur without the proposal.
c) Finally, actual change must be recorded and analyzed.

3.4.5.1 The pre-analysis for the projects requiring EIA

Land-use planners have long argued that all development proposals should be subject to appraisal. EIA implies a special type of analysis involves a careful, through and detailed analysis of the likely implications of a development. This indicates the need for some threshold 'significance' being exceeded in order to trigger the full EIA process, a procedure commonly referred to as 'screening'.

> Morris and Therivel (1995) illustrating the procedures in the assessment of an environment component of an EIA, defined 'screening' as, a preliminary review that is carried out the proposed project in order to decide whether to carry out an EIA. In addition, they questioned, what key impacts, issues and alternatives to be considered, where they should be carried out early in the EIA process? This action is termed, 'scoping'.

Thompson (1995) argues that Baseline studies form the basis of the ecological component of EIA. If they are accomplished, ecologist must be consulted at the earliest stages of a planning proposal, and not be brought in when decisions have already been made. The ecologist must be able not only to provide ecological expertise but also to understand the developer needs and the developer must understand the implications of his needs and this must be communicated to the architect, since it will pour at his end.

If the development is located by the seacoast, one of the complexities that the developer might face is very basic: the definition of the coastal zone itself. An EIA, prepared with a squeezed uncertainty. A brief must be agreed, and adhered to, by all the interested parties. Two underlying factors in this approach are good consultation and sufficient resources; unfortunately, both of these receive inadequate treatment under the existing EIA systems.

Since several consultants would be involved, the EIA coordinator will need to ensure that all parties are basing their assessments on the same, most up-to-date version of the proposed project. It is particularly important to ensure that all impacts of the mitigation measures outlined in separate analysis are fully agreed upon and assessed. When mitigation measures are proposed and adopted they become part of the most recent version of the project proposal and the environmental impacts of this version need to be reassessed.

3.4.6 Environmental management program

The use of the term "environmental management program" in the standard relates singularly to a program for achieving objectives and targets and not to what is conventionally considered an environmental management program such as waste management program, air monitoring program, and others. The program must include "the who", "the when", and "the how" (Woodside et al, 1998).

3.4.7 Records

In order to manage the flow of information within the EIA process, apart from definitions and words there should be a record system, where the distinction between records and documents should be highlighted. According to Woodside et al (1998), documents include procedures, instructions, manuals, and other forms of documents that are used to manage the environmental management system (EMS). Records, on the other hand, are evidence that has been accomplished (i.e., inspection, and training).

Environmental records should be:

- Legible,
- Identifiable and traceable to the activity, product, or service involved,
- Easily retrievable,
- Protected against damage, deterioration, or loss,
- Retained per established and recorded retention times.

3.5 Development in EIA methods

Bisset (1988) differentiated between methods and techniques used in EIA. He suggested that, *techniques* are concerned with predicting future states of specific environmental parameters such as noise level. In any single EIA study, a number of techniques may be used. Together, they provide data, which are then gathered, arranged, presented and sometimes interpreted according to the organizational principles of the EIA method being used. EIA *methods* have been described alternatively as methodologies, technologies, approaches, manuals, guidelines and even procedures in the literature.

EIA methods are used for various activities, namely: impact identification, prediction, interpretation and communication; and in devising monitoring schemes. A particular method may not be equally useful for each activity.

3.6 Quality within environmental impact assessments

Therivel and Morris (1995) highlighted a crucial aspect, with their notion that all of a project's impacts interact with each other. This is related to the fact that ecosystem components interact. Further they add that there is no one agreed terminology for describing impacts. But they can be broadly classified as following:

a) Direct, primary or first-order impacts which are caused by the project and occur in the same time and place,
b) Indirect, secondary or higher-order impacts which are triggered by the project but affect the environmental component under considerations as knock-on effects between sub components; or,

3.7 EIA methodologies

Further Giplin (1995) explores such aspects, on the basis that EIA is an essential element in the optimization of resources through the allocation of all such resources, to achieve a balance between sustainable development and environment protection. EIA can achieve a modest contribution to balancing development and environmental protection at the work-face of the policy, plan, program, or project. This requires an evaluation of the worth of many issues, which are not otherwise likely to be considered in narrower financial calculations, and it means attempting to value the environmental aspects through a series of objective and subjective routes when no market dimensions are necessarily available.

Approaches to an EIA methodology in the 1970s followed in the tracks of economic science, in the direction of models, matrices, numbers, networks, inputs and outputs, with subjective weightings provided by expert analysts, who often worked independently. Some of the current EIA methodology elements rendered are:

3.7.1 Cost-benefit analysis (CBA)

A procedure for comparing the social costs with the social benefits of a program or a project, all expressed, as far as practicable, in monetary terms. Costs and benefits, which cannot be valued, are identified as 'intangibles'. Also the cost-benefit rule that a project is acceptable, where the net social benefits are positive, that is the benefit-cost ratio is positive, rather than negative.

3.7.2 Cost effectiveness analysis (CEA)

Particular objectives might have corporate or political approval while the benefits, though obvious and real cannot be readily measured in monetary or material terms. CEA is about the least-cost approach to the objective; with an examination of alternative ways of meeting the objectives to achieve the maximum value for the dollar invested.

3.7.3 Opportunity cost

It is the cost of satisfying an objective; measured by the value those resources would have had in other attractive alternative uses. For example, if capital funds committed to a project could have earned a higher return elsewhere, then that return is the opportunity cost of those funds in present use.

3.7.4 The multiplier

It implies social benefits far beyond the initial capital investment of a program or project. The multiplier is a ratio indicating the estimated effect of total employment on total real income of a specific amount of capital or stream of expenditure.

3.7.5 Contingent valuation

It is a method of establishing a monetary value for a good or service by asking people what they are prepared to pay for it. In this context, it would be an environmental amenity, it can determine a willingness to pay for a better environment, or accept compensation for a degraded environment.

3.7.6 Travel cost approach

It is particularly useful for assessing the economic value of natural areas or recreational areas where no price is charged directly. In this case, the willingness to pay for an environmental amenity is assumed to be measured in the costs incurred by people when traveling to chosen locations. The relationship between cost and visitor rates becomes a demand curve for recreational experience, which might involve a number of activities.

3.7.7 Ecological evaluation

It seeks to identify the importance of conservation and the inherent value of nature. Thus they fill an essential role within the context of CBA, yet cannot be priced readily or at all. Such evaluation can be applied to any natural asset such as mangroves, wilderness, natural coastlands, fauna and flora, or coral reefs.

3.7.8 Matrices and checklists

Once a project is before a multi-disciplinary group for drafting an ES or EA, the question of the precise procedure or methodology to be adopted comes to the fore. Costs and benefits need to be defined and orders of magnitude identified.

Leopold et al (1971) with the US Geological Survey produced one of the first systematic methodologies for the entire field of EIA. However, the Leopold matrix has a number of drawbacks; amongst them, that there might be uncertainties hidden within the ratings as it becomes impossible to distinguish between a highly probable low impact event and a catastrophic event with low probability. The matrix fails to handle the important secondary impact and the social and economic values. The final EIS can be prepared using a matrix only as a guide; the matrix itself should not be included, or if it is, it should be included alone as an appendix.

Of all methodologies, checklists have tended to survive as a guide to the potential impacts of a project. Such checklists may initiate preliminary analysis to provide first approximation answers, or to identify areas of ignorance; they are not, however, final analysis in the sense that an assessment is. Checklists are another approach to sorting out often-complex situations, strong in impact identification. All types of checklists, simple, descriptive, scaling, and weighing are valuable. They can be drawn from specialist literature or created on the basis of previous experience of similar projects.

3.8 Strategic Environmental Assessment (SEA)

The word 'strategic' in SEA has diverse meanings in the sequence of decisions, from broad policy visions to quite specific programs of more concrete activities, (Glasson et al, 1996). It is argued that the function of SEA, and the terminology associated with that function are still subject to extensive debate.

SEA can be defined as "the formalized, systematic and comprehensive process of evaluating the environmental impacts of a policy, plan or program and its alternatives, including the preparation of a written report on the findings of that evaluation in publicly accountable decision making". SEA can ensure that alternatives are adequately assessed, cumulative impacts are considered, and the public is fully consulted. Thus, decisions concerning individual projects are made in a proactive rather reactive manner.

3.8.1 SEA approach

Therivel and Partidario (1996) note that the development of SEA is showing similar trends to that of project EIA during the 70s. Where, attention is primarily focused on understanding SEAs as a concept, scope, and range of application as EA tool. Most countries relate SEA to sustainability goals on the grounds that SEA may assist the decision-making process by influencing the design of more sustainable policies and strategies on a more global scale. SEA is also related to consideration of cumulative effects, such as the long-term effects that would result from the development of a tourist resort, which are normally addressed on a project-by-project basis, the following would be a common SEA approach;

3.8.2 SEA limitations

Therivel and Partidario (1996) argue that SEA also has technical and procedural limitations. Where, on the technical side, SEAs generally cover a large area-sometimes several countries- and a large number of alternatives. This makes collecting and analysis data for SEAs very complex, which, in turn would make SEA subject to greater levels of uncertainty than project EIA. More over, collection and baseline data analysis for SEA is often problematic.

The large areas and wide range of impacts that are relevant to most SEAs are not covered by most existing sources of baseline information, and do not easily lend themselves to SEA specific fieldwork.

Examples of regulatory systems of SEA are still relatively scarce. With a very few exceptions, most countries in which SEA has been carried out in practice, do not yet have a legislated process.

Finally, this makes it difficult to know when a SEA should be carried, what exactly the PPP that is being assessed and on what basis. Hence, it might be useful to explore the PPP objectives and how the surrounding influences them in the following.

3.9 The International Organization for Standardization, (ISO)

ISO is the name given to the International Organization for Standardization, a global federation of 118 countries headquartered in Geneva, Switzerland. The name was selected from the Greek language, where *"isos"* means *"equal"*, representing the organization's goal of global standardization (Sasseville et al, 1997). The organization was formed in 1947 to promote the development of international standards. "ISO" is commonly used when referring to the organization and its standards. The ISO standards are totally voluntary and carry no legal requirements, and have not typically centered on management systems.

According to Woodside et al (1998), Quality management standards are process standards the first of their kind for ISO, the ISO 9000 series brought world recognition to the organization as a leader in developing these types of standards. Sasseville et al (1997) adds that ISO 9000 is a series of standards developed by the International Organization for Standardization (ISO) to establish a system for quality management. The ISO 9000 standards are relatively recent development, first adopted, published and revised in 1987, and revised one more time in1994.

3.9.1 The three registration standards in the ISO 9000 series are:

- ISO 9001–for organizations primarily involved in the design, development, production, installation, and servicing a product or service
- ISO 9002 designed more for organizations that do not posses a design component
- ISO 9003 designed for companies that focus only on the processes of final inspection and testing or distribution of a product or service.

Like any quality management approach, it would stress (1) *Prevention over correction* (2) *Doing the job right at the first time*; and (3) *Active work to continuously improve your process and operations*, thereby improving the quality of your final product or service.

3.9.2 Environmental management system, (EMS)

Such an EMS functions by bringing together many separate elements, placing them in a framework. The coordination of these components provides companies with a systematic way to understand and control the many elements of environmental management. An important part of an EMS is its ability to track how the various parts of the system are functioning. This allows management to make corrections and take action necessary to prevent future problems.

Although EMS does not set performance requirements, it sets up a management system that ensures that certain activities are undertaken; at the correct times or frequency, and that those activities are documented and reviewed.

3.9.2.1 Environmental management system Structure

Woodside et al (1998) suggests the following procedure in order to structure an EMS:

- Establish an environmental policy appropriate to the organization's activities, products, and services
- Identify significant environmental aspects and impacts
- Identify legal requirements
- Set environmental objectives and targets and the program to establish them
- Define structure and responsibility for elements of the EMS
- Involve employees at relevant levels in the EMS process
- Enhance communication with employees and external interested parties
- Schedule audits of EMS
- Establish schedules for management review of the EMS for suitability, adequacy and effectiveness, and continual improvement of the EMS itself.

In essence, it should be noted that an environmental management system (EMS) is a proactive approach, which focuses the organization on its full impact on the environment. Sassville et al (1997) explores the distinction between *environmental aspect* and *environmental impact* in order to establish an environmental management system. Where an environmental aspect is any business activity that may have an impact on the environment, such as emissions, noise, energy use, and so on. An environmental impact is the change that actually takes place in the environment because of the action of the aspect. Impacts might include toxicity due to an emission, natural resource depletion due to energy use, or nuisance or habitat disruption due to noise.

Another issue that needs to be explored is the differentiation between the organization *objectives* and *targets*. An objective is established to provide specific emphasis and direction to meet your organization's environmental policy. The target is a specific and measurable endpoint, related to an objective, or progress toward achievement of that objective. All the above-mentioned are amongst others systems that helped in the development of environmental management systems; ISO 14000 introduced in the following literature is another scheme within the series of international standards.

3.9.3 ISO 14000

3.9.3.1 ISO 14000 background

In June 1992, an international conference was held in Rio de Janeiro, Brazil, out of which came the Rio Declaration on Environment and Development. The concept of *sustainable development*, development that is sensitive to its impact on energy use and the environment, was at the core of the 27 environmental guiding principles presented in the declaration.

The following standards were approved and published in late 1996:

- ISO 14001, Environmental management systems–specification with guidance for use
- ISO 14004 Environmental management systems–general guide lines on principles, systems and supporting techniques
- ISO 14010 Guidelines for general auditing–Audit procedures for environmental management systems
- ISO 14012 Guidelines for general auditing–Qualification criteria for environmental auditors.

ISO standards would undergo 5 years reviews, and modifications, edits, or corrections may be made at that time based on the experience of those who have put the standard into practice. For ISO 14000 standards, it is anticipated that the technical committee will continue functioning for many years (Sassville et al, 1997).

3.9.3.2 The use of Gap Analysis

Sassville et al (1997) indicated that *Gap analysis* involves a detailed review of the organization's existing programs, both environmental and non-environmental. This gap analysis should first determine what environmental programs and procedures are already in place that can satisfy some ISO 14001 requirements or at least provide a foundation on which you can build. The analysis should also determine what elements of non-environmental programs would be adapted for use in ISO 14001.

Then, in comparing existing programs to the requirements of ISO 14001, the gaps between your existing programs and ISO 14001 are identified. The gap analysis would produce the information needed to develop a detailed plan to implement ISO 14001 in a manner that is specific to the organization. As mentioned earlier, ISO 14000 is basically related to environmental issues; however, the gap analysis would fit to both environmental and non-environmental aspects. In this respect, the common and the non-common aspects of ISO 9000 and ISO 14000 are further explored.

3.9.3.3 ISO 14001 background

ISO 14001 was being drafted in the early and mid-1990, which was finalized and issued as a first edition in September 1996, it is the most widely recognized environmental management standard. It is a specification standard, which means that organizations, which confirm to its requirements, can become registered to the standard. ISO 14001 was written as a consensus standard with nearly 50 countries participating. BS 7750, in particular, as well as other national standards influenced much of the original draft language in ISO 14001. Upon finalization and publication of ISO 14001-and British acceptance of it as a national standard- BS 7750 became obsolete. Companies registered to BS7750 would now be considered registered to ISO 14001.

3.9.3.4 Monitoring and Evaluation

This element of ISO 14001 standard requires that the organization establish and implement procedures to monitor and measure, on a regular basis, key characteristics of its operations and activities that could have a significant impact on the environment as Woodside et al (1998) pointed out. Another crucial issue of the standard specifies that the organization must put in place a documented procedure for periodically evaluating compliance with relevant environmental legislation and regulations.

It may be the case that such standard with its positive side mentioned earlier, might have as well its negative side in the near future. Where some developing countries are concerned that ISO is to be used by industrialized countries to erect trade barriers, preventing often-fragile developing country economies from expanding. Woodside et al, 1998 indicated that design is considered a service to be exported; the architect in this case must react positively in response to the current situation prior to the possibility of further more invasions.

3.10 Impacts

Morris and Therivel (1995) suggested that impacts are the outcome of the interaction between the characteristics of the project/development action and the characteristics of the "host" environment. As a starting point, the analyst must assemble baseline information on both sets of characteristics.

Consideration of project and host environment characteristics can help to clarify key issues. Denzin (1970) and Gradyel et al (1987) remind us that issue specification should be rooted in several sources. They advocate the use of the philosophy of *"triangulation"* for data (the use of variety of data sources), for investigators (the use of different sets of researchers), for theory (the use of multiple methods).Impacts must be characterized and described to help decision-makers understand their relative importance for the environment and for corporate policy, product feasibility or plant operations. Impacts were broadly described by Ledgerwood et al (1992) as:

Direct	**Indirect**
Intended	**Accidental**
Positive	**Negative**
Immediate	**Longer-term**
Discrete	**Cumulative**
Quantitative	**Qualitative**

Naturally, all operations would involve many tradeoffs. Traditionally, environmental objectives have been sacrificed to economic, social and commercial objectives.

Environmental auditing now is requiring that such choices be made explicit, and places limits on the degree and number of environmental sacrifices, which are tolerable.

When determining the significance of impacts the auditor must consider that:

1. Assessment of significance calls for a balanced consideration of technical factors as well as social values;
2. Concerns and priorities may vary considerably from one stakeholder to another; and
3. Many environmental impacts are complex, with a mixture of positive and negative aspects. Some of these will be more critical than other.

Clearly, there is no magic threshold at which effects and consequences change from 'significant' to 'insignificant': it is usually a question of degree. An initial assessment by the architect of significance can thus be only based on good judgment. Another crucial issue would be the identification and assessment of alternatives for the expected impacts.

3.10.1 Impacts identification

In choosing a method to identify the anticipated impacts Glasson et al (1996) points out that the analyst needs to consider specific aims in his identification approach as:

- To ensure compliance with regulations
- To provide a comprehensive coverage of a full range of impacts,
- To distinguish between positive and negative, large and small, long-term and short-term, reversible and irreversible impacts,
- To identify secondary, indirect and cumulative impacts as well as direct impacts,
- To distinguish between significant and insignificant impacts,
- To allow comparison of alternative development proposals,
- To consider impacts within the constraints of an area's carrying capacity,
- To incorporate qualitative as well as quantitative information,
- To be easy and economical to use,
- To be unbiased and to give consistent results, and
- To be of use in summarizing and presenting impacts in the EIS.

Amongst the methods that would facilitate the identification of the impacts are checklists, matrices, quantitative methods, networks and overlay maps.

- Descriptive checklists (table 3.2) give guidance on how to assess impacts. Questionnaire checklists are based on a set of questions to be answered. Thresholds of concern checklists consist of a list of environmental component, a threshold at which those assessing a proposal should become concerned with an impact.

- Matrices (fig. 3.3) are the most commonly used method of impact identification in EIA.

- Weighted matrices is more specific approach in which the impact of the project (component) on the environmental component is then assessed and multiplied by the appropriate weighing(s), to obtain an overall total of the project.
- Quantitative methods attempt to compare the relative importance of all impacts by weighting, standardizing and aggregating impacts to produce a composite index.

(a)

1. Identify all actions (located across the top of the matrix) that are part of the proposed project
2. Under each of the proposed actions, place a slash at the intersection with each item on the side of the matrix if an impact is possible
3. Having completed the matrix, in the upper left hand corner of each box with a slash, place a number from 1 to 10 which indicates the MAGNITUDE of the possible impact; 10 represents the greatest magnitude of impact and 1, the least (no zeroes). Before each number place + (if the impact would be beneficial). In the lower right hand corner of the box place a number from 1 to 10 which indicates the IMPORTANCE of the possible impact (e.g. regional vs. local); 10 represents the greatest importance and 1 the least (no zeroes)
4. The text which accompanies the matrix should be a discussion of the significant impacts, those columns and rows with large numbers of boxes marked and individual boxes with large numbers

	a	b	c	d	e
a		2/1			8/3
b		7/2	8/8	3/1	9/7

Sample matrix

			A. Modification of regime													B. Land transformation and construction																			C. Resource extraction						
			a. Exotic flora or fauna introduction	b. Biological controls	c. Modification of habitat	d. Alteration of ground cover	e. Alteration of ground water hydrology	f. Alteration of drainage	g. River control and flow modification	h. Canalization	i. Irrigation	j. Weather modification	k. Burning	l. Surface or paving	m. Noise and vibration	a. Urbanization	b. Industrial sites and buildings	c. Airports	d. Highways and bridges	e. Roads and trails	f. Railroads	g. Cables and lifts	h. Transmission lines, pipelines, corridors	i. Barriers including fencing	j. Channel dredging and straightening	k. Channel revetments	l. Canals	m. Dams and impoundments	n. Piers, seawall, marinas and sea terminals	o. Offshore structures	p. Recreational structures	q. Blasting and drilling	r. Cut and fill	s. Tunnels and underground structures	a. Blasting and drilling	b. Surface excavation	c. Subsurface excavation and retorting	d. Well drilling and fluid removal	e. Dredging	f. Clear cutting and other lumbering	g. Commercial fishing and hunting
		Proposed actions																																							
CHEMICAL CHARACTERISTICS	1. Earth	a. Mineral resources																																							
		b. Construction material																																							
		c. Soils																																							
		d. Land form																																							
		e. Force fields and background radiation																																							
		f. Unique features																																							
	2. Water	a. Surface																																							
		b. Ocean																																							
		c. Underground																																							
		d. Quality																																							
		e. Temperature																																							
		f. Recharge																																							
		g. Snow, ice and permafrost																																							

(b)

Part 1. Project actions

A. Modification of regime
a) exotic flora or fauna introduction
b) Biological controls
c) Modification of habitat
d) Alteration of ground cover
e) Alteration of groundwater hydrology
f) Alteration of drainage
g) River control and flow modification
h) Canalization
i) Irrigation
j) Weather modification
k) Burning
l) Surface or paving
m) Noise and vibration

B. Land transformation and construction
a) Urbanization
b) Industrial sites and buildings
c) Airports
d) Highways and bridges
e) Roads and trails
f) Railroads
g) Cables and lifts
h) Transmission lines, pipelines and corridors
i) Barriers, including fencing
j) Channel dredging and straightening
k) Channel revetments
l) Canals
m) Dams and impoundments
n) Piers, seawalls, marinas, and sea terminals
o) Offshore structures
p) Recreational structures
q) Blasting and drilling
r) Cut and fill
s) Tunnels and underground structures

C. Resource extraction
a) Blasting and drilling
b) Surface excavation
c) Subsurface excavation and retorting
d) Well drilling and fluid removal
e) Dredging
f) Clear cutting and other lumbering
g) Commercial fishing and hunting

D. Processing
a) Farming
b) Ranching and grazing
c) Feed lots
d) Dairying
e) Energy generation
f) Mineral processing
g) Metallurgical industry
h) Chemical industry
i) Textile industry
j) Automobile and aircraft
k) Oil refining
l) Food
m) Lumbering
n) Pulp and paper
o) Product storage

E. Land alteration
a) Erosion control and terracing
b) Mine sealing and waste control
c) Strip-mining rehabilitation
d) Landscaping
e) Harbour dredging
f) Marsh fill and drainage

F. Resource renewal
a) Reforestation
b) Wildlife stocking and management
c) Groundwater recharge
d) Fertilization application
e) Waste recycling

G. Changes in traffic
a) Railway
b) Automobile
c) Trucking
d) Shipping
e) Aircraft
f) River and canal traffic
g) Pleasure boating
h) Trails
i) Cables and lifts
j) Communication
k) Pipeline

H. Waste emplacement and treatment
a) Ocean dumping
b) Landfill
c) Emplacement of tailings, spoil and overburden
d) Underground storage
e) Junk disposal
f) Oil well flooding
g) Deep well emplacement
h) Cooling water discharge
i) Municipal waste discharge, including spray irrigation
j) Liquid effluent discharge
k) Stabilization and oxidation ponds
l) Septic tanks, commercial and domestic
m) Stack and exhaust emission
n) Spent lubricants

I. Chemical treatment
a) Fertilization
b) Chemical de-icing of highways, etc.
c) Chemical stabilization of soil
d) Weed control
e) Insect control (pesticides)

J. Accidents
a) Explosions
b) Spills and leaks
c) Operational failure
Others

Part 2. Natural and human environmental elements

A. Physical and chemical characteristics
1. Earth
a) Mineral resources
b) Construction material
c) Soils
d) Landform
e) Force fields and background radiation
f) Unique physical features
2. Water
a) Surface
b) Ocean
c) Underground
d) Quality
e) Temperature
f) Recharge
g) Snow, ice and permafrost
3. Atmosphere
a) Quality (gases, particulates)
b) Climate (micro, macro)
c) Temperature
4. Processes
a) Floods
b) Erosion
c) Deposition (sedimentation, precipitation)
d) Solution
e) Sorption (ion exchange, complexing)
f) Compaction and settling
g) Stability (slides, slumps)
h) Stress-strain (earthquakes)
i) Air movements

B. Biological conditions
1. Flora
a) Trees
b) Shrubs
c) Grass
d) Crops
e) Microflora
f) Aquatic plants
g) Endangered species
h) Barriers
i) Corridors
2. Fauna
a) Birds
b) Land animals, including reptiles
c) Fish and shellfish
d) Benthic organisms
e) Insects
f) Microfauna
g) Endangered species
h) Barriers
i) Corridors

C. Cultural factors
1. Land-use
a) Wilderness and open spaces
b) Wetlands
c) Forestry
d) Grazing
e) Agriculture
f) Residential
g) Commercial
h) Industrial
i) Mining and quarrying
2. Recreation
a) Hunting
b) Fishing
c) Boating
d) Swimming
e) Camping and hiking
f) Picnicking
g) Resorts
3. Aesthetics and human interest
a) Scenic views and vistas
b) Wilderness qualities
c) Open space qualities
d) Landscape design
e) Unique physical features
f) Parks and reserves
g) Monuments
h) Rare and unique species or ecosystems
i) Historical or archaeological sites and objects
j) Presence of misfits
4. Cultural status
a) Cultural patterns, lifestyle
b) Health and safety
c) Employment
d) Population density
5. Man-made facilities and activities
a) Structures
b) Transportation network (movement access)
c) Utility networks
d) Waste disposal
e) Barriers
f) Corridors

D. Ecological relationships, such as
a) Salinization of water resources
b) Eutrophication
c) Disease – insect vectors
d) Food chains
e) Salinization of surficial material
f) Brush encroachment
g) Other
Others

(a) Part of a Leopold Matrix; (b) Leopold Matrix elements.

Fig. 3.3
Example for commonly used Matrices for impact identification in EIA
Source: Glasson et al (1996)

3.11 Monitoring

Bisset and Tomlinson (1988) defined monitoring as an activity under taken to provide specific information on the characteristics and functioning of environmental and social variables in space and time. Monitoring involves the measuring and recording of physical, social and economic variables associated with development impacts.

It seeks to provide information on the characteristics and function of variables in time and space and in particular on the occurrence and magnitude of impacts. Monitoring could be useful to the designing process, where it could be used as an early warning system, to identify harmful trends in a locality before it is too late to take remedial action. It can help and correct unanticipated impacts.

Monitoring (fig.3.4) implies the systematic collection of potentially large quantity of information over a long period. The information collected needs to be stored analyzed and communicated to relevant participants in the EIA process (Glasson et al, 1996).

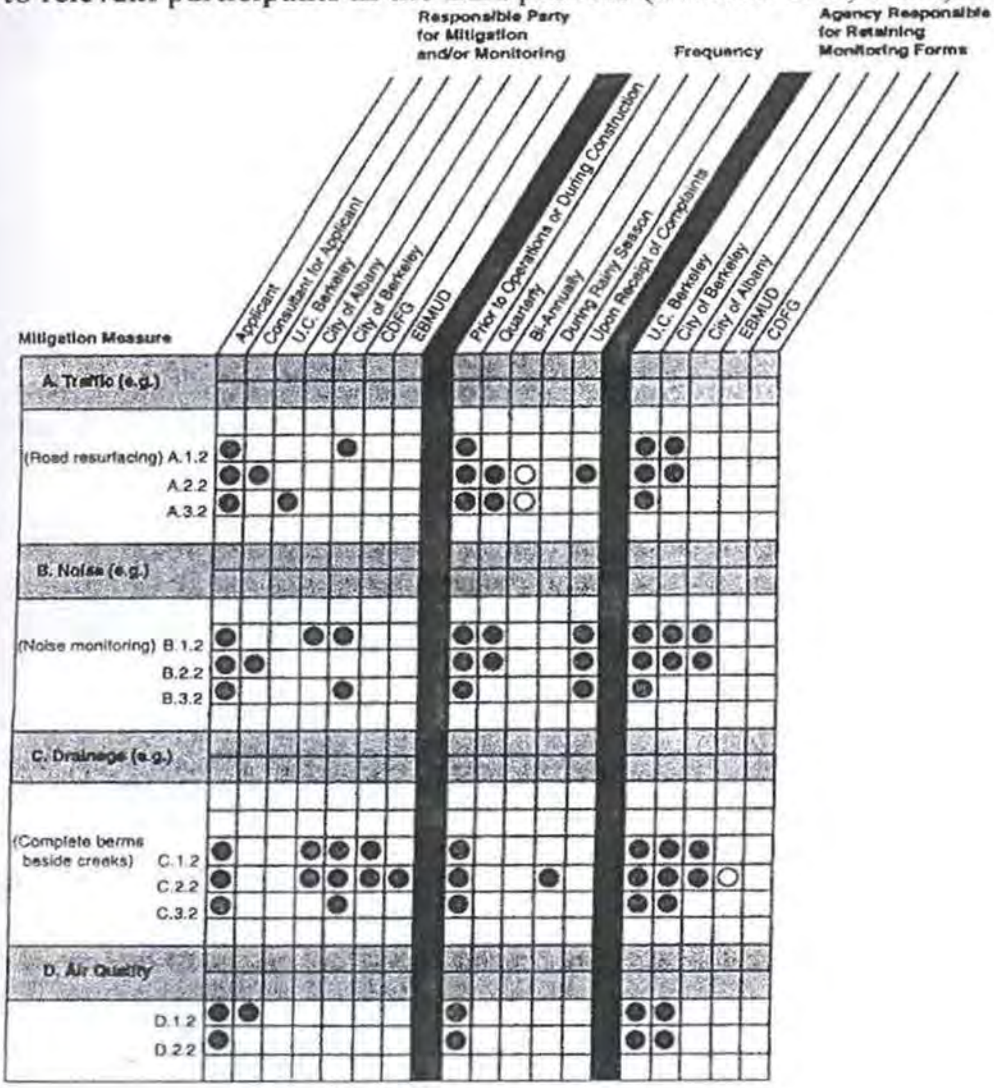


Fig. 3.4
Example of Monitoring Programme
Source: Glasson et al (1996)

Further more Wood (1996) notes that 'Implementation monitoring' involves checking that the action (normally project) has been implemented (constructed) in accordance with the approval, that mitigation measures (e.g. sound proofing) correspond with those required and that conditions imposed upon action (e.g. emission limits) have been met.

In addition, such checking may involve physical inspection (e.g. of building location, construction or waste storage/disposal) or measurement using various types of instrument, together with the application of professional judgment. This type of monitoring can be carried out either by the decision-making or environmental authorities or by the proponent (with appropriate checks and balances) or, as is frequently the case, may be divided between them.

Another crucial issue is 'Impact auditing', which involves comparison between the results of implementation and impact monitoring and the forecasts and commitments made earlier in the EIA process. It is also frequently referred to as 'post-auditing'. The principal purpose of impact auditing is to enable the effectiveness of particular forecasting techniques to be tested and thus to improve future practice. A secondary purpose is in the management of the impacts of the action concerned.

3.12 Auditing

The term *audit* does not have, as yet, an agreed meaning in environmental science literature. Increasingly the term is used to describe the process of comparing the impacts predicted in an EIA with those that actually occur after implementation in order to assess if the impact prediction process performs satisfactorily (Wathern and Tomlinson, 1988).

Petts and Eduljee (1994) suggested that there is a need to more effectively integrated monitoring and auditing into the EA process. In particular, this integration should assist in enhancing the role of monitoring and auditing in the impact of specific projects. However, to achieve this integration a number of requirements are apparent.

> *Firstly,* the quality of site monitoring programs needs to be improved.
> *Secondly,* facility monitoring needs to be extended to cover all of the impacts considered in the EA where required mitigation measures are identified.
>
> *Thirdly,* there needs to be the establishment of complementary monitoring protocols for the purposes of compliance monitoring by operators and environmental quality monitoring by statutory authorities.
>
> *Fourthly,* there needs to be more attention to collecting and collating information from facility monitoring and also environmental monitoring by authorities and other parties so that regional and national databases can be maintained.
>
> *Fifthly,* as discussed, there is an opportunity for environmental auditing schemes, which are being implemented both nationally and in the EC to be more closely related to EA for new projects.

Further, it should be highlighted that auditing could be used to test mitigating and monitoring schemes. Such schemes are undertaken to achieve certain objectives, for example to prevent expected impacts or to enable actual impacts to be identified and described. It might be argued that auditing could be viewed as a tool for criticizing the decision-making process and hence be perceived as a threat. However an audit is to monitor the performance of an organization in following its own procedures. Where, an effective audit requires an understanding of those procedures and the co-operation and participation at all levels of the management structure to ensure full disclosure of the performance in implementing those procedures.

3.12.1 Environmental auditing definitions

Woolston (1993) points that the standard *Oxford Dictionary* definition of an audit is that 'it is an official systematic examination of accounts'. The phrase came from the financial world but environmental auditors have modified the definition to cover the whole field of environmental science.

The International Chamber of Commerce has produced a good, all embracing definition, which has received a fairly wide acceptance amongst auditors and industry. The definition is highlighted by Renger (1992) as following: 'a management tool comprising a systematic, documented, periodic and objective evaluation of how well organizations, management and equipment are performing with the aim of contributing to safeguard the environment by facilitating management control of environmental practices, and assessing compliance with company policies, which would include meeting regulatory requirements and standards applicable'.

The key elements for the definition are:

- Systematic;
- Documented;
- Periodic;
- Objective.

The British Standards Institutions defines the term 'environmental management audit' as 'a systematic evaluation to determine whether or not the environmental management system and environmental performance comply with planned arrangements, and whether or not the system is implemented effectively and is suitable to fulfil the organization's environmental policy'.

European Eco-Audit defines 'environmental audit' as: 'a management tool comprising a systematic, documented, periodic and objective evaluation of the performance of the organization, management system and equipment designed to protect the environment with the aim of:

I. Facilitating management control on environmental practices

II. Assessing compliance with company policies, including observance of the existing regulatory requirements.

In conclusion Sasseville et al (1997), notes that although there are numerous definitions of environmental audit, certainly one of the most authoritative definitions in the United States comes from the U.S. Environmental Protection Agency (EPA) in their 1986 Environmental Policy Statement:

"Environmental auditing is a systematic, documented, periodic, and objective review by regulated entities of facility operations and practices related to meeting environmental requirements." (Federal Register, 131, July 9, 1986).

Sppeding et al (1993) explored the above-mentioned statement by their notion that "systematic" has, in this context, two aspects: the methodology to be adopted and the scope of the audit. As regards to methodology, it is interesting that the US Environmental Protection Agency, (EPA), ICC and the European Community emphasized the importance of:

(i) Management understanding that leads to support and commitment
(ii) Proper definition and aims of the audit
(iii)Independence and objectivity of the audit team; and
(iv)Quality control.

It should be noted that all the schemes require that audits be carried out at regular intervals. Where the eco-audit scheme of an organization is expected to have:

1. An environmental protection system;
2. An environmental system;
3. An environmental management system;
4. An environmental program; and
5. It is expected to undertake environmental reviews and of course, environmental audits and issue environmental statements.

The "environmental protection system" is at the *heart* of the scheme. It includes in writing: environmental objectives, an environmental program and an environmental management system. It is to be developed on the basis of the initial environmental review, and is defined as "a coordinated set of measures of various kinds aimed at protecting the environment".

3.12.2 Audits objectives

Environmental auditing has three broad aims according to Legerwood et al (1992), which concerns the existing operation of a firm;

(i) Compliance with regulatory codes;
(ii) Assistance in acquisition and disposal valuations; and
(iii) Corporate development towards green missions.

In this respect Renger (1992), demonstrates the objectives for audits as following:

- To increase the organization's knowledge of its own sites and activities
- To monitor and improve environmental performance
- To assist better management
- To ensure compliance with legislation
- To assess compliance with corporate policy
- To identify and control a specific problem

- To educate and motivate the workforce: corporate environmental policies by their nature are strong on principle and weak on detail
- To demonstrate commitment of management to environmental performance
- To reduce costs: undertaking an environmental audit could be a potentially expensive task. However, the short-term financial costs could often be outweighed by improvements in environmental performance
- To identify and minimize future potential liabilities.

3.12.3 Audits functions

Basically, an environmental audit is a system that checks for policies and practices, which can improve corporate environmental performance. During an audit a number of evaluation methods may be used, such as: reviewing procedural documentation; visiting the site; and using interviews and questionnaires (Woolston, 1993). During the evaluation procedures Sasseville et al (1997), points that the environmental audits could verify compliance with environmental requirements, evaluate the effectiveness of components of the organization's EMSs, asses risks from regulated and unregulated materials and practices, and Serve as quality assurance check.

The different types of audits-in its easiest form-within the ISO 14001 context, are divided into three types. *First,* the most common historically, the environmental compliance audits. *Second* is the EMS audit. *Third* is a specialized set of EMS audits that together comprise the ISO 14001 certification audit.

In this respect, the difference between the EMS audit and the environmental compliance audit should be pointed out, where an EMS audit evaluates the status of each part of the organization EMS and compares them to the way in which they were designed to function. Unlike an environmental compliance audit, which is concerned with the details of the specific regulatory requirements, an EMS audit looks strictly at the organization's EMS. Does it have a workable, functioning EMS? (Woodside et al, 1998).

In general environmental management system (EMS) audits are required by ISO 14001 to assess whether or not the EMS conforms to planned arrangements for the EMS-including conformance to ISO 14001-and has been properly implemented and maintained. Unlike compliance audits, these audits specifically address the EMS as it is established, maintained, and implemented in conformance to the standard.

The auditor or the audit team will compare what is required by regulation to what is actually occurring. An audit report will be written and corrective actions can be implemented as needed to bring the facility into compliance.

3.13 Mitigation

Wood (1996) emphasized that;

> *If the consideration of alternatives lies at the heart of the environmental impact statement then the mitigation of impacts is the principal aim of the EIA process.*

In practice, the consideration of alternatives is intertwined with the consideration of mitigation measures. On the contrary, with some arguments, effectively the main purpose of EIA, to allow the proposed development to proceed while reducing it impacts to an acceptable level. The secondary purpose of EIA is to prevent unsuitable development by demonstrating that certain impacts cannot be mitigated to the point of acceptability.

Also, it should be noted that although the treatment of alternatives is the 'heart of the EIS' in the US, mitigation measures is probably the most important outcome of the American EIA process. Further more the Department of Environment within U.K. classifies mitigation measures into avoidance (using an alternative approach to eliminate an impact), reduction (lessening the severity of an impact), and remedy (which may involve some enhancement or compensation).

Clearly, details of mitigation should be set down in the EIA report, providing a record of all the mitigated measures and modifications suggested or accepted by the proponent. Lee and Colley (1992) have suggested that EIA report should deal fully with the scope and effectiveness of mitigation measures.

Glasson et al (1996) highlighted the types of mitigation measures defined in EC directive 85/337 as "measures envisaged in order to avoid, reduce and, if possible remedy significant adverse effects" (box 3.1).

Box 3.1
Guidelines for drafting effective mitigation measures

WHY:	State the objective of the mitigation measure and why it is recommended
WHAT:	Explain the specifics of the mitigation measure and how it will be designed and implemented • Identify measurable performance standards by which the success of the mitigation can be determined • Provide for contingent mitigation if monitoring reveals that the success standards are not satisfied
WHO:	Identify the agency, organisation, or individual responsible for implementing the measure
WHERE:	Identify the specific location of the mitigation measure
WHEN:	Develop a schedule for implementation

Source: Wood (1996)

Examples of methods to avoid impacts on site would include:

- The control of solid and liquid wastes by recycling on site or by removing them from the site for environmentally sensitive treatment else where;
- Avoid disturbance to communities from construction lorry and night construction; and
- Establishment of buffer zones.

Examples of methods to reduce adverse effects during the design phase might include:

- The sensitive design of structures, using simple profiles, local materials, and muted colors, to reduce the visual impact of a development, and landscaping to hide and/or blend it into the local environment;

- Use of construction site hostels, and coaches for journeys to work, to reduce the impact on the local housing market, and on the roads, of a project with major construction stage employment;
- Use of silting basins or traps, planting of temporary cover crops, and scheduling of activities during the dry months to reduce erosion and sedimentation.
- A local community astride a route to a new tourism facility could be relieved from much of the adverse traffic effects through the construction of a bypass.

Conclusion

EIA has been introduced as a tool that would guide to the rejection of the developments environmentally improper actions, and to the mitigation of its impacts to the acceptability threshold. Wood (1996) hence explored that EIA is an anticipatory, participatory environmental management tool of which the EIA report complements.

Basically, EIA has been notified on one hand, as a planning tool to do with the methodologies and techniques for identifying, predicting, and evaluating the environmental impacts associated with particular development actions. On the other hand as procedure for decision-making, which has to do with those mechanisms for ensuring an environmental analysis, that would influence the decision-making process. Alternatives have been described as the heart of the EIA, but how they are addressed would determine its relation to the subsequent decision making process.

Essentially, in conducting an EIA, there should be an understanding for the dimensions of the development, the full description, site information, and the all the necessary data involving the identification of construction and operational stages in order to assess the impacts, which the development is likely to have on the environment.

It has been noticed that EIA originally is planned to restrain, but not to control discussions. Although, it is compulsory in Egypt within the context of tourism, the decision is taken after the EIA report has been prepared and subject to review, it is obviously prepared by a third body, other than the developer or the body that would grant the development clearance.

Accordingly, (1995) Giplin viewed EIA as the best approach to assist in decision-making about policies, plans, programs, and projects; and is a most important ingredient of democracy in practice, majority rule with respect to minority rights. Where, it has been highlighted that one of the basic problems is that in all assessments there are winners and losers. Although, a new tourist resort could mean a negative effect on the marine life, on the other hand it means hard currency input for the economy.

The earth summit held in Rio de Janeiro in 1992 proved that the environment is now at the top of the world agenda. This change in attitude towards the protection of the environment has been described as a 'Green Revolution'.

Hence, EIA has been introduced as an instrument that would assist in achieving sustainable developments that would not cost the earth. However, for "deep ecologists", it has not been seen providing the 100% certainty about the environmental consequences of development proposals. In order to squeeze uncertainty in EIA preparation, a brief must be agreed, and adhered to, by all the interested bodies. Although it is becoming widely accepted as a useful tool in decision-making, although, it has been argued that it largely reacts to development proposals rather than proactively anticipating them.

In order to focus on the organization's process for producing a product or service, ISO management standards have been illustrated; they are totally voluntary and carry no legal requirements. Auditing is a technique that provides the feedback on the effectiveness of methods, although it does not have an agreed meaning in environmental science literature, it has been suggested that there is a need to more effective integration for monitoring and auditing into the EIA process, however, it has been argued that auditing could be viewed as a tool for criticizing the decision-making process and hence be perceived as a threat.

Wood (1996) noted that if the consideration of alternatives lie at the heart of the EIA, then the mitigation of impacts is the principal aim of the EIA process. Weston (1997) as a planner noted that environmental assessment is a valuable tool for creating environmentally sensitive, even sustainable developments. However, what might be considered as an EIA weak point, that although tourism has been identified as a major industry within the global economy, EIA examined literature did not give more attention to this issue, taking into consideration that the industry developments might not be outlined with the same features for other developments.

In this respect, design should use information from the environmental impact assessment conducted for the development under consideration, and aim to make best use of available information fully aware with the detailed mitigation measures within the required context. Obviously, there would not be a magic threshold at which effects and consequences change from 'significant' to 'insignificant' it is usually a matter of extent. The designer initial assessment of significance might be only based on good judgment in the attempt to provide sustainable development.

It should be realized that the design of environmentally sound buildings would not be only based on choosing suitable materials and ways of putting them together, it would further involve more than having ideas about which resources are scarce or un-renewable. Clearly, sustainable buildings grant benefits to all parties; hence a holistic attitude towards the balances within nature is needed; the following chapter further explores sustainable developments, sustainable design, materials as well as, sustainable construction and their impacts on the environment.

Introduction

The phrase "sustainable development" came into widespread use in the last half of the 1980's, it signaled a new phase on our struggle with the twin catastrophes of resource depletion and environmental degradation (Lyle, 1994). The ecological understanding developed over the last few decades makes it clear that only the needs of humans could be attained in the environment where the needs of other species are also met.

Consequently, this requires maintaining the integrity of nature's life support processes. However, maintaining does not imply simply preserving, obviously, development is essential as a fact of life. Needless to say, that this implies change, which raises serious questions among environmentally concerned people. Although, development indicated destruction of the nature for the majority, still, varied levels and types of development would possibly be introduced within the context of sustainability.

Policy makers attempt to address sustainability progress on both global and local scale, where there is a need to take local viewpoints and locality into account in order 'not' to impose concepts that would be rejected. The terms *Green architecture* or *Sustainable architecture* are simply different expressions for designing in an environmentally responsible way. They both represent a similar approach to the built environment involving a holistic philosophy towards buildings' design; in other words, all resources that go into a building, site constrains and features need to be appropriately considered if a sustainable architecture is to be produced.

Most contemporary architecture has forgotten the age-old lessons of design, which took biological components of the site's ecosystem into consideration. Architects should be reminded of Frank Lioyd Wright notion of the *importance* of working with the nature. In this respect, the research would cross by a traditional Chinese method of arrangement, the *Feng shui,* although it may seem odd to imagine an invisible life force drifting through and around our buildings, considering its principals, when designing a building or setting out furniture, does seem to result in a more balanced, peaceful environment.

Moreover, this chapter would attempt to explore some architectural trends, in search for sustainability concepts, some examples for environmental buildings are introduced. Clearly, emphasis on the 'pros and cons' for the architectural movements would enlarge the areas of knowledge, hence, the design team would need to examine certain design aspects, as designing for the environment, for disassembly, for recycling to the highest degree, and considering materials impact on the environment to achieve sustainability.

Sustainability is studied here as a philosophy attempting to describe the process starting at the planning and design phase up till the construction process. The attempt here is not just implementing sustainability within the building industry, as political or marketing slogan; rather, it is a search for the philosophy benefits that could assist in the conservation of the environment with its positive feedback on the tourism industry, the research focal point.

To realize the goal of a sustainable future, the engineering and construction industry must overcome many barriers today. The current condition of the construction industry in Egypt amongst other problems might be lacking consensus on construction policies; requiring standardization in its systems, the following literature is to study lessons in order to assist in mitigating the negative impacts within the industry.

4.1 sustainable development

4.1.1 Origins of sustainable developments

Adams (1991) indicates that the concept of sustainable development is at the center of the current concerns about environment and development. He further adds that it is not only the best known and commonly cited idea linking environment and development, but it is also worked-out, in that it is the capstone of the World Conservation Strategy and the Bruntland Report. Sustainability is an issue of great importance for society, and for the building sector, Anink et al (1996) pointed in the following why buildings should be sustainable:

- ❑ 50% of material resources taken from nature are building related
- ❑ Over 50% of national waste production comes from the building sector
- ❑ 40% of the energy consumption in Europe is building related.

However, it should be highlighted that reliable details on the environmental effects of the building materials and certain technical operations are not freely available. Concern about environment and development in the Third World has become a central feature of the thinking of development studies. Adams (1991) illustrates that awareness of the environmental aspects of development is not by any means new; there has been a self-conscious effort to move beyond environmental protection and transform conservation thinking by appropriating ideas and concepts from the field of development.

The evidence of this transformation in environmentalist language is substantial, but much of it focuses on the almost universal adoption of the phrase 'sustainable development'. The concept of sustainable development was important at the 1972 United Nations Conference on the Human Environment in Stockholm. International agencies such as the United Nations Environment Program (UNEP) and the International Union for Conservation of Nature and Natural Resources (IUCN) have also backed sustainable development. It was the central concept in the World Conservation Strategy published in 1980 (ICUN 1980) and is also the foundation of the report of the World Commission on Environment and Development seven years later (Bruntland 1987).

It should be noted that the Stockholm conference held in 1972 has been partly concerned with the environmental problems evolving in our Third World. The conference has been initiated by problems of the industrialized developed world, in this respect; a cautious approach must be taken when studying the literature outcome and applying or rather adapting it to the underdeveloped World.

However, it should be mentioned that the Brundtland Commission came years later (1987) and was important for several reasons. First, it is obviously and rather self-consciously attempts to recapture the 'spirit of Stockholm 1972' which was so celebrated by environmentalists in the early 1970s. Second, *our common future* places elements of the sustainable development debate within the economic and political context of international development. It is starting point was deliberately broad, and a move to limit its concern simply to the 'environment' was firmly resisted:

"This would have been a grave mistake. The environment does not exist as a sphere separate from human actions, ambitions and needs, and attempts to defend it in isolation from human concerns have given the very word 'environment' a connotation of naivety in some political circles".

Box 4.1
The principles of sustainable design for dwellings

HOLISTIC APPROACH An integrated design approach is preferable to a fragmented design one; everything is connected to everything else. **SITE** The specific nature of a place dictates sustainable design **ENERGY USE** Reducing energy use is more cost effective than producing or reclaiming it. **RESOURCE USE** aiming for durability and re use is more efficient than recycling products and materials. **HEALTH** A sustainable environment is healthy one for people. **SIMPLICITY** Simple solutions are better than those, which are complicated, over, designed or rely on "technical fixes". **EFFICIENCY** Good sustainable design produces multiple benefits from one feature **PARTICIPATION** Sustainable design involves the user at all stages.

Source: Sustainable Housing Design Guide- (1999)

4.1.2 Sustainable developments techniques

Edwards (1998) suggests that there seems to be unwritten agreement that target date for reducing atmospheric carbon emissions to the recommended levels in 2050. By then there would be at least a doubling of atmospheric carbon, which means that substantial climate related damage is inevitable. From the following, it is crucial for the construction industry with all those related activities as entities responsible of the current environmental degradation to implement sustainable principals (Box 4.1). For it seems that it is an issue of survival and not only of sustainable developments structuring.

Table 4.1 summarizes some methods and techniques, which are considered to be environmentally friendly. *Sustainable development* is a technique where a resource is managed so that it is replaced at the same rate as it is used. For example, if the trees in a particular forest take 20 years to grow then one-twentieth of the forest could be used each year, provided that replacement trees are planted (Hore et al, 1997).

Table 4.1
Sustainable development techniques

Technique	*Example*
Reuse of materials	Use of stone, brick, timber, fireplaces from earlier buildings
Recycling of materials via a process	Processing of old paper, metals, concrete, plastic to make new batches
Replacement of resources after use	Replanting forests
Preservation of habitats	Keeping old trees on new building sites
Reinstatement of land after use	Filling quarries, replanting vegetation
Recycling of land	Reusing of land of old factories
Low energy devices	Solar energy, efficient lighting

4.1.2.1 Integrated life cycle management and sustainable building

Anink et al (1996) introduces Integrated Life Cycle Management as a technique where it means striving to keep raw materials within a single cycle as much as possible. This means a minimum of waste, lengthening the life span of building components, increasing the flexible use of dwellings, and promoting the recycling of materials and products after the demolition of the building.

Every effort must be exerted for high-grade reuse of waste materials. For instance concrete rubble from manufacture of new concrete and the reuse of an aluminum window frame is preferable to smelting the frame down and processing into a new product.

4.1.2.2 Holism/Bioregionalism

It has been argued that the current debate on how to assess sustainability in the built environment is focusing on the need to take locality and local viewpoints into account. At the same time policy makers are attempting to address progress with sustainability on both local and global scale.

This implies the need not only for local understandings from specific standpoints but also for a more universalized umbrella of understanding of sustainability. This umbrella of understanding is 'meta-language' for communications between localities and it must be able to accommodate the range of scales form whole planet to localized regions (Stevenson et al, 1998).

4.1.2.3 The productivity principle

To build a persuasive business case, according to Dimson (1996) sustainable building must be lifted out of the abstract moral sphere and into the world of hard dollars. The "productivity principle" plays out in six basic areas; *Site planning, materials selection, energy planning, waste management, air quality, and design for flexibility.*

4.1.3 Sustainable development and ecosystem

An ecosystem is the symbiosis between living (plants and animals) and non-living entities (e.g. soil, climate) in a particular area. Harm can be done both to our ecosystem and landscape.

Anink et al (1996) emphasizes that it may take from decades to centuries for the balance to be restored in an ecosystem, which has been disrupted. Scarcity of resources, their reuse and prolonging the raw materials life span by certain measures are issues that need to be considered within sustainability.

4.1.3.1 Scarcity of resources

A renewable raw material can only be spoken of, when the rate at which this raw material increases (turnover rate) is of comparable order to that of the rate of consumption. Presently, materials high consumption means a higher turnover rate. Timber is one of the few raw materials, which is renewable in certain instances. Temperate hardwood and softwood, if forested with consideration, are suitable and environmentally beneficial

4.1.3.2 Reuse

Reuse can be promoted in two ways in sustainable building. In the first place, products could be selected to be reused in a primary (unchanged) or secondary fashion (where the by-product is used as raw material for making building materials), and secondly, choosing products which can be used again after demolition.

4.1.3.3 Life span and reparability

Greater durability through design concepts and construction methods results in fewer repairs to a product and eliminate the need for replacement later on, so that the burden on the environment over a certain period is reduced. It is, though important for the durability of individual building elements to match the life span of the whole building.

4.1.4 Benefits of sustainability

Pieters (1996) argues that sustainable buildings offer benefits to all parties. Uniformity in application will result in productivity gains for building contractors. Many users have a positive attitude towards buildings, which have been designed and built based on environmentally friendly techniques. Moreover, for suppliers and traders, the result may be increase demand for environmentally materials. As a result, there may be a decline in the prices of environmentally friendly products as demand for them grows.

Dimson (1996) adds that all around us the evidence points *incontrovertibly* to the same conclusion: we are leaving the industrial age and entering the age of ecology, we need to awaken the industry from its *somber*.

To do so, two parallel strategies must be followed; one focuses on people minds: and is called education, other on environmental materials and manifest itself in the form of sustainable offices and buildings. Both strategies could be comprised within the same context of sustainable architecture

In this respect Yeang (1995) proposed that *Green architecture* or *Sustainable architecture* are simply different terms for designing in an environmentally responsible way. Design in relation to the earth's ecological problems refers to the future and is therefore predictive and hypothetical.

He further adds that architects, designers, engineers, and all those whose work affects the environment must make everyday design decisions and take action on the basis of the information that is available. Assessments and guidelines for design should be provided on the basis of what is already known rather than on the ignorance or the exclusion of environmental considerations.

4.2 Green Architecture

Farmer (1997) points that making an environmentally sound building by choosing suitable materials and ways of putting them together involves more than having ideas about which resources are scarce or un-renewable. A holistic attitude towards the balances within the nature is needed.

Further more there appear to be a real reordering of thought as we entered a new millennium, with science itself leading the way. The universe is as a fluid and dynamic amalgamation of inter-relationships. Biologists are returning to the 'whole' after finding that the traditional methodology of examining the 'part' not only failed to substantiate orthodox theories but also refused to acknowledge many of the phenomena so obvious to the naturalist.

It might be the case that architecture sits between the macro and the micro but it is influenced by both. Hence, as mentioned in the following definitions, green architecture cannot stand apart from the societies and the environments that produce it, but it is regarded within a holistic framework.

4.2.1 Definitions

Brenda and Vale mentioned that a green approach to the built environment involves a holistic approach to the design of buildings; that all the resources that go into a building, be they materials, fuels or the contribution of the users, need to be considered if a sustainable architecture is to be produced. William Reed defines green buildings as structures, *"designed constructed operated and demolished in an environmentally enhanced manner"*. Dietsh demonstrated that truly "green" architecture is a holistic approach to design that engages a complex relationship between a building and its materials, systems, occupants, and surroundings (Mokhtar, 1998).

4.2.2 Interrelation between natural and manmade environment

Yeang (1995) highlighted that many of the current design approaches that claim to be "green" do not show a thorough understanding of the earth's ecosystems (fig. 4.1) and their functions. He further notes that in an ecological design approach, the concept of the environment has to be regarded as much more inclusive, encompassing not only the physical (inorganic) milieu of the building but also the biological (organic) as well.

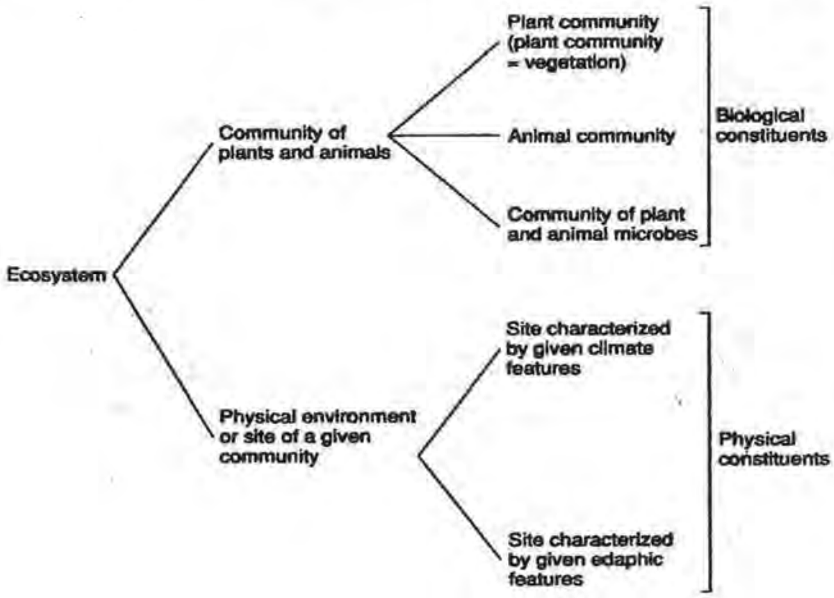


Fig 4.1
Earth Ecosystem
Source: Designing with nature- (1995)

In most building projects, we often find that the architect or the designer has completely omitted any consideration of the biological components of the projects site's ecosystem. Papanek (1995) mentioned that most contemporary architecture has forgotten the age-old lessons of design, which took nature, climate and the elements into consideration. Frank Lloyd Wright once said: *it is important to work with the nature but some architects will say to their client: "Madam, I can't work with nature, how would you like a nice contrast?"*

The idea of green architecture might be organic or also inorganic. When buildings use lightly the earth's resources, and are expressive also of a way of living, which thinks in terms of partnership with nature, it might be organic in those senses. Equally they might be inorganic, relating to physical rather than biological aspects of nature. Farmer (1999) illustrates the essence of green architecture as the past that leads to the green present would be wider and more inclusive than the organic, as has been understood in architecture.

It has been seen that the separation from the ground, whether in skyscrapers on Pilotis in Le Corbusier's city for three million project, or in villa Savoie, detaches human building from the earth's surface, not for the functional reasons as in folk building, but in order for the building metaphorically to fly. Coupled with transparency, with the glass window barely separating inside from outside. Compared to the earthbound building there is a delicacy of contact with what's outside, an openness.

If the health-giving properties of sunshine and fresh air which fundamentally underwrite the design of these buildings is added to the raison d'etre of these modern city open spaces, then these early modern buildings seem to point to renewal, though of a different kind, of a union between human and the natural. On the other hand a detachment from what is outside can happen when viewed from life inside space, which is artificial. Wright said in 1914:

> *...By organic architecture I mean an architecture that develops from within outward in harmony with the conditions of its being as distinguished from that is applied without.*

A difficulty occurs when examining the relationship between the man-made and the natural environment, that is, is there a sharp distinction between the "man-made" and the natural elements in the environment?

Neither the word *natural* nor the word *man-made* is entirely satisfactory since people are a part of nature as biotic component and all communities, whether strongly influenced by humans or not, are also part of nature. However, because of humanity's pervasive influence, no area can be completely isolated form its direct or indirect effects. The study of interactions between organisms and biological species (including humans) with their living and nonliving environment has been defined as *ecology* (a term originated by Haeckel in 1869). In ecology, the term *ecosystem* is used both to define a unit of study and to describe a concept or an approach. The term ecosystem can be applied to a unit of landscape or seascape for a definite segment of space and time.

4.2.2.1 Eco-capacity

The ecological carrying capacity or 'eco-capacity', its idea is that the biosphere offers (global) society a finite means of support, in the form of stocks of natural resources and in the form of its resilience to depletion, pollution and encroachment. Worldwide trends predict that eco-capacity will, in the long term, be exceeded if environmental policy remains unchanged.

In this respect, Weenen notes that aiming for optimization, new 'nuts and bolts', new methodology and procedures are being introduced, which help to polish the existing frame of basically unsustainable industrial production and consumption. Aiming for the future, however, values, needs and functions must be discovered and redefined.

4.2.3 Green approach

A 'green' dimension to what we are producing ought to prevail and a common base must exist between all concerned, due to Brenda and Vale (1991) whether artist or a lay person. Since the journey into space, the fragility of the world has both shocked and challenged. The single shared experience is that living on the same, very small earth. The way in which one person makes an alteration to the planet must have an effect on rest of the inhabitants.

At the present time, few examples of green approach to the built environment exist that it may be appropriate to glance back to vernacular architectures that did espouse the green approach for some clues. In a world of almost five billion people it is not possible to return such traditions, it is the implementation of the concept and attitude towards resources within the framework of future architecture. In the days of vernacular architecture, the consumers of buildings understood the process of construction, even if they were not builders. Some would argue that the vernacular tradition was never architecture, only building, and that unless aesthetics predominate; 'architecture' does not exist. In his writing on the subject Brunskill describes architectural process as follows:

> *"Aesthetically and, probably, constructional the designer will have been adventurous, exploring new ways of achieving his conscious wishes; in so doing his materials will have been chosen to help achieve the aesthetic or constructional end and have been obtained from whatever source could supply such materials".*

Medieval architects showed further how the arch form could minimize the use of resources covering the maximum space with the smallest quantity of material; the development of Gothic architecture between the Romanesque and Perpendicular in England illustrates this trend.

Yeang (1995) further adds that the designer must be aware that any structure, which he or she locates upon a project site, will inevitably, by virtue of its physical presence and functioning, affect not only that site's ecosystem but also other elsewhere.

4.2.4 Green architecture through history

The essence of the 'green' approach to architecture is not a new one. It has existed since people first selected a south-facing cave rather than one facing north to achieve comfort temperate climate. What is new is our perception towards the green approach to the built environment that it should involve a holistic approach to the design of buildings. It might be the case that many buildings embody at least one of the various identifiable green characteristics. However, few as yet embrace the holistic approach (Brenda and Vale, 1991). The return to nature as a source of inspiration for thinkers of the Enlightenment was inseparable from the rise of science.

4.2.4.1 Folk building

Farmer (1999) points that the term 'vernacular'-meaning originally that most architects and historians have adopted the everyday architectural language of a particular region. He prefers 'folk' for its resonance with folk music, folk tales, etc. In folk traditions we find slowly evolving ways of putting buildings together, based upon the available resources gathered by hand.

4.2.4.2 Victorian buildings

It may seem at first far fetched to claim that much Victorian building reflects the momentous discoveries of natural science. Yet alongside the technological advances in iron and steel construction, sanitation, and ways of manufacturing building components and putting them together, and connected to the historical and technical search for an architectural style appropriate for the age, was a response to changing perspective of the human place in the natural order.

4.2.4.3 The idea of ecology

Farmer further suggests that John Ruskin's name can be credited with the founding of green sensibility. The propositions Ruskin's put forward for the arts and then for society were besides else the first systematic reaction of a kind we would now call green. Ruskin's advocacy of Gothic architecture as a model for his time, his analysis of industrial ills and the eventual advocacy of social change, his later practical experiments in cleaning up pollution, getting involved in selling unadulterated food and organizing a community, were all grounded in his crucial experience in the 1850s.

He has been involved in the construction of the Oxford Museum. Ruskin part in the building tells of the adjustments it forced upon his attempt to re-build humans relationship with their own past and the forgoing of what we might now call a green sensibility within the context of architecture.

Architecture has been defined as 'scientific art', although there exists various definitions for the term 'art', there might be consensus upon its context, however, the term 'science' in the following literature is classified according to three main types of science. Science, Parascience and Protoscience, Sydney and Baggs (1996) suggest that *Science,* as we know it today, is based upon a strict process. A scientist develops a hypothesis to explain a particular phenomenon; experiments are undertaken in attempts to prove that the hypothesis is incorrect or correct.

Protoscience refers to original, primal or ancient knowledge. *Parascience,* (from the Greek, *para:* beside, near by, along with). It involves not only the controlled experimental procedures of science, but also the mysticism and occultism of protoscience. These types introduced might broaden the scope of understanding certain approaches within the context of green architecture.

4.2.4.4 The GAIA Hypothesis

In describing the interrelationship between the planet and its life forms, Doctor James Lovelock (1979) used the term Gaia, the name of the ancient Greek goddess of the Earth. The Gaia hypothesis is a metaphor for a self-regulating world system.

4.2.4.4.1 The five elements of GAIA

Fire, at a basic level, fire represents the hearth: the warmth and comfort necessary for life. For us, the fundamental fire of life is the sun, which sustains all organisms on Earth.

Earth, soil is very precious resource, which is being wasted all over the world. It originates from the rock that makes up the Earth's crust, a mixture of granite, sedimentary and metamorphic rock.

Air; originally the earth was surrounded not by the atmosphere we know today, but by the sulphurous gases and methane. Oxygen formed firstly as a result of ultraviolet light turning water molecules into hydrogen and oxygen.

Water, every drop of water has been here since the beginning of the Earth. Apart from the small amounts lost in the debris of craft sent into deep space, it will remain here. Water circulates in complex pathways and therefore needs to be conserved and its purity protected (Myers 1985).

Ether, (or aether) is the sea of radiation and energy, which creates the necessary conditions for the life, health, and demise of all organisms. It could be said to embrace the geoenergetic, electromagnetic, electrostatic and gravitational forces exerted upon us by the Earth, the sun and other planets.

The ecological realization of these elements would strengthen our understating of the relation between architecture and nature, which has been demonstrated in the past, and the ongoing Chinese and Japanese architecture. It is a system of rituals called the "Feng Shui" that influence the design of our buildings.

4.2.4.5 Feng shui

A blend of geomancy and astrology, the Chinese practice of *feng shui* is based on the principle that location in the universe affects our destiny. When buildings are harmoniously positioned in accordance with *feng shui* practice, life patterns are in balance and harmony with nature and universe. Prosperity, health and equanimity follow for inhabitants.

Sydney and Baggs (1996) literally explain the term *feng shui* as 'wind and water', in essence it is 'a thing like wind which you cannot comprehend and like water which you cannot grasp' (Michel 1975). It is based on a belief that everything in the universe, whether organic or inorganic, has life. It is neither a superstition nor a religion and, as a science progresses, some of its causes and effects will be measurable in the future.

They further question if *feng shui* apply to all places on the globe? In their defense to such quest, they point that thoughtful design can overcome the problems that might occur, by the application of the essence of the approach not by trying to enforce concepts that might not apply to the microenvironment or even the culture of targeted location.

As a matter of fact the *feng shui* itself has two schools that we have the choice to select between what is more appropriate to our case.

4.2.4.5.1 The two schools of feng shui

There are two schools of *feng shui* thought, the form, and the compass schools. The form school was the first to be formally established. The school follows sets of rules about the placement of a building, its rooms and furnishings. The compass school does not follow prescribed rules, but uses the *feng shui* compass to link aspects of a site with personal astrology and familial status of the people who will occupy the building.

4.2.4.5.2 feng shui as a design tool

In their writing on the same subject, Borer and Harris (1998) add that *Feng shui* is a traditional Chinese method of arrangement. At the centre of *feng shui* is an understanding of the flow of *Ch'I,* which can be linked to a viscous fluid flowing around the landscape, being diverted and blocked by natural or artificial obstructions. It may seem odd to imagine an invisible life force drifting through and around houses. It is also more difficult to tell whether manipulations of *ch'I* bring benefits to us than it is with that other.

A consideration of *Feng shui* principals, when designing a building or setting out furniture, does seem to result in a more balanced, peaceful environment. *Feng shui* advice is a mixture of good sense and an understanding of Eastern astrology.

- *Practical science:* As an example, beds should be raised above floor to avoid draughts; light from rising sun is beneficial in bedrooms.
- *Aesthetics:* if there is no view from a room, draw attention away from it by providing another visual focus, such as flower arrangement, and put a translucent blind over the window.
- *Psychology:* Do not place a dressing table with its mirror facing the bed, as you may frighten yourself if you wake up quickly and see your reflection.
- *Beliefs:* The whole system based on astrology and the various compasses is an aspect of *feng shui* Westerners find difficult to understand.

In considering a new and a controversial approach to the above approach, which has expressed strong ties with nature, modern architecture is illustrated to highlight the negative aspects in relation to nature and the environment.

4.2.4.6 Modern architecture

Industrial age was apart from nature as Mokhtar (1998) has illustrated, where she noted that new building technologies have been used. Man consequently, depended mainly on these developments to do much of his work but he forgot what nature can do for him and treated it, merely, "as a background for the piece of architecture itself".

Revivalism showed classical and gothic revival and began to return. Art nouveau was more related to nature through its flowing lines and curves. By the turn of the ninetieth century, architecture called "modern architecture" appeared (1920-1960). It consists of a particular vocabulary (the international style) embodying a certain philosophy (functionalism). Although functionalism declares that the form must follow its function, yet, some extremists regarded function is to design houses as a machine to live in.

4.2.4.7 architectural trends

It should be mentioned that Papanek (1995) highlighted that Post-modernism followed Modernism, and was in its turn replaced by Deconstructivism. He explains that such a movement started out as a legendary fashion that deconstructs meaning and seemingly reconstructs historical reality. Turning us against our own past and against our nature when applied to architecture and design, it continues to dehumanize the tools used, the rooms worked in, and the homes and the cities in which people live in.

Deconstructivism is an anti-world view according to ecologist David Orr, who goes on to say: "it deconstructs or eliminates the ingredients necessary for a world view, this type of postmodern, deconstructive thought results in relativism even nihilism.

With the present environmental mess it is even more important that support is provided to guide the intervention of design with nature and mankind. Areas of knowledge must be enlarged, and at the same time redirect ways of working.

It might be the case that there should be no special category called 'sustainable design'. It might be simpler to assume that all designers shall try to reshape their values and their work, combine objective aspects of climate and ecological use of materials with subjective intuitive processes, and relies on cultural and bio-regional factors for its forms.

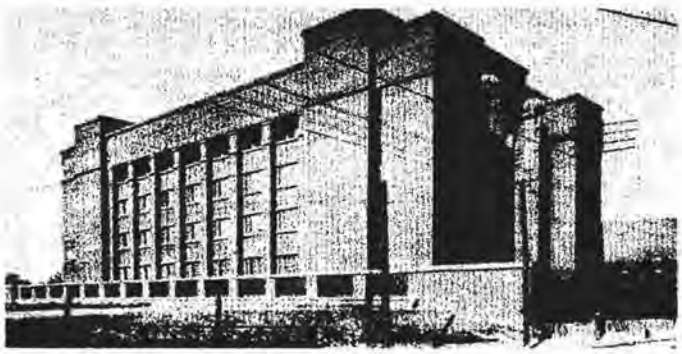


Fig 4.2
Larkin Building - Frank Lloyd Wright
Source: Environmental Design- (1999)

Randall et al (1999) points to one of the landmarks of twentieth-century modernism; the Frank Lloyd Wright's Larking Building (fig. 4.2), which was designed as a sealed box with mechanical ventilation to combat pollution and noise from adjacent railway.

These buildings were seen as prestigious, and alliance of clients, architects, structural engineers, mechanical engineers and suppliers of everything from ventilation fans to cladding systems collaborated to produce them. In many ways these systems were effective. The price has proved to be to high, however, the most appropriate way from a holistic point of view needs to be determined, in order to provide comfortable temperatures while simultaneously addressing related issues as air quality and noise. To transform into architecture is a challenge, since the procedure of Stack Effect Ventilation fig. (4.3) is a complicated procedure in real designs.

4.2.5 Intelligent buildings

Further, Farmer (1997) argued that the images and forms of technology are often illusory. Although 'intelligent buildings' have been anticipated for some twenty years, the prohibitive costs of many of the technologies involved have limited their realization. Intelligent glass that responds to external light and heat levels has been in production for many years. The possibilities of nano-technology could transform buildings into a myriad of tiny automatic, self-regulating systems, which could produce a subtly changing and modifying environment at apparently little energy cost. What is however clear is that truly green design is more than a technological add-on.

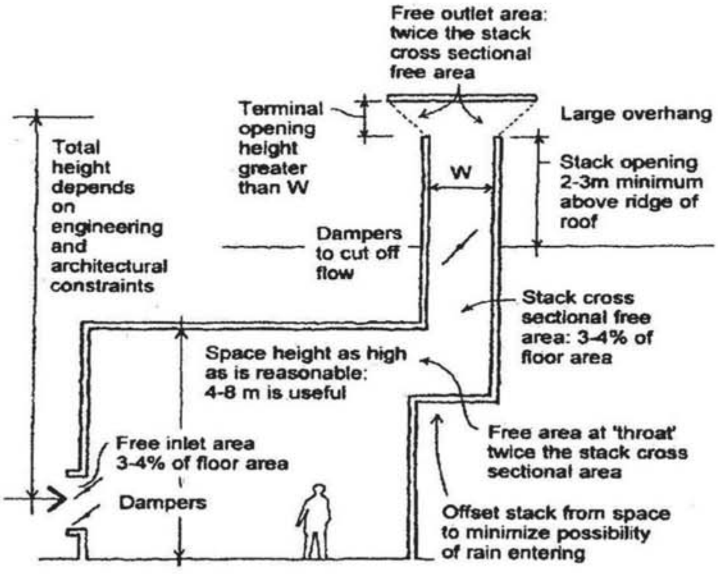


Fig 4.3
Stack effect Ventilation
Source: Environmental Design- (1999)

Sydney and Baggs (1996) emphasize that such a house is far from intelligent-it exemplifies an unhealthy environment, dominated by harmful electromagnetic and electrostatic fields and indoor chemical pollution.

In this respect, Randall et al (1999) adds that there are number of points that apply generally to controls. Firstly, the mechanical and electrical systems of a building and their associated controls should be as simple as possible, consistent with the need to meet requirements of efficiency, comfort and cost.

Farmer (1999) suggests that what ever might be said about new technologies being clean and however intelligent buildings might become, it will still be argued that the forceful technological expression of such design solutions must implicate the building with the very problem that underlies the environmental crisis. The most extreme examples from this point of view would be perhaps the well-known Lloyds building in London and the Centre Pompidou in Paris. Exciting and innovative in appearance, they derive their form from their raison d'etre from the belief that mechanical services on the outside of buildings could be renewed or upgraded as technology improved. In fact the use of some hi tech architects to the exposed pipes and external structure is a kind of decoration to articulate and give expression to what otherwise would be simply large serviced boxes.

Of course electronic and mechanical systems should be used to help wherever is needed, but these could be made as simple and user friendly and used in conjunction with those 'green' aspects.

4.2.5.1 Ventilation–natural and assisted natural

In their simplest form, controls consist of manual opening and closing of windows and in some cases, such as nineteenth century schools, ventilating panels built into walls and roof cupolas with opening flaps. A more sophisticated ventilation system, based on the auditoria at De Montfort's Queens Building (fig. 4.4) requires more elaborate controls.

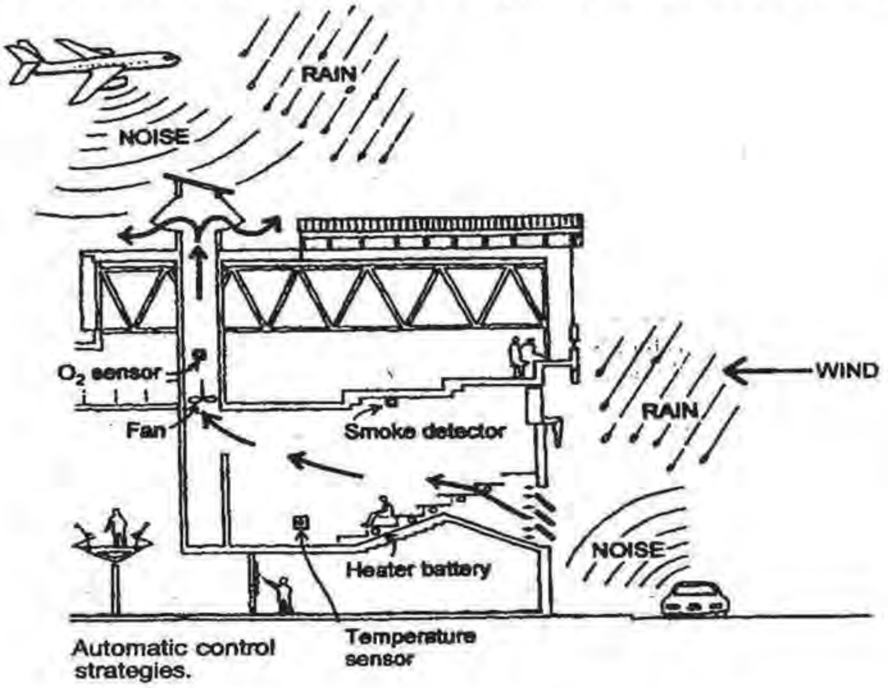


Fig 4.4
De Montfort's Queens Building
Source: Environmental Design- (1999)

On the other hand Sydney and Baggs (1996) note that the traditional wind and cooling towers have been used for hundreds, possibly thousands, of years in a hot, arid band just north of the Tropic of Cancer, including Pakistan, Iran, Saudi Arabia, Egypt and North Africa. Traditional wind tower structures use either the 'stack effect' principle of encouraging air to move from the inside to the outside of the building, or more commonly they evaporatively cool the incoming air and release it via leeward openings.

The construction of the wind tower depends upon the wind-directional characteristics of the terrain. On the River Nile in Egypt, the coolest wind blows mainly from the river and the Mediterranean Sea. Consequently, the wind catcher on the of the wind towers face towards the river or the sea and away from the desert.

Along the Arabian Sea and the Gulf coasts, the wind can blow from the four points of the compass; therefore the wind catcher must be multidirectional.

This is achieved by using four baffles within the intake. These baffles are constructed from an 'X' shape (fig. 4.5) in the wind catcher, providing four triangular intakes in the vertical shaft. During desert winters, wind catchers are usually blocked with timber covers. The intake and exhaust of air by a wind tower depend upon the pressure differential between the exterior and the interior air, and on the two temperatures. This element could be incorporated with buildings that use also hi tech solutions.

However, Dimson (1996) suggests that there are two philosophical schools of thoughts towards to what extent should a building be green in plain view. One proposes that all buildings need to do is to perform green through greater energy efficient, use of sustainable products and materials and so on. The second takes a broader view of architecture, argues that buildings are educational, and should therefore deliver a clear visual message about the need for environmental sensitivity.

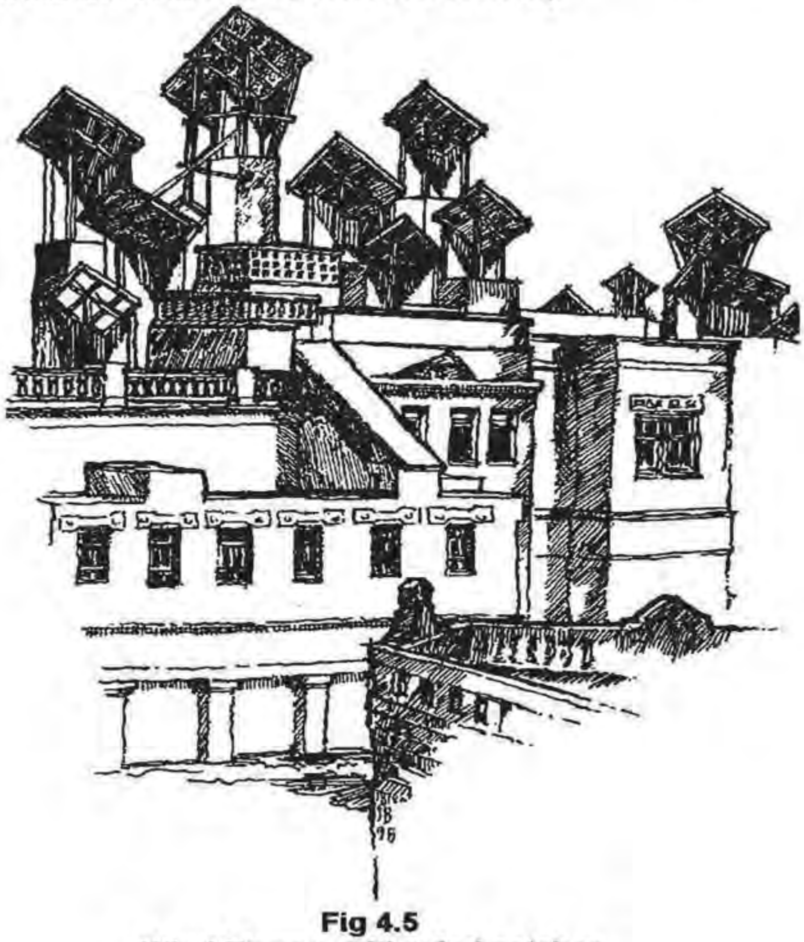


Fig 4.5
Wind Towers with wind catches in Hyderabad- Pakistan
Source: The Healthy House- (1996)

4.2.6 Benefits of green architecture

Whatever philosophical school would be followed, direct and indirect benefits exist for green architecture, Edwards (1998) illustrates the direct benefits for the developers as following:

- Economies in fuel bills (either for owner or tenant)
- Market advantage
- Lower long-term exposure to environmental or health problems
- Greater productivity of workforce.

The main benefits of green design to a developer are financial: taking a long-term view, the running costs will pay several times over for the greater initial investment. Alan Hedge and Andrew Wilkes undertook at the beginning of the 1980s derived empirical understanding of people's reaction to buildings in which they worked. They came to separate the buildings, which were cause for complaint into distinct categories:

- Problem buildings; use to describe any buildings in which the occupants were dissatisfied with their indoor environment.
- Sick buildings; where no single factor could be identified as being the cause, but which nonetheless had a statistical data profile of complaint that impaired the efficiency of the people in the building.

In this respect, there are three ways highlighted in which sustainable approach benefits both the developers and their tenants and has an indirect bearing upon balance sheets. Green buildings:

4.2.6.1 Healthier to use

The use of more natural sources of light, solar energy for heating or cooling, and more organic materials in construction all add up to a healthier building than that represented by a conventionally designed and constructed building.

4.2.6.2 Psychological advantage

People feel 'better' in green buildings; they claim an enhanced sense of well being. The ability to open windows, to activate their own blinds, to have trees and planting immediately outside their windows, and to smell the breeze, all lead to a sense of feeling better about work, thereby increasing productivity.

4.2.6.3 Enhance company image

Green design is normally the result of holistic thinking by a team of professionals, including the client, who share similar environmental ideals.

Obviously, the above direct benefits could be seen in the context of financial benefits-both direct and indirect-to those who undertake building development. However, the philosophy of green buildings is not only a question of designing for the sake of financial benefits, but for considering in an integrated way the whole range of environmental and ecological impacts involved. In order to be considered in a systematic fashion the broader benefits of green design each building should be evaluated against the following aspects:

- Global warming;
- Ozone layer depletion;
- Bio-diversity;
- Product miles;
- Recycling.

4.2.6.4.1 Global warming

Buildings that greatly reduce their CO_2 production, use materials such as homegrown softwoods, and are designed as part of self-sufficient carbon communities where buildings and forests exchange oxygen for CO_2, all point the way forward.

4.2.6.4.2 Ozone layer depletion

About half of ozone damage is caused by chlorofluorocarbons (CFCs) used in connection with air-conditioned, usually high-energy buildings.

4.2.6.4.3 Biodiversity

Buildings influence biodiversity in many ways - they are home for species other than man, and the choice of materials used in their construction affects the destruction of endangered global habitats and the creation of the others, for example, to specify beech helps to conserve domestic and European forests, but to use teak or mahogany threatens more distant which are not usually managed on sustainable lines.

4.2.6.4.4 Product miles

The environmental footprint of a building can be very extensive. One way to measure this is to use the concept of 'product miles' where the product weight, distance and means of transport are considered. As a general rule it is better to use local products.

4.2.6.4.5 Recycling

The long-term answer is to design buildings that incorporate; the maximum possible amount of recycled materials (either directly or indirectly) and allow for ready dismantling and reuse.

Papanek (1995) concludes that the change in the environment of our fragile planet is a result of the things that we do and the tools that we use. Architects design approach should be sustainable in concept, as a commitment to their responsibilities towards planet earth.

4.3 Sustainable design

Design must be the bridge between human needs, culture and ecology. Scarcity of materials in our planet made Sustainable design a necessity and a way of life for generations. In the broadest sense, a designer is a human being attempting to walk the narrow bridge between order and chaos, freedom and nihilism, between past achievement and future possibilities.

Brenda and Vale (1991) argue that it is no longer sufficient that the design satisfies the client, built within the budget allowed, and earns the aesthetic approval of architecture peers; the designer of a building must also realize the responsibility that resides in making any part of the built environment, however small- that design for the few affects the many. Design should enable internal adaptation in the future as circumstances change. "Engineers shall perform services that help to sustain the world's resources and meet long-term human needs while protecting the natural cultural environment".

Architects and engineers are in a position to demonstrate how a fundamental change of attitude to the practice of their profession can have a measurable impact on the destiny of the planet. He emphasizes that it is up to them to set the example, which others may feel, moved to follow. In general, the environmental problems faced provide the single greatest challenge for building design.

4.3.1 Design challenges

The design professions can and should have a very significant influence on the environmental impact of the projects they design. There is rather adequate information available for a designer who wishes to pursue a policy minimizing the environmental impact of design: to do so will require commitment and extra effort (CIRIA, 1994).

Thomas et al (1999) suggests that development of the building envelope, or 'skin', is likely to be rapid in the next decade or so. Technological innovation in glass will allow window systems to respond to environmental conditions in ways not previously commercially viable for buildings. Building envelopes obviously need to be durable, economical, aesthetically pleasing, weather tight, structurally sound and secure. Psychologically, views out are very important. Environmentally, the question that need to be addressed is how to microclimate. The envelope would to a large extent, determine how the internal environment is affected by the external one.

Within the 21st century there will be an increasing need for *some-a few-* designers who are specialist in ecological design. However, in Papanek (1995) opinion, all design education must be based on ecological methods and ideas. This will include studies in the scientific method, as well as in biology, cultural geography and related fields. Social and human ecology and philosophy and ethics will form an integral part of this training.

- *The procurer,* by investigating, identifying and clearly instructing the design team with regard to the real needs, requirements and priorities of the users. By being prepared to move away from the syndrome of lowest price in pursuit of quality and on the basis of life cycle costs and environmental impact.

- *The design team,* designers must think through issues leading to over-design and inefficiencies, pay attention to detail and give forethought to maintenance, commissioning and manageability.

Dhir et al (1998) emphasizes that the design team objective will have to deal with the following aspects:

- Designing for environment
- Designing for disassembly (e.g. construction of joining systems)
- Designing for recycling.

From the above it is crucial to highlight the skills and the capabilities that a design team member must develop as Papanek (1995) has illustrated.

4.3.2 The designer's repertoire

- The ability to research, organize and innovate

- The capacity to develop appropriate answers to new or newly emerging problems
- The skill to test these answers, through experimentation
- The training to communicate such developments through drawings, models and mock-ups and feasibility studies
- The talent to combine form giving with rigorous technical considerations and with a sense of humane and social factors and aesthetic enhancement
- The wisdom to anticipate the environmental, ecological, economic, and political consequences of design intervention
- The ability to work with people from many different cultures, and different disciplines.

Moreover, amongst the designers' skills, is their ability to be more sensitive to their environment from the aspect of waste minimization. Also adapting the concepts of *reduce, reuse, recycle,* to their sustainable approach, and this might be implemented through clever design leading to:

- More slender sections
- Thinner slabs
- Less need for false work
- Reduce amount of temporary work

Mackenzie et al, 1991 argues that the idea that designers should take into consideration the environment impact of their work is not new. Twenty years ago Victor Papanek argued convincingly that the designer was in powerful position, able to help create a better world, or contribute to planetary destruction. Designers should strive to find ways of using their skills for socially social ends, especially in developing countries.

4.3.3 Design considerations

The first stages of a potential project are critical in establishing an environmental agenda and a good brief is fundamental to success of a project. The form, orientation and internal planning of the building have a critical influence on its energy requirement. The building should aim to provide as far as possible a naturally serviced environment.

The environmental issues encountered by the construction industry are similarly complex and inter-related. Effective communication between the different parties can therefore save time and money and ensure the successful realization of a project's aims and objectives. Design team members should bear in mind the implications of their work at all stages, from the construction phase to operation through to demolition (CIRIA, 1994).

A crucial element within the framework of design is feedback. Feedback can be derived from continuous monitoring of the design development and construction activity. The essence of this approach is the interaction between the design process and the real life, not only leading to the enhancement of the design quality, but also to implement an environmental consciousness within the design, construction and management of the building. This could be developed through a series of ideas as demonstrated in the Checklist provided by Leicestershire County Council (1992):

4.3.3.1 Site considerations

It can be argued that designers do not pay sufficient regard to how the site and its buildings will interrelate with their surroundings. Designers often neglect the microclimate variation, reducing the potential energy-efficient design

4.3.3.2 Wind

The design should reflect the wind direction and how it is channeled over site such that the building catches the wind to ventilate the internal space.

4.3.3.3 Water

Large expanses of water on, or close to, the site will result in microclimate variations. The water naturally conditions the air passing over it by absorbing heat or by adding evaporative heat into cooler air.

4.3.3.4 Sun

The sun offers a valuable source of heat and light. To achieve optimum results the orientation must be carefully selected.

Johnson et al, 1993 suggests that to appraise the environmental impact of any building, a structured approach is necessary. An environmental consultant is appointed along with other members of the design and construction team at the conceptual design stage where, a two-stage approach could be agreed. First, an environmental policy is developed to control all aspects of the scheme from design to construction. Secondly, environmental criteria for specific topics are determined, such as the types of materials to be used. The criteria established at the conceptual design phase to be refined at the scheme progresses. Then the environmental consultant is retained to monitor the activities of all team members as a safeguard against divergence from the environment policy and criteria.

Designers of any construction project would be able to include in their comparisons of alternative designs, the environmental impact of the materials chosen. Comparing such materials on environmental grounds is difficult and requires careful interpretation. As an example for finishing stage, when choosing bricks for walling, and because of the high-energy consumption required by brick production, the designer should ensure that:

- Any brick chosen is totally suitable for the particular location;
- The clay should preferably be extracted and the brick manufactured in the same region as the project in order to reduce transport costs and associated emissions;
- Consideration is given to the re-use of second-hand bricks where appropriate.

Designers are often cautious, allowing generous safety margins in their design, again resulting in unnecessary use of materials. However this has to be balanced against the flexibility and adaptability, which over-designs can provide. Construction products should be produced in coordinated sizes. It should be noted that the lack of attention to design for buildability could result in unnecessary use of resources (CIRIA, 1994).

Amongst the elements that should be highlighted within the design considerations is the environmental management programs, which are designed and tailored to fit a company's own corporate culture. Willig (1994) suggests that there are six key components of any strong environmental management program and it is useful to articulate these areas before the following detailed discussion of benchmarking, so as to lay a foundation for potential environmental benchmarking topics. The six areas are:

- Management and organization
- Continuous assessment and measurement of performance
- Information flow and communication
- Technical expertise
- Strategic planning, and
- Adequate resources.

4.3.4 Benchmarking and environmental management system

Benchmarking can be as formal as and elaborate or as informal as company wants. But would this concept of benchmarking benefits an organization?

- It helps the company develop good performance measurements
- It allows a company to determine how one operation within the company, or the company itself, stacks up itself or competitors. Such an analysis sets the stage of performance improvements
- It provides an opportunity to gather innovative ideas for improve
- It can help identify and set priorities for performance improvement.

It should be noted that it is not sufficient to benchmark and assess, Fisher suggests that implementing a total quality environmental system audit is much of a global approach. It is a process that goes beyond completing an audit checklist and issuing a report, as often the case with compliance audits.

These system audits involve a total process (fig. 4.6) best described in the following four elements of the plan-do-check-act (PDCA) cycle.

Fig 4.6
Environmental System Audit PDCA Cycle
Source: Environmental TQM- (1994)

Cleary, that the approach might be better adopted from a comprehensive point of view and also should not be static; in other words, it should be dynamic in its interaction with its surroundings and the factors that might affect the end product.

4.3.5 The interrelation between design and ecosystem

Yeang (1995) points that previously, many designers referring to any design approach that expresses some concern for its impact on the environment have loosely used the term ecological design. However, since ecosystem approach is a comprehensive and synchronized approach, any piecemeal or incomplete approach to environmental problems may result in creating further problems.

4.3.5.1 Linear Flows and cyclical flows

Thompson and Steiner (1997) illustrates the humans replacement of the nature's endless cycling and recycling of materials processes at the core of the Earth operating system, with an encompassing system of one-way flows, moving the materials that support life in vast quantities from source to sink. Eventually, a one-way system destroys the landscapes on which it depends. Such linear approach is not appropriate for a green approach design, cyclical approach is what would a designer implement through his green design process.

A green approach is holistic, balancing, health, and ecology in architectural design. Each project is approached with respect to five critical issues: siting, energy efficiency, indoor air quality, alternative building materials and waste reduction (Mokhtar, 1998). Many designers tend to delineate their project sites as discrete areas isolated from other areas by fences, walls and boundary lines. However, in the biosphere, ecosystems are not isolated systems but have a spatial interlocking property (fig. 4.8). They are open systems exchanging matter and energy with their environment. Due to complexity of these interdependencies, the designer must be aware of two important points:

First, any human action on an ecosystem might influence not only its immediate environment, but also the surrounding system, and others within the biosphere.

Second, design must be seen in the context of the ecosystem operating as a whole and not in relation to any one of its components.

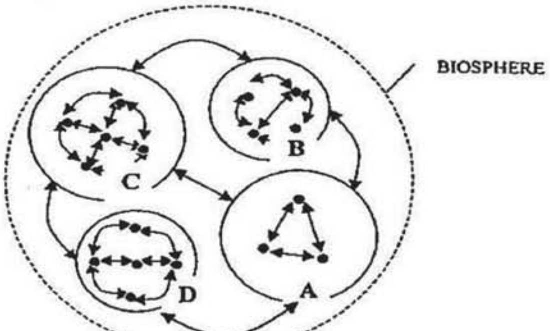


Fig 4.7
The interlocking property of the ecosystem

- o Refers to ecosystems
- • Refers to component parts of an ecosystem

Source: Towards Green Architecture- (1998)

She further adds that in the ecological approach, there is no single or universal design approach that will solve all environmental problems or eliminate all negative effects. It is not always possible to perform just one action in an ecosystem because the effect of one activity designed to accomplish a single purpose are in fact multiple.

In order to minimize undesirable impacts, the designer must attempt to predict, at the design stage, the effects of each individual activity on the ecosystem. Ideally, this must extend to anticipate the effects of these activities throughout the designed system's entire life cycle as in figure (4.8). The designer must be aware with the two different types of ecosystems:

1. Natural ecosystems (virgin sites)
2. Man-made ecosystems (built sites)

However, as mentioned above, if it is natural or manmade, it is an ecosystem type and we should consider the ecosystem characteristics in a manmade one. The following explains the difference between the linear and the cyclical pattern, a cyclical pattern, which is analogous to that of the ecosystem, is essential in the built environment. This means that the decomposer component of the built environment should be of an adequate capacity in comparison to its producer and consumer components.

- The linear pattern ... from resource to use to waste.
- The cyclical pattern, an element once used is returned into the system.

The advantage of having a cyclical pattern of use of materials are:

- To reduce the problems of output disposal
- To conserve the earth's resources
- To reduce environmental contamination as a disposal problem
- To reduce the throughput of energy and material resources by the built environment.

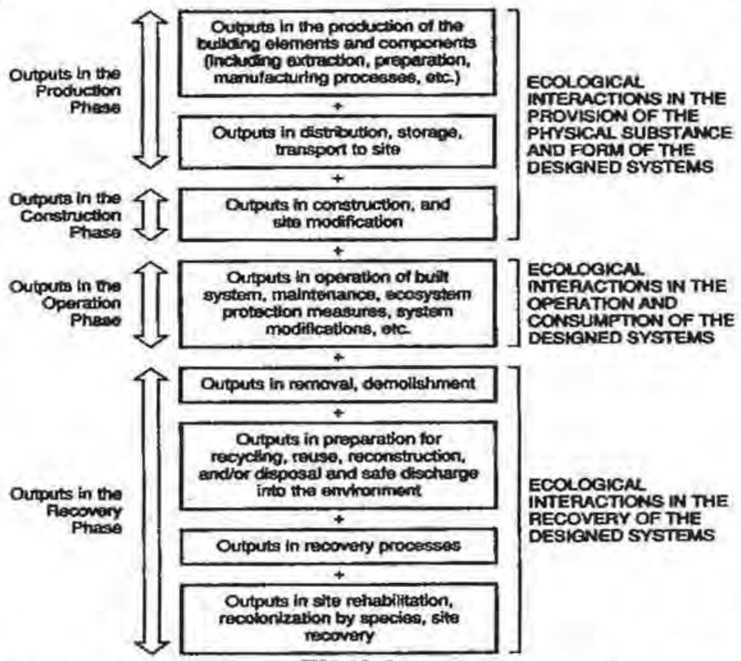


Fig 4.8
The total outputs in the life cycle of a designed system
Source: Designing with nature- (1995)

In this respect, Yeang (1995) points that the designer must simultaneously anticipate at the design stage all the desirable impacts on the ecosystems along this route. This analysis can be conveniently conceived using the concept of an *open system,* i.e., in terms of inputs into the system, functions within the system, outputs from the system, and the relationship of the environment to the system.

4.3.5.2 Regenerative Design

Regenerative design means replacing present linear system of throughput flows at sources, consumption centers, and sinks. The regenerative design system provides for continuous replacement, through its own functional processes, of the energy and materials used in its operation.

Karl-Henrik Robert (1991) puts it like this "We must learn to deal with environmental problem at the systematic level; if we heal the trunk and the branches, the benefits for the leaves will follow naturally". Sustainability depends primarily on environmental design.

The first law of thermodynamics makes it clear that the one-way throughput system in unsustainable energy and materials cannot be created or destroyed, only transformed from one state to another. This means that in order to be sustainable, the supply systems for energy and materials must be continually self-renewing, or regenerative, in their operation. That is, is sustainability requires ongoing regeneration.

The problem is not our effect on the environment so much as it is relationship with the environment. Rather than mitigating impacts, we might create ecologically harmonious development that by its very nature requires no mitigation, recognizing that humans are integrally part of the environment (Lyle, 1994).

Yeang (1995) notes that in design terms, the built environment cannot be regarded as a static system, which has negligible or unchanging interactions with ecological systems. After a built system has been located, constructed, and put into operation, it will continue to interact with the environment over its entire physical life span.

Traditionally, the architect has been responsible for the assembly of materials at the site, the construction, the maintenance and renovation of the building. However, an ecological design approach would require that the designer be concerned not only with these traditional responsibilities but also with the ecological interactions between the designed system and its environmental over its entire physical life cycle.

In this way, architectural design might even be redefined as a form of energy and material management, where the earth's energy and material resources are managed and assembled by the designer into a temporary form (viz., for the period of use), and then demolished at the end of the period of use, with the materials either recycled or assimilated into the natural environment. Hence, it is only normal to consider material selection as a key element or a key tool within the tools of sustainable design.

4.3.6 Materials selection

How much of which materials should be used? Is an unanswered question? Should the use of rare materials be prohibited or should they be acceptable when 'absolutely necessary'? An important question is: Where do materials come from?

Deforestation is another key issue but not a new one. Environmental attention is now concentrated on more remote areas such as the rain forests. One approach, proved to be difficult in practice, is to ensure that any tropical hardwoods come from the organizations such as Friends of the Earth. (Thomas et al, 1999).

A primary concern in selecting materials for effective environmentally sensitive use in construction is to consider the life cycle environmental costs materials and its use. Tools for such comparisons are limited presently but under active developments (CIRIA, 1994).

Lacasse and Vanier (1999) highlighted the issue of the newly products introduced every year by manufacturers in response to competition. Architects frequently used 'short cuts' based on their experience in order to save time, reporting a strong preference for certain materials and components that they have used previously.

On the other hand, Mokhtar (1998) emphasizes that the designer must be aware of the extent of the earth's materials used as inputs in the composition of any designed system because the specific use of each material resource in the built environment incurs spatial alterations to the ecosystem and a depletion of that resource.

The Construction Industry Research and Information Association-CIRA (1995) introduced certain positive steps that might be taken by designers in Selecting appropriate materials and components, such as;

- Specifying that wood for projects is sourced from well-managed forests
- When possible, the use of local materials-reducing energy used in transportation
- Specifying paints with reduced impact as those, which use no organic solvents
- Using components made from recycled materials
- If a project involves demolition, taking active steps to ensure that as much material as possible is recovered, re-used, recycled or sold as raw material.

In contradiction to the above, Dimson (1996) argues that traditionally, designers choose what to use based on such factors such as cost, aesthetics, availability, ease of installations, durability and maintenance requirements. Sustainable design calls for the impacts on environmental and human health to be a paramount consideration as well.

Recently, there has been a rapid increase of interest in the environmental impact of materials. There is significant activity by manufacturers and trade associations at an international level on life-cycle assessment. There is also a great deal of academic interest in devising methods of rating materials against environmental criteria.

4.3.6.1 Life cycle analysis (LCA)

The International Design and Environment Activities-IDEA pointed that the concept of 'Eco-design', also referred to as 'Green Design', or 'Life Cycle Design', concerns the design of products that applies environmental criteria aimed at the prevention of waste and emissions and the minimization of their impact, throughout the product life cycle.

Originally, life cycle analysis (LCA) aims were to compare alternative processes, improve efficiency i.e. to use less energy and raw materials, producing less waste. As environmental concerns have grown, the scope of work has been extended to assess impacts identifying ways to reduce such impacts (Atkinson et al, 1996).

Borer and Harris (1998) suggested that Life Cycle Analysis (LCA) is currently the most commonly used tool for evaluating building material, and, although still at the development stage, it forms the basis for many environmental assessment procedures.

In their argument with respect to this point Thomas et al (1999) noted that there is a saying that 'comparisons are invidious', and in the environmental field it could be added, 'difficult and contentious'. Life cycle analyses examine the 'cradle-to-grave' or origin to disposal impacts of materials or products. The analysis of energy used is just one aspect of such studies, which, ideally, should incorporate all environmental effects, in the broadest sense of the term.

In an industry as complex as construction industry, a vast range of materials and products are used, many number of different applications, during the erection of a building or structure. There are numerous stages in the design and construction of buildings and structures where decisions are taken on the systems, components and materials used, and there would appear to be a seemingly endless number of ways in which a functional design requirement can be met. In order to assess the full life-cycle impact of a building or structure, the following information is required (CIRIA, 1995).

- Information on all the impacts associated with the winning and pre-production of the materials used in it
- Information on the impacts caused during the manufacture of the products from feedstock materials
- Information on the impacts caused during the construction phase, including pollution and waste implications
- The design life, life expectancy and maintenance requirements of the product, and the significance of its impacts relative to those involved in the use of the building or structure in which it is incorporated
- The fate of the system/product and its components/materials once its useful life is over, particularly whether it can be reused and/or recycled or whether it needs pretreatment and/or disposal.

Anink et al (1996) agreed that LCA is not suitable for comparing choices in the design process of buildings; more over, most building products have not yet been investigated in this way. Further, they add that these studies do not tell us how to evaluate one kind of environmental impact against another – for instance. There is another approach according to Borer and Harris (1998) that its methodology aims to be a simplification of LCA, but with the ability to focus in on factors with a very large impact. This approach is termed Environmental preference method, where for each element in construction different solutions are offered in order of environmental preference, together with one, which is 'not recommended'-often the most commonly use.

4.3.7 The Environmental Preference Method

Environmental preference method (EPM), which has been developed by Woon/Energie (now W/E) in 1991, compares materials and products currently on the market and ranks them according to their environmental impact. Experience as consultants on several sustainable building showed there was a great demand for accessible and up-to-date information on the environmental impact of building components and materials.

The result is not an absolute assessment but a relative ranking based on the environmental impact: an environmental preference. The method provides what could be termed a 'best practical solution' (the basic selection). When preparing a specification, the architect, the engineer or contractor can quickly refer to this manual for the preferred environmental solution. It should be noted that now a days, many occupiers of buildings find the notion of 'green certificate' attractive. BREEAM (Building Research Establishment Environmental Assessment Method) is an established method of assessing the environmental quality of buildings. It was developed in U.K. for assessing new offices at the design stage; a revised version of the scheme 1/93, extending the scope of the environmental effects covered by the assessment was published earlier in 1993. The scheme is voluntary and has independent assessors for evaluation the design stage.

The EPM is not static, Anink et al (1996) pointed that their consideration is based on information available at the time of their writing, so subsequent research data may affect the environmental preference illustrated in their work. They suggested the basic strategy for choice of sustainable building materials to consist of the following steps:

Step 1: prevention of unnecessary use and efficient use of materials

At the early design phase, significant improvements can be achieved, for instance by investigating the possibilities for reuse of existing buildings. Secondly, designers can design a building to be as efficient as possible, by minimizing the resources needed. In the final design-specification phase an optimization of the sizes of components may be helpful to avoid demolition waste during construction. Last the expected lifetime of a component should be adjusted to its technical lifetime.

Step 2: use of renewable and recycled sources

By making use of renewable and recycled sources, life cycle of a building can be closed. Recycled materials will enter a second life, without taking resources from the nature. Clients, designers can allow for future recycling by:

- Not using composite materials that cannot be separated at the end of the life cycle
- Not gluing and sealing components together
- Designing buildings for dismantling, not for demolishing.

They emphasized that the first recycling option is direct reuse of components or complete buildings. A second consideration is the recycled product quality. The so-called down cycling into low-grade application will not close the life cycle, but only expand lifetime.

Step 3 selections of the materials with the least environmental impact

The environmental impact of materials is caused during the complete lifetime. Amongst the typical environmental issues are; raw materials, embodied energy, emissions, waste, recycling, repair and lifetime. It is important to select those building products, which have the lowest environmental impact.

4.3.7.1 The approach Structure:

The entire life cycle is considered, i.e. from extraction of raw materials through to processing the waste material at the end of the components life. EPM can be considered as a 'global analysis' and 'problem analysis'. Impact on the environment over the whole life cycle must come into a judgment of environmental preference. Listed below are several distinct phases and the most important environmental issues they raise

4.3.7.1.1 Extraction phase

The stock of raw material that can be extracted is judged on technical, economic and environmental factors. The extraction of raw materials often results in damage to the nature, in the release of harmful emissions or in the risk of an environmental disaster.

4.3.7.1.2 Production phase

Clearly, the more processing involved, the more environment will be threatened.

4.3.7.1.3 Building phase

Problems occurring during the building phase are the consumption of energy and the creation of waste and pollution.

4.3.7.1.4 Occupational phase

Obviously, environmental damage during this phase is determined to a large extent by choices made in earlier phases. On the other hand, pollution also results from the use of dwellings, such as water and energy consumption. The impact that the user might cause on the ecosystem must be considered in the light of the interrelation between the humans and their ecosystem, which has been mentioned in an earlier section.

4.3.7.1.5 Decomposition phase

The impact on the environment of demolition waste is great, taking the form of harmful emissions to the air (incineration), water and soil (landfill). For recycling, it is important for the materials to be well separated and clean.

In the attempt to conclude the above approach, it is crucial to refer to Pieters (1996) notion, that there is no clear, extensive "black" or "white" lists of building materials or construction in terms of sustainability exists as yet in most countries. However, several initiatives do exist such as agreements between government and market actors to reduce the application of certain materials because of their impacts on health, safety and the environment (e.g. lead, chloride, asbestos) "black list" could be said to exist in this sense. In addition, attention is generally paid to promoting the reuse of materials (e.g. concrete aggregates), also the primary reuse of materials.

4.3.8 Materials impact on the environment

Generally, Sydney and Baggs (1996) propose that indoor pollution can be controlled by the selection of appropriate materials during design stage, before construction or renovation. The greatest health risks exist in newly completed buildings or renovated buildings, which have, on average, 10 times the level of organic vapors normally found in old buildings. Some products are advertised as 'environmentally safe' or 'non-toxic', but these claims need to be supported by published test results. Some of the out gassing from formaldehyde and other volatile organic compounds (voc) is only recognizable as a strong smell while some acts as toxic assault on the immune system.

As a matter of fact, it should be noted that the out door pollution is a major contributor to the indoor pollution. In this respect, an explanation of the physical process, which occurs between the ions, is introduced. Ions are molecules or atoms in the air around us that carry an extra negative or positive electrical charge creating *poisons* and *negions*.

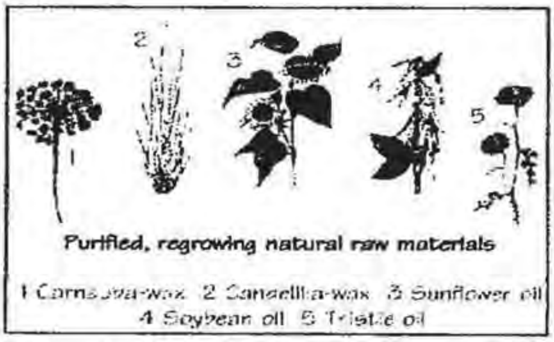
In general terms an excess of *posions* is not good for organisms while an excess of *negions* appears to have a beneficial effect. Friction causes the *negions* to attach themselves to particles of dust, pollution, or moisture and lose their charge, resulting in excess of poisons. In clean mountain places where sunlight is plentiful and there are no dust storms. Because of the air *negions* are not 'consumed' by dust. Being in air that contains a greater number of *negions* than *posions* can make us feel vigorous, while an excess of *posions* can make us feel edgy. Further cautious should be taken in selecting the outdoors materials, as well the site landscape in order to prevent the impact mentioned.

It has been suggested by Borer and Harris (1998) that a 'new house' smell is a cocktail of alien compounds that we do not have to endure, some common indoor pollutants are; Radon which is a radioactive gas damages lungs, causing cancer risk. Also, Volatile organic compounds (VOCs) where these include organochlorines; a wide family of plastics compounds including PVC and polychlorinated biphenyls (PCBs) found in many buildings and household products and paints. Fromaldehyde is present in many building materials as a glue constituent, vapours given off from many synthetic products it is very irritating to skin, eyes and respiratory system.

Common to the manufacture of most of the composite boards is the use of a synthetic resin binder, which turns relatively weak and flimsy materials into strong, rigid sheets. Often this resin is a form of formaldehyde. This can often off-gas inside a building where the amounts may be small but the exposure can be long term and constant. It is a major source of indoor VOC emissions. Over recent years the industry has responded to Health & Safety concerns by reducing the quantities of formaldehyde used. Unfortunately this has led in some cases to a belief that the problem has been solved.

An alternative binder, methylene bisphenyl di-isocyanate (or MDI), is beginning to replace formaldehyde. It is now used routinely in MDF production in North America and Europe. It is a very efficient binder and so accounts for only 3% of the boards weight.

Paints and stains are either *water-based* or *solvent based*. Where a solvent is used, it can either be chemically produced, such as white spirit, or derived from naturally occurring plants, as citrus peel oil. Natural or organic paints and stains use plant based solvents (fig.4.9), fillers, and dyes-renewable resources, which will biodegrade on disposal.



Some of the ingredients in naturally derived paints.

Fig 4.9

Source: The Whole House Book- (1998)

Most modern, concrete-block, reinforced concrete and lightweight buildings achieve two- to four air exchanges per hour. According to research undertaken in Germany by Professor Lotz, this is an acceptable air-exchange rate in cold climates, and will occur automatically through cracks and gaps in the building (Schneider 1988). However, in hot climates the rate needs to be changed to six changes per hour.

Dhir et al (1998) points that engineering performances are no longer analyzed and evaluated on the basis of technical specifications only; but also, on the basis of their design environmental effect. With the growing material and energy concern consumption since the beginning of the industrial age, the goals are set to conserve natural resources and minimize waste quantity Based on these aims, the "sustainable building material" can be defined as a material that;

- Can be produced and used in an environmentally compatible as well as without any technical loss in Quality of the end product
- Can be produced as residue free as possible
- Is produced with the highest possible consideration for future reuse
- Has a future, multiple (material), reuse at a high technical level that is as complete ecologically meaningful as possible.

4.3.9 Materials and energy

Energy inputs for running buildings tend to be much greater than the initial energy inputs. Initial energy, or, more precisely, embodied energy, has been defined as the energy used to (a) win raw materials, (b) convert them to construction materials, products or components, (c) transport the raw materials, intermediate and final products; and (d) build them into structures.

There are number of ways in which to reduce the embodied energy and CO_2 production of buildings. Firstly, selecting lower energy-materials. Secondly, designing for longevity. Thirdly, economically using of materials, and designing for waste reduction. Other aspects include high quality, durable materials and design solutions that reduce the need for refurbishment. Recycling of materials is a very important aspect; the following are some examples for the sort of energy consumed within construction materials;

Brick

The largest part of energy consumption in brick production is for drying and firing. (CIRIA, 1995).

Cement

The production of cement involves chemical and physical reactions that take place at high temperatures, and the process is therefore energy-intensive.

Gypsum

Energy is used for crushing and dehydration of gypsum.

Glass

Most energy is consumed in melting the constituents of glass together

Fuel/Transportation

Consumption will vary with load size, distance, and method of transport.

The following are material selection guidelines highlighting some crucial factors for providing a reliable system within the sustainable design process.

4.3.10 Materials selection Guide lines

Randall et al (1999) illustrates the following points:

- Use materials with minimal health and safety risks over their life cycle
- Avoid CFCs and use HCFCs only when unavoidable
- Investigate the impact of extraction of source materials, pollution associated with manufacturing and the possibility of recycling materials
- Promote sustainability
- Embodied energy is important but the greatest savings are to be made from reducing energy in use
- Use energy efficient materials.

Borer and Harris (1998) further add,

- ❑ Use well-known, familiar materials that do not emit pollutants
- ❑ Use materials that are permanent, stable and durable for the job
- ❑ Use no material suspected of containing toxic substances
- ❑ Make sure that mineral and any other fibers are completely encapsulated
- ❑ Use low, or nil, formaldehyde-emitting materials
- ❑ Avoid surface-area finishes with a high 'fluff-factor' (for example, wall-to-wall synthetic mixture carpets) in high use rooms
- ❑ Avoid polyvinyl chloride (PVC) products and foam-filled furniture
- ❑ Minimize the use of paint and when used it should be water-based
- ❑ Avoid timber preservatives.

Briefly, Mokhtar (1998) suggests in choosing building materials to use:

- Most ecologically appropriate
- Non-toxic
- A local resource
- Renewable
- Recyclable
- Energy efficient
- Natural and not synthetic
- Least distance of transport
- Durable
- To function without utility energy demand
- Easy to maintain.

Unfortunately, Pat and Harris (1998) pointed that there are no building materials, which are completely environmentally benign, nor there are any without some redeeming feature. The process of evaluation is almost a balance of *pros* and *cons*, on the scales are qualitative as well as quantitative criteria.

Consequently, the search for a universally reliable and acceptable assessment procedure can only ever be part of the solution. All forms of construction have their good and bad points. Based on the choice of construction and materials and the design approach itself, energy efficient buildings might be obtained.

4.3.11 Energy efficient buildings

If the main components of a building's fabric are considered, an overall representation of the energy efficiency of the design can be determined. Both the overall construction and the individual components of a building contribute significantly to the energy efficiency of its design. It is important to consider at the earliest stages of design (fig. 4.10).

Fig 4.10
NMB Bank
Energy efficient has been a high priority in design and servicing of the building: It is considered to be one of the most- energy-efficient *in the world*- there is no air-condition system
Source: Green shift (1999)

However, Pitts (1992) views the designer quite wrong to think that low energy house design is simply a matter of designing houses and adding insulation. According to Pitts, This fact was dramatically illustrated in a 1980s field trial, which compared energy costs in two neighborhoods. The difference between the two set of houses that one was designed with energy saving in mind while the other set was not. The results demonstrate the value of taking care with:

- Orientation and site layout
- Building form and internal planning
- The control of ventilation
- Construction details to reduce infiltration
- Insulation details.

Due to the significance and the impact of the above-mentioned aspects within a sustainable design approach, some are further explored:

4.3.11.1 Orientation and site layout

Orientation simply refers to the aspect of windows on habitable rooms. Orientation in response to microclimate is an ancient design principle used extensively in vernacular architecture. This principle has been recently ignored due to the combination of volume of housing, thus the burden on the designer is much higher. Orientation and site layout decisions should be taken early in design process and will have a significant effect on overall energy efficiency.

4.3.11.2 Building form and internal planning

The potential for designed energy conservation is related to height, length, width, surface area and volume of the building. In other words its form, the form of a building should reflect considerations such as day lighting and natural ventilation. A compromise between depth, height, length and volume should be reached to enable the most energy efficient form to be established.

4.3.11.3 The pyramid shape

Sydney and Baggs (1996) indicated as architects, that they have experience with various building forms. Curved forms are most suited to earth-sheltered houses. Aboveground buildings, on the other hand, are more likely to use materials with planar surfaces, so curved are less of an option. The pyramid provides the most interesting possibilities in terms of the shape of aboveground houses. According to the famous 19th century esotericism H.P. Balvatsky, the pyramid represented a tree; at its apex, the link was made between heaven and earth. The Giza Great Pyramid has been thought that it was capped with gold casing to symbolize the importance of this mystic connection with heaven.

4.3.11.4 Form and Modern Architecture

Buildings designed by architects in the industrial period that sought to learn from folk buildings, were natural in their forms and in their relationship to the landscape, in as much as they used the local materials and obeyed long established ways of constructing buildings and symbolizing what those buildings represented. Farmer (1999) noted that through the past ages of architecture too, forms and decorations derive from other natural forms.

From papyrus, lotus and scarab of ancient Egypt, the dolphin forms of Mycenae, the acanthus and spiral forms of Greece to the structural as well as decorative evocation of tree forms in Gothic, the relationship of natural forms to the way buildings are decorated, and sometimes how they are constructed, is ever present.

However, glass was to be a key material in modern architecture. New forms developed from the conjunction of interest in crystal structures and glass, which was then becoming available in larger pieces and varied forms.

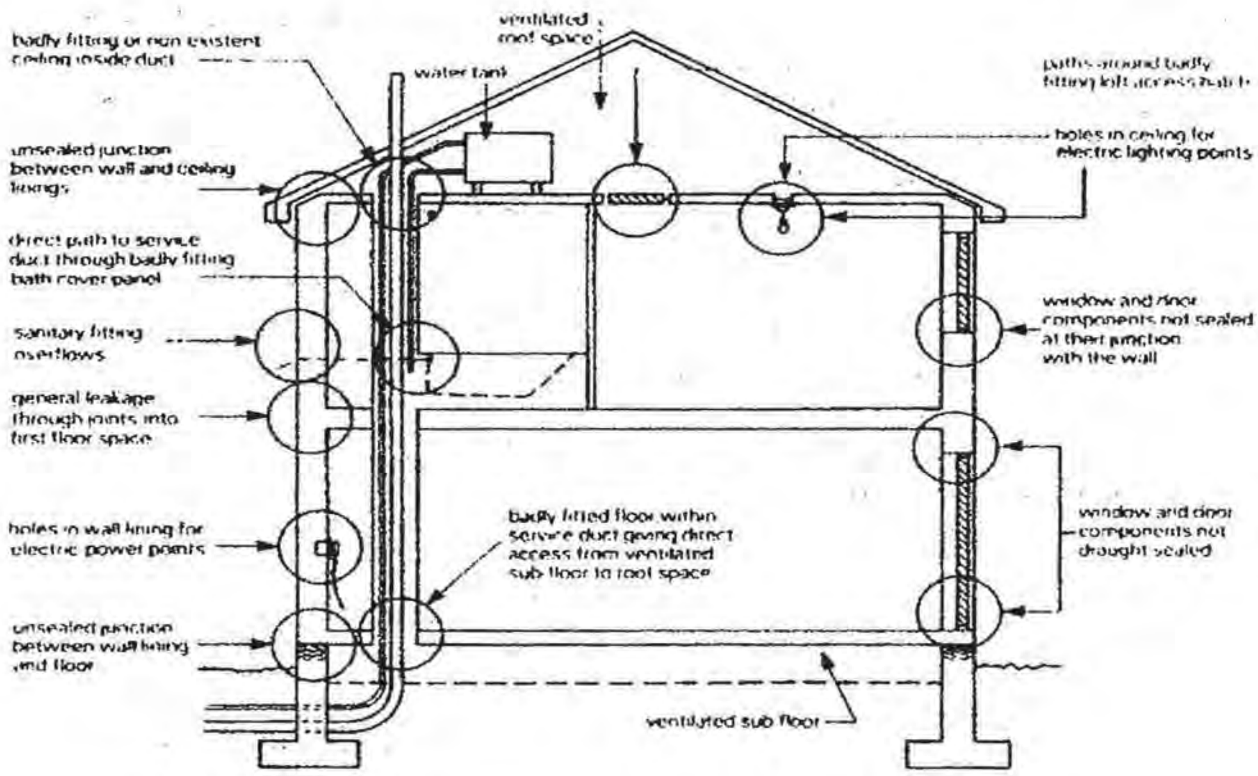
It should be mentioned that planning regulations, client brief and site constraints in our modern architecture influences also the Building form. Roaf and Hanock (1992) suggest that however, a compact building form such as a cubed will result in the minimum practical surface area and thus the minimum fabric heat loss. Though, this form does not necessarily give optimum solar access to a building.

4.3.11.5 Form and surface area

The external envelope, however well insulated, allows a degree of heat loss or heat gain. Jones (1969) argues that the general principle is that the ratio of envelope surface area to usable area should be a minimum, because it is through the envelope that energy flows occur. Mathematically, this leads to a sphere in free space or perhaps a hemi-sphere, on the ground. Building restrictions may limit this, but a circular or square plan is preferred.

4.3.12 Infiltration and Ventilation

It is important to understand the difference between infiltration and ventilation. Infiltration is the uncontrolled air leakage through cracks and other openings in the building fabric (fig. 4.11). Ventilation is the controlled introduction of fresh air to combat odors and condensation, for general healthy living and, in summer for cooling.



Typical air leakage points.

Fig 4.11
Infiltration and ventilation
Source: Energy Efficient Building- (1998)

- A 'tight' well-sealed house has energy advantages in terms of infiltration control but for the comfort and safety of occupants and for condensation control, planned controllable ventilation must be provided. Planned, fine controlled ventilation can be provided by: Natural means under the control of the occupants.
- A combination of natural and mechanical means still under occupants control or,
- A full mechanical system, which requires minimal occupant control.

4.3.12.1 Ventilation

There has been a growing interest in ventilation, summarized by the slogan 'Build tight-ventilate right'. Thomas et al (1999) view the essence of a tightly sealed construction is careful design and good workmanship. Flexible sealants are required at junctions, say between window frame and walls and at interfaces of steel frames and masonry; and when detailing external joints, allowance must be made for thermal expansion, deterioration and weathering.

4.3.12.2 Natural ventilation

External features of a building can be designed to *trap* the wind (wind catches) to create sufficient speed for airflows to ventilate space. Internal partitions can with careful design, be used to divert airflows and achieve a wider coverage. An ideal solution for adequate cross ventilation is to combine a narrow building with a central atrium. Vents in both the atrium and the windows will draw air across the space. This allows the moving air to remove the heat from the space through the vents in the atrium.

The use of such natural airflow, or stack effect, can be initiated to draw air across and through the building in vertical manner. Generally, the higher the ceiling the greater the potential for cooling in warm months as warm air rises allowing cool air to fill the space. Lower ceiling allows the size of windows to be reduced and helps constantly warm space.

4.3.12.3 Ventilation in hot areas

The research in recent years has been directed mainly towards the problem arising in the hot, tropical and sub-tropical regions. Two main reasons are indicated for this trend. First, these regions contain most of the developing countries and most of the world's population. Secondly, most of the existing knowledge has been gained in Europe and North America, with their temperate climate and the specific problems associated with it. Only in relatively recent years have the developing countries started to develop their scientific institutions and research activity, and the developed countries to pay more attention to problems of hot climates (Sherratt, 1969).

In selecting suitable building orientation in hot-dry areas, the object is to reduce the internal daytime temperatures, and thus minimization of solar heating is the primary concern. It is further added that windows should be designed and arranged so that approximately equal areas are open on the windward and leeward sides of the building, and so that the air stream is directed to the area and level of occupation.

Reinhold (1994) agrees that during the summer in a hot dry climate it is both desirable and possible to lower the indoor temperature significantly below the outdoor level during the daytime hours by minimizing the heat gain from the outdoor air. To this end the building should be compact-the surface area of its external envelope should be as small as possible to minimize the heat flow into the building. When the building facades are "indented" by deep narrow porches the surface area of the envelope is greatly increased.

During the evening and night hours, on the other hand, the insulated shutters should be opened. The porches are then exposed directly to the outdoor air, increasing the surface area of the envelope and the openings through which the building can be cooled by ventilation (fig. 4.12 A-B). In hot humid climate ventilation is the most effective way to minimize the physiological effect of the high humidity. Also, plants can affect the indoor temperature and the cooling load of buildings in several ways:

1. Trees with high canopies and pergolas near walls and windows provide shade reducing the solar heat gain with relatively blocking the wind (shading-effect)

2. Vines climbing over walls and high shrubs next to the walls, while providing shade also reduce the wind speed next to the walls appreciably (shading and insulation effects)
3. Plants near a building can lower the air temperature next to the building's skin
4. Ground cover by plants around a building reduces the reflected solar radiation.

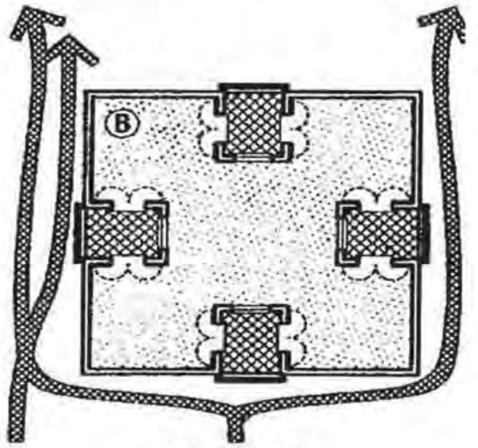


Fig 4.12A
Techniques in hot dry climates
When windows and/or shutters of the porch are closed, smooth, reducing the area of heat loss

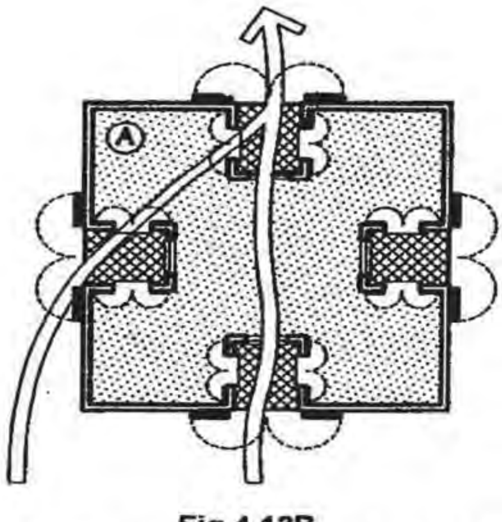


Fig 4.12B
Techniques in hot dry climates
A building with recessed porches and insulating shutters open.
The porch function as an open space, providing ventilation for adjoining rooms
Source: Passive and Low Energy Cooling of Buildings – (1994)

Theoretically, and as has been suggested in an earlier section, two philosophical schools of thoughts towards to what extent should a building be green are proposed. The researcher would like to explore the one, which demonstrates a broader architecture point of view, arguing that buildings are educational, and should therefore deliver a clear visual message about the need for environmental sensitivity. The following section is demonstrating some buildings that might highlight such approach

4.3.13 Examples for environmental buildings

Certain buildings seem to summarize, in their design and particular circumstances, crucial cultural issues of their time. Not necessarily the best buildings, they have in their siting, purpose, construction, and appearance. Such buildings may show the direction that design will take.

Ruskin and the Oxford Museum and beyond

Fig 4.13
The Oxford Museum as the first attempt towards green buildings
Source: Green Shift- (1999)

Farmer (1999) noted that only in the design and the building of the Oxford Museum could the excitement and the dismay of our relationship with nature at the time be seen in built form (fig. 4.13). In a sense this is the first green building, not because of an attempt to propose technical answers to conserving of natural resources. It was though, from the first thoughts about its inception in the last decade when such a belief among the forward thinking was possible, a building intended to display unity: between the faith and science and between humankind and a beneficent nature.

Nowhere in the construction of the museum was the conflict between Ruskin's ideas for organic architecture and the realities and enthusiasms of the time more evident than in the use of iron in the building. He displays a consistent view as to what constitutes an organic material. Iron is not organic because it has been moved away too far from its state in raw nature to be so. Therefore it cannot carry the truth and beauty of the natural world as laid by God. Instead it carries connotations of human hubris, and potentially destructive power (figures 4.14 & 15).

Fig 4.14

Fig 4.15
Capitals with botanical decoration adding natural features to the building
Source: Green Shift- 1999

In the 1970s a group at Cambridge University School of Architecture led by Alex Pike ran a research into the design of a self-sufficient house. Although this project was only developed to one-tenth-size model from which computer simulations were made, it is representative of attempts to weld together new technologies to create an environmentally responsive architectural form… the house as a machine for living; its entire form is being derived from a functional and technological analysis of human need. Instead of a house made by hands and hearts it is a house made by heads, where when human evaluation capacity is exhausted, computing power is substituted to provide reassurance that the artificial environment is functionally matched to physical needs.

American designers such as Frank Gehry (fig. 4-16 , 17 & 18) demonstrates an ability to search back through personal experience to develop what appear as distorted forms initially but which can be read as forms evolving and generating themselves derived from and responding to the external environment within which they are attempting to establish their unique existence.

Fig. 4.16
Frank Gerhy, American Center, Paris
Source: Green Shift- (1999)

Fig. 4.17

Fig. 4.18
Frank Gehry architectural forms
The Guggenheim Museum- Bilbao, the distorted forms can be read as forms derived from and responding to the external environment within which they are attempting to establish their unique existence. Source: Albenaa-no: 101-1998

4.3.13.2 Building Research Establishment

Sited 300 m from a major motorway (the M1) in Garston, about 15 km northwest of London, is one of the most innovative buildings in UK. Thomas et al (1999) suggests that perhaps the greatest significance of the Environmental Building (EB-fig. 4.19) is that it is one of the first buildings to result a holistic view of construction. It takes advantage of all the available local sources of energy (sun, wind and groundwater), and in addition goes beyond this by incorporating a philosophy of which materials should be used and how should the building be constructed (and deconstructed). In the next 20 years every aspect of EB will be improved upon, but it will have more than fulfilled its purpose in setting an agenda for architectural and engineering quality.

Edwards (1998) in his writing on this building pointed that once the building has been prepared the architect and engineer can begin to design the building with green perspectives in mind. He adds that it is often advantageous to test the evolving design against benchmarks of good practice. One of the best known according to his notion is the building Research Environmental Assessment Method (BREEAM), developed by the Building Research Establishment (BRE) to provide developers with an independent assessment of the overall environmental credentials of the building. The scheme is comprehensive, tested and monitored by evaluation of buildings in use, and covers a range of building types including offices.

Buildings are given a rating on a scale of Fair, Good, Very good and Excellent. An early assessment allows alternative options to be explored before ideas have hardened. The environmental quality standard represented by BREEAM encourages the development community to a stake in environmental matters. The wide parameters of the assessment give weight to legitimate user needs, such as health and comfort. Further more Farmer (1999) presents The Building Research Establishment (BRE) as n a champion of energy-efficient design and that it has in the past put theory to test in its own buildings.

4.3.13.2.1 Building Research Establishment Ventilation strategy

Fig 4.19
Environment Building façade with the stack-effect ventilation
Source: Environmental Design- (1999)

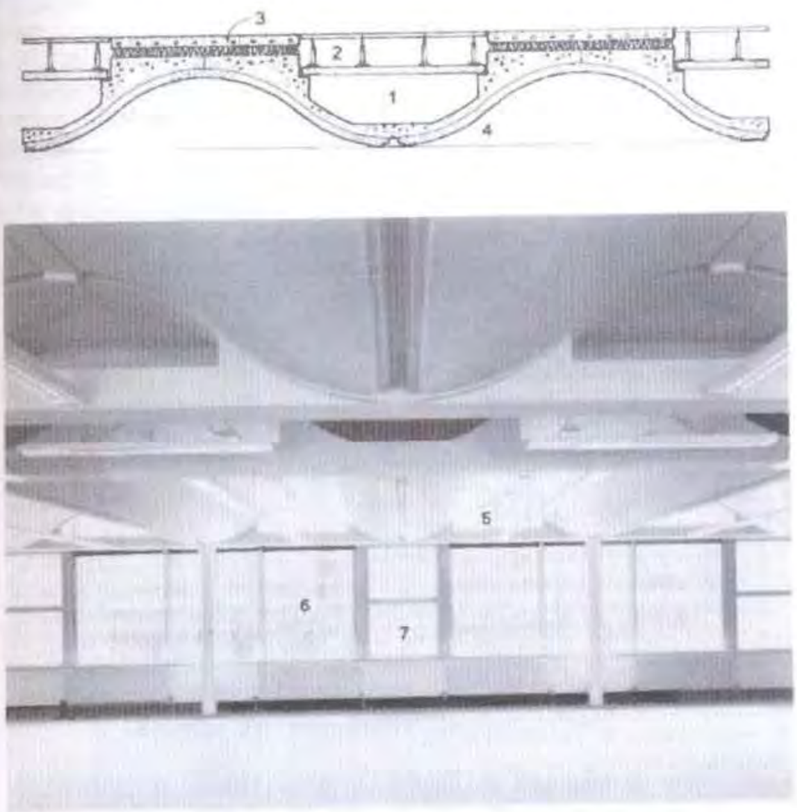
Recently, what has been seen is the development of more tightly sealed buildings, defined ventilation routes and control techniques that allow the required air to be introduced as and when needed, day and night. For the EB, there were several starting points.

> The first was to minimize the energy used associated with ventilation. This favored either cross ventilation or stack-effect ventilation (as in De Montfort Queens Building, which will be explored further) or a combination of both; in addition there was the possibility of providing some low-powered mechanical ventilation in the form of, say, a simple fan Thomas et al (1999).
>
> The second point was to link the ventilation path with the thermal mass to take advantage of night cooling, and the third was that the normal requirement that a space for heating pipes, electrical cables and so forth had to be found. Close co-operation among the architect, structural engineer and environmental engineer led to an attractive, structurally efficient sinusoidal slab as shown in figure (4.20).
>
> The floor is a composite construction incorporating a pre-cast concrete former and a profiled *in situ* topping. Insulation below screed helps to create some thermal separation between the two floors. The floor is designed as a folded plate with, typically, the bottom of the 'wave' in tension and the top in compression.

Farmer (1999) in his analysis to the building illustrates that a building that uses cross ventilation, as its principal ventilation strategy requires alternative measures to deal with hot, still summer conditions. The approach taken here was to incorporate ventilation stacks on the south façade of the building connected to the lower two floors. The stacks are positioned to draw air through the ducts in the floor structure, but there is also a gap between the south façade and the wave from slab that allows the stacks to drain off hot air from adjacent high points in the office spaces.

Stack performance has been investigated by Cambridge environmental Research using a Salt Bath model. This indicates that, under hot, still conditions, air will enter the building through high level windows into the cool slab ducts and drop into the center of the plan, pass through the office spaces and exhaust via the stacks. To maximize their usefulness, the tops of the stacks are positioned clear of ridge and eaves eddy zones. They contain low resistance propeller fans (80W each) mounted at top floor level. This gives them a predictable minimum performance if required and also means that they can be used for other ventilation scenarios such as to pull air through floor ducts and across the office spaces on still nights.

Finally, Thomas et al (1999) concludes that The Environmental Building is an important step towards sustainable, positive energy buildings. Its most significant contribution is that it provides designers with a way of thinking about buildings. It is not a kit of parts where architects select an external shade here or a stack there rather, it is an 'organism' in which elevation and section are equally important and equally necessary to provide fresh air, remove stale air and waste heat and maintain the comfort of the 'body'.



Sinusoidal slab section and view of a typical bay

KEY
1 Ventilation paths through slab serving floor below
2 Raised floor zone for cables and pipes for floor above
3 Screed with heating/cooling pipes and insulation beneath
4 Pre-cast concrete (75 mm) ceiling with *in situ* concrete topping
5 High level windows
6 Side-hung casement windows
7 Bottom-hung translucent windows

Fig 4.20
Source: Environmental Design- (1999)

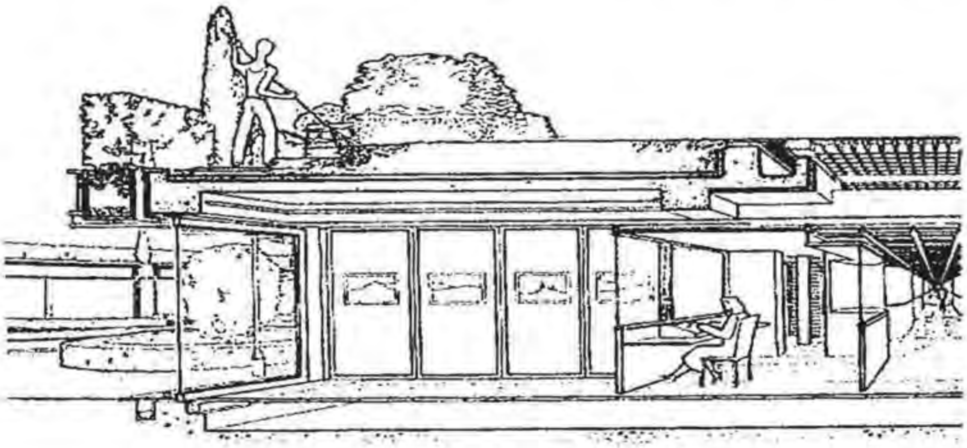
4.3.13.3 Ready Mix Concrete International Headquarters (RMC)

RMC House completed in 1989 is the headquarters building for Ready Mix Concrete PLC, at the Thrope in surrey. Because the site is in the 'green belt' of London the architect strived to ensure that the headquarters were well integrated with the surrounds and the public appearance was discrete. One approach was to design a largely single-story structure with an extensive roof garden, (fig. 4.21).

One intention of the design is to keep the offices comfortably cool without air conditioning. This involves the application of passive techniques to reduce the heat gains in the offices and to mitigate their effects and was achieved by:

1. Providing internal and external solar shading
2. Insulating the building to a high standard

3. Incorporating significant mass in the building for cool thermal storage
4. Use of the ground floor slab as a cooling element for incoming air in conjunction with a mechanical system
5. Providing numerous open-able windows to allow cross ventilation
6. Increasing the daylight penetration into the building to reduce the need for artificial lighting.



Medium weight room admittance 18 W/m² (floor area) K

Ceiling, concrete slab; internal walls, plasterboard; external walls, double glazing; floor, carpeted timber floor tile with concrete slab under

Typical office and room admittance. (Drawing by Edward Cullinan.)

Fig 4.21
Source: Environmental Design- (1999)

The building is divided up by courtyards, which allow daylight to enter the offices. One of these courtyards is paved with white tiles to increase the amount of daylight into the adjacent spaces. The offices at RMC House are performing well and are reasonably energy efficient. In the summer where occupants have access to patio doors they have control over their own environment which leads to a high degree of occupant satisfaction. There have been some complaints from the people in the central area of the building, mostly due to a feeling of stagnant air, and probably exacerbated by the lack of outside awareness and individual control Thomas et al (1999).

4.3.13.4 Queens Building, De Monfort University

It is has been noticed as one of the most exciting and innovative buildings (fig. 4.21) which have been built in Europe in the last few years. The building represents a shift from the tradition of university buildings that has grown up over the past 20 to 30 years. The design strategy chosen has been to look to the solutions of the past then, applying modern technology, to refine these solutions and make them the way to the future.

In particular, the building has been designed to function with out the use of air conditioning in spite of high internal heat gains in lecture theatres and computer laboratories and this has been established by natural ventilation.

In naturally ventilated buildings air moves because of pressure differences arising from stack effect and wind effects. Stack effect or buoyancy forces are caused by warm air rising and being replaced by cold air at low level. Wind effects arise due to wind flow around the building causing pressure gradients over the building envelope.

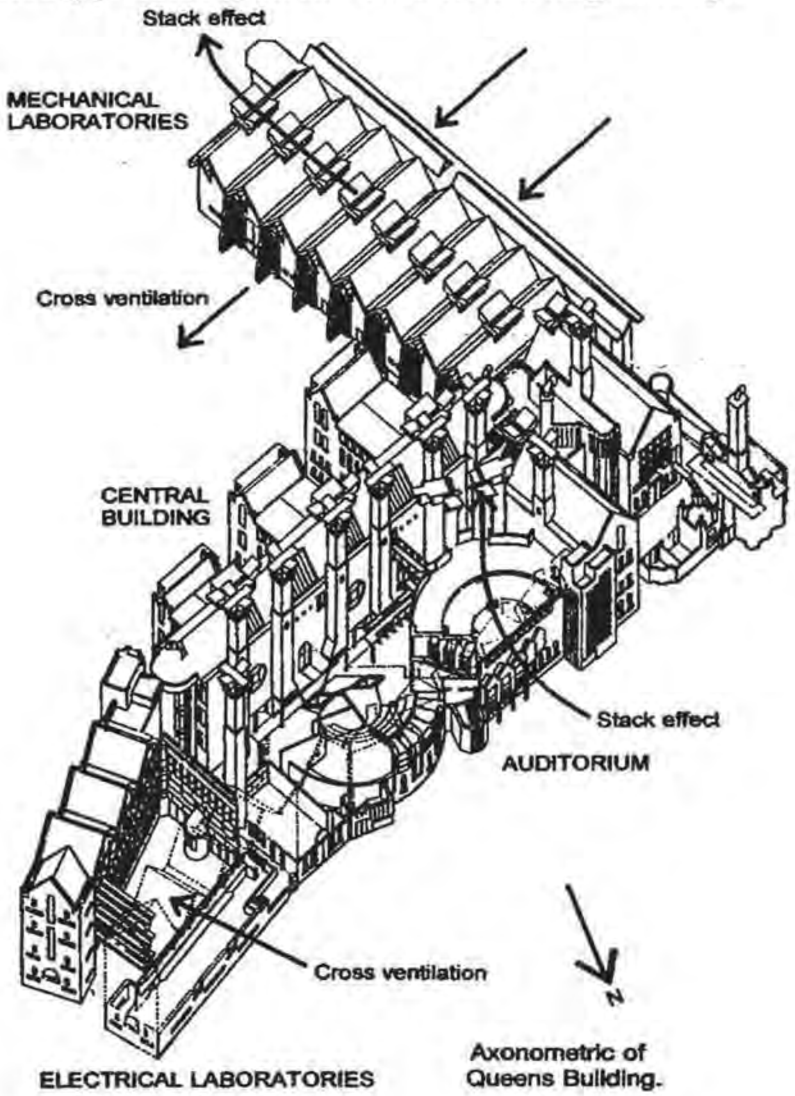


Fig 4.22
Source: Environmental Design- (1999)

Normally both effects are in operation, but the contribution on the space varies with the geometry of the space, the size and the positions of air intakes and exhaust and the temperature differential between inside and outside. The new engineering school has a range of different combinations of stack and cross ventilation.

One of the main questions that tend to be asked about this building is whether it cost more, or less, to build than a more standard highly massed engineering school with full or part air-conditioning. In part, response of this question, table (4.2), shows some of the figures produced by quantity surveyors. Capital costs for mechanical and electrical services are obviously lower. An attempt has been made to reduce costs by making aspects of the building relating to natural ventilation serve more than one function, as an example the auditoria stacks provide the main exhaust for air, in the mean time the stacks support it, is a structure that supports the drawing studio roofs.

Table 4.2

Approximate capital cost comparison between two comfort cooled auditoria and two naturally ventilated auditoria at De Montfort

	Comfort cooled (£)	*Naturally ventilated (£)*
1. Comfort cooling plant	70000	–
2. Plant room space	30000	–
3. External intake louvres	–	9000
4. Attenuators and controls	–	11000
5. Plenum duct space	–	5000
6. Ventilation stacks (4 No.)	–	35000
7. Attenuators, ventilation terminals and controls to stacks	–	32000
	100000	92000

Source: Environmental Design- (1999)

4.3.13.5 The NMB Bank- Amesterdam

Brenda & Vale (1991) demonstrates one of the exciting examples that symbolizes 'green architecture', they mentioned that one of the three largest banks in Holland Nederlandsche Middenstandbank-NMB (fig 4.23 A, B & C) indented to build a new head office in Amsterdam, they turned for the architectural Practice of Alberts en Van Huut in Amsterdam for the design of the project. They were chosen because of their human-centered approach to design. The decision to build the headquarters was taken in 1978.

Fig 4.23-A
Nederlandsche Middenstandbank-(NMB)
The building form
Source: Towards Green Architecture- (1999)

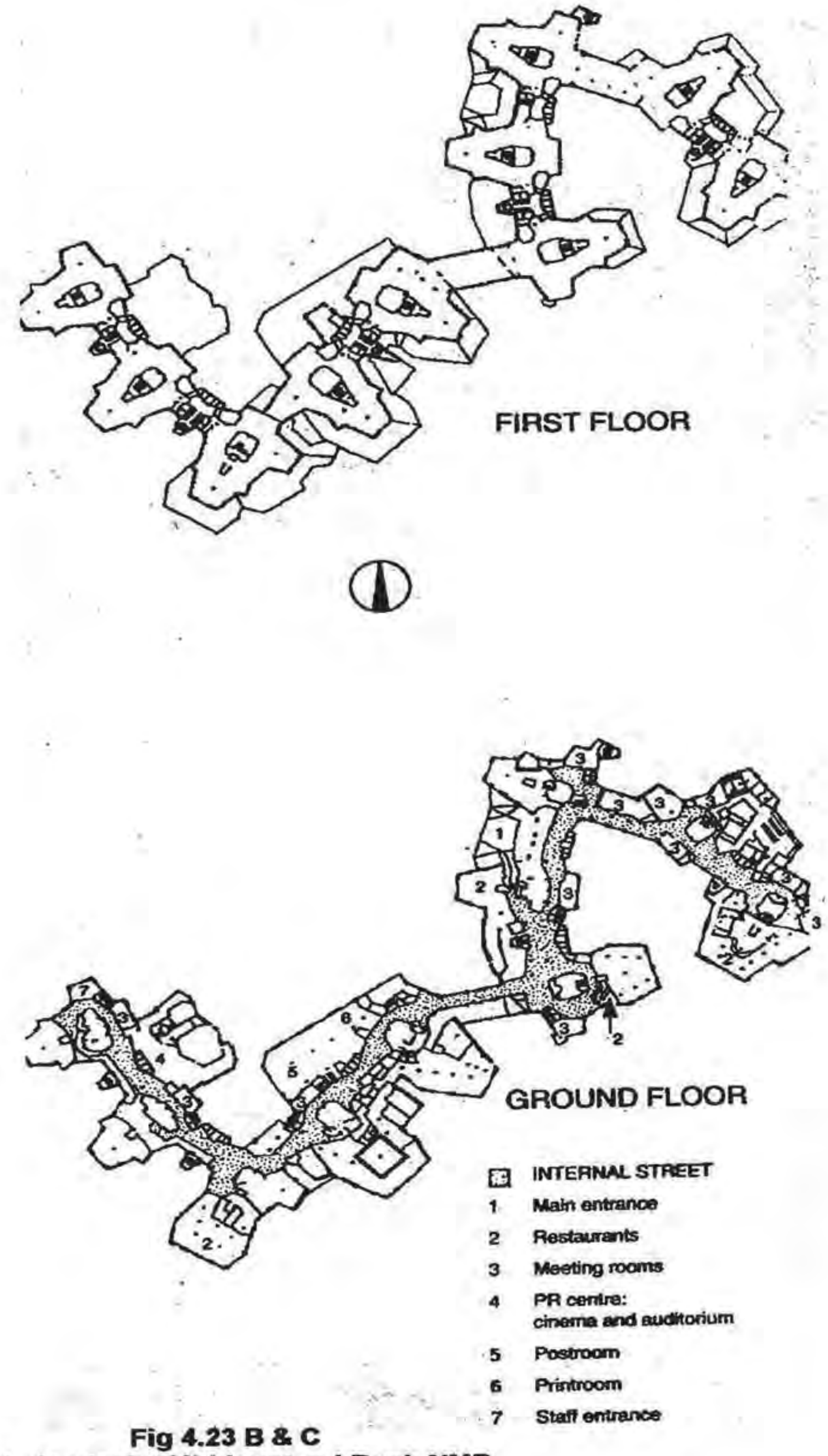


Fig 4.23 B & C
Nederlandsche Middenstand Bank-NMB
Plans indicating the rambling internal street, which creates series of spaces between the ten towers
Source: Towards Green Architecture- (1999)

The design team came up with a building, which provided accommodation in a series of ten towers, linked with a route across the site. The T-shaped plan of each tower allowed group working as well as division into smaller units where necessary (fig. 4.23 B & C).

The NMB Bank is built of brick cladding on a partly pre-cast and partly in-situ concrete structure (about 50:50). Walls have a 45mm cavity behind the brickwork. Backed by 100 millimeters mineral fiber insulation, and 18 mm pre-cast inner leaf (fig. 4.24).

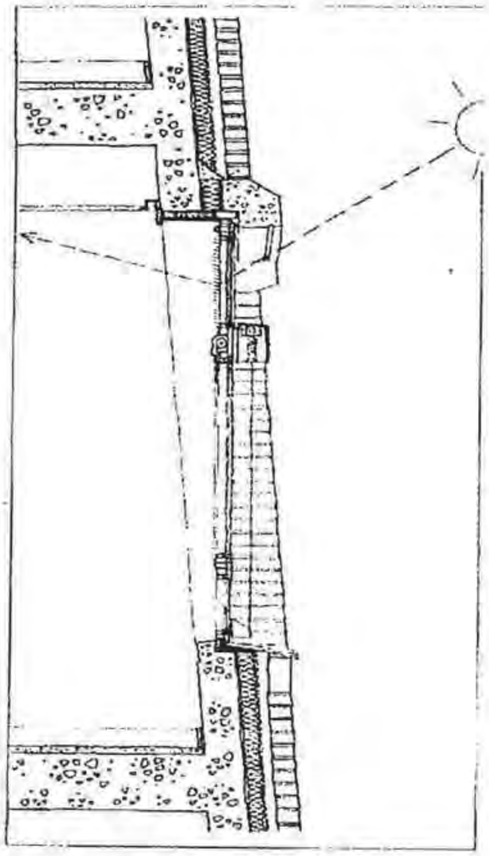


Fig 4.24
A typical cross section in NMB external wall
Source: Towards Green Architecture- (1999)

The ten towers which make up the office accommodation are linked at ground level by a rambling internal street, varying in width and paved in marble, the curving route on plan creates a series of spaces between the towers which have been landscaped as gardens, most of the offices look on to these. The circulation at the center of each tower also serves, via its glass roof to bring light to the floor street, in addition to the light from the windows that provide views of the gardens as the street meanders across the site.

The interior (fig. 4.25 A & B) drips with water. Rainwater is collected and pumped round internal and external planting, waterfalls and fountains are enjoyable providing sound that offsets the outside noise. The use of water is part of the design philosophy to integrate the building with nature. Providing plantings and water is not the sole architect's response to 'greening' of the building, they have attempted to avoid the problems of 'sick building syndrome' by maximizing natural light and ventilation, and by giving a higher degree of individual control to the users, all the windows can be open for ventilation.

Fig 4.25 A & B
NMB
Source: Towards Green Architecture- (1999)

In the building, materials were used that showed the hand of the builder much as possible. To see human blemishes in the painted concrete walls, in the wrought timber. A machine-finished component does not give the human feeling, where possible natural paints were used to avoid emissions. The NMB Bank demonstrates that a modern office block can also be a piece of green architecture, in ways that range from the technical to philosophical. The greatest difficulty reported by the architect was finding the right staff. There are not many 'organic architects' to be found in Holland or any were else, however, this is changing by the time this research is under work.

The fact that the building is one of the most energy efficient buildings in world is due to the view taken of the operation of the whole building on this particular site. The above-mentioned green approached examples sets the concepts of the sustainable design presented in the following literature.

4.3.14 Elements of sustainable design

Based on Edwards (1998) work, the following are the six guiding principles found in green design:

1. Environmental design appropriate to the context;
2. Use of simple, robust techniques rather than unnecessary complexity;
3. Exploitation of thermal capacity of structure;
4. Exploitation of natural ventilation as the prime means of cooling;
5. Use of easily understood building controls;
6. Avoidance of over-sized plant with up-gradability provided at design stage.

Responsive and anticipatory design strategy; hence, the objective of ecological design is not to keep the biosphere and ecosystems from being influenced or changed by people, but of how to relate human activities to the ecosystems in the limitations of the ecosystem and most advantageous to the ecosystems. The critical design issues are how, when, and where these changes are executed and what forms of designed systems are introduced.

Buildings of the future will increasingly incorporate environmental, ecological and energy factors in the design at a conceptual level. This, of course, requires a client sympathetic to these ideals, users who understand and value the concepts, and designers and contractors who as a team evolve the design with a green outlook (Edwards, 1998). In other words, we are looking after aware stakeholders within the industry.

Yeang (1995) emphasized that if we are to attempt to design in an ecologically responsive way we need a holistic and comprehensive approach in looking at building design. The intention here is to seek out those aspects that influence the design process, the design decisions, and the design system itself. Previously ecology and environmental biology have been little understood by designers, and in many cases, such lack of understanding has led to extensive environmental damage that could have been adverted if had the proper preventive measures been carried out initially.

In this respect Sydney and Baggs (1996) point that 'Holistic Design' requires the skills of architects or designers who have training, maturity and experience to embrace all aspects of a family's lifestyle. Holistic architects and designers must have a through knowledge of what comprises an environmentally healthy house in the biological and ecological sense; and landscape architecture. They should also have background knowledge of psychology, philosophy and possibly even comparative religion.

Their task is to provide a healing environment. An enquiring mind and a willingness to experiment across the sciences, into the area of the Para scientific, is perhaps the greatest value of all for a holistic architect or designer. The time will come when professionals who do not keep up to date with matters (as which building materials contain toxic, out gassing chemicals, how radon levels need to be controlled, and the electrical pollution by incorrect layout wiring, or choice of electrical equipment) may become answerable in law for what amounts to professional incompetence; such situations have already arisen in the United States and Germany (Kanuka-Fuchs 1994).

A vital ingredient in the essence of the 'holistic approach' would be its implementation to the process of erecting the building itself, in other words the construction process it self.

4.4 Sustainable construction

Sustainable construction is generally used to describe a process that starts well before construction, in planning and design, and continues after the construction team has left the site. Waytt (1994) has deemed sustainable construction to include managing the serviceability of a building during its lifetime and eventual deconstruction and recycling of resources to reduce the waste stream usually associated with demolition. Most of the literature on sustainability within construction industry focuses on the biophysical environment and technical issues.

Hill and Bowen (1996) recommend that interested parties involved in a project use the list of principles as a checklist and then themselves determine which principles should be applied. The framework for the attainment of sustainable construction requires the application of the following processes:

- EA during planning and design stage
- Implementation of (EMS)

It should be noted that construction industry has become under greater pressure to produce buildings, due to government placing greater emphasis on the 'polluter must pay' principle, a principle that is implemented strictly in some parts of the world and has started to be implemented by the Egyptian government. There are currently numbers of key influential 'drivers' of environmental change that have and will affect all business in the near future. The construction industry has been described as the 'sleeping giant', infamous for its conservative nature and unwillingness to change. A deep routed opinion and any overnight claims of a 'green commitment' are likely to be received with skepticism.

The industry is a major consumer of raw materials, manufactured products and energy. Buildings and other engineering developments shape a long-term availability of resources and the degree to which they are being consumed.

4.4.1 Materials within the construction industry

Construction is an important consumer of non-renewable resources, a substantial source of waste, a polluter of air, and a contributor to land deterioration. According to world watch institute, one tenth of the global economy is dedicated to constructing and operating homes and offices. In other words, this activity consumes one-sixth to one half of the world's wood, minerals, water and energy, as a result; the responsibility for much of the environmental damage (Industry and the Environment-UNEP-1996).

Dimson (1996) adds that building construction accounts for 25% of the virgin wood, 40% of the raw stone, sand, gravel, each year. Globally buildings consume 16% of water and 40% of the energy used annually. Close to 70% of the sulphur dioxide produced by fossil fuel combustion are produced through the creation of electricity used to power homes and offices. Indoor air-quality is inadequate in 30% of buildings around the world. It is noted that world wide, the construction industry is the principle user of tropical hardwoods and their products, contributing very substantially to the loss of tropical forest.

Construction uses many materials extracted from deposits in the earth's crust. Some of these, such as aggregates and filling materials, are used directly on site after simple processing (washing, grading, etc.). Some alternatives may exist which could partially satisfy demand. In particular, industrialized countries produce very large amounts of inert material waste, such as furnace-bottom ash from power stations and blast furnace. Such materials are suitable for use as aggregate and fill material.

For many materials, impacts caused by extraction processes are considered more important than reserves. However, for many of the materials in common use within the construction and other industries, reserves are finite. For instance, oil and gas reserves are estimated to be 40 and 60 years respectively. The depletion of tropical hardwoods by extraction from unmanaged sources is also a widely acknowledged problem.

4.4.1.1 Manufactured materials

Increasing awareness within the construction industry as to environmental implications of choice of materials would allow the industry to examine its consumption patterns in a new light. (Industry and the Environment-UNEP-1996).

The raw materials for a building product need various treatments before they can be used in a building according to Hore et al (1997). The materials need finishing and shaping in some way to allow use. For example, the material may need to be crushed into powder, pulled into lengths, or flattened into sheets, energy consumed will always depend on the sophistication of the treatment.

It should be realized that modern materials are often a combination of two or more materials simpler materials (composite materials). Concrete for example, is a composite of stones (aggregate) and cement paste, which are locked together. The aggregate by it self is loose and cement paste by itself is weak and brittle. A composite material is a combination of materials that gives a new type of material with new properties. As an example Concrete Masonry Units (CMU's) are the result of a marriage between many of the best characteristics of bricks and of concrete. In this composite material, the energy costs of mining and kilning cement, and of casting, finishing and transporting the finished blocks, give cmu's relatively high-embodied energy value.

On the other hand, historically bricks were produced from local clay, and sun dried or fired in Kilns with local fuel, thus reducing transportation energy costs. New masonry products are being researched by different institutes from recycled materials such as sewage sludge and petroleum-contaminated soils in combination with clay.

Material delivery, vehicle size, type and frequency of use should be assessed to reduce unnecessary vehicle movements. (CIOB, paper no.49 Brigth and Lown).

When the architect set out a design baring in mind the materials that he is supposed to use, and considering the operation during construction, obviously, he would be able to reduce the use of scarce materials, even water that should be minimized during construction, as well as, the energy consumed to produce composite materials, variety of organic and inorganic materials are in-use within the industry, the production of some essential materials can be summarized as follows:

Metals

Metals and metal alloys are used in construction in a wide range of applications, and often in combination with other materials. Metals are readily recycled and there are established international markets for scrap metal. Hence they have a high (but fluctuating) value, which ensure that they will continue to be substantially recycled (CIRIA, 1995).

Cement & concrete

Cement production is extremely energy intensive, creates dust and waste gases, and is normally associated with large scale quarrying activities. The combined environmental impact of these factors has created considerable pressure against the establishment of new cement works (Ove Arup&partners, 1993).

Aggregates

The 'glory hole' method of obtaining crushed rock is an improvement that entails entering a mountain at the top and coring out the product through a tunnel below. Recycling of aggregates is a possible long-term answer to aggregates shortages.

Sustainable Concrete

Hendriks and Delft (1998) note that although the durability of all types of concrete is recognized worldwide, there are questions concerning its sustainability that need to be addressed. These concern raw materials depletion, energy consumption and other harmful emissions. Of course, a balanced approach of the sustainable character of concrete means that we should not only focus on its potential environmental burden, are positive effects, such as:

- Ease of recycling, and ease of applicability of concrete building-and demolition-waste.
- Its mobilization potential for specific toxic substances.
- Durable protection resulting in an effective shield for the dispersion of toxic- or otherwise undesired substances.

Blocks

There is a limited potential for recycling as hard-core fill material. Block specification should attempt to maximize the environmental advantages of lightweight, insulation properties and the use of waste materials (Ove Arup & partners, 1993).

Stone

All types of stone have potential for reuse, although this is not often seen to be a cost effective process for all, but the very high value stones. The major advantage of stone is that it can be extremely durable, as well as attractive, and its use should take advantage of its potential durability to prolong the design life of buildings.

Plaster and render

Plaster and render materials are produced from non-renewable resources by energy intensive processes, and are very difficult to recycle. Plaster and renders can only be recycled into lower grade materials such as fill. External rendering, as a decorative finish or weatherproofing layer, may be useful in allowing the use of bricks or blocks of a lower durability or aesthetic quality.

Aluminum

Aluminum is a metal, which has found a significant place in the building industry because of its strength and stiffness to weight characteristics, and corrosion resistance. Its processing and refinement from Bauxite require large amounts of energy.

Glass

Glass is one of the few materials that are readily recyclable although this operation is not currently practiced in the building industry.

Sealants

Modern buildings rely heavily on the use of sealants, which are used to solve "awkward" detailing problems rather than changing the detail. They are not suitable for reuse and cannot be recycled.

Timber

Of all the materials used in the construction industry, timber is one of the few that can be said to derive from a genuinely renewable resource; yet the environmental impact of our use to timber is causing worldwide concern.

Boards

Organic boards are mostly derived from timber products and represent an efficient use of timber in utilizing almost all parts of the tree. Products that minimize or eliminate such hardwoods and/or binder content are to be preferred environmentally. Inorganic boards are all derived from non-renewable resources and can involve energy-intensive production processes.

<u>*Organic boards*</u>
Plywood:

Plywood is composed of thin layers of timber glued together, and the timber can be from almost any source (durable materials might contain tropical hardwood).

Block board (core-ply woods):

These materials normally contain a softwood core, but can have decorative veneer facings from any source, including tropical hardwoods. They incorporate organic resins and comments are similar to these for plywood.
Particleboards:

Chipboards incorporate mostly softwood materials, and come in a variety of grades. The performance (and cost) of the grades is normally a function of the practical size, grading, and distribution.

Fiber-boards:

Basic fireboards can be found in varying grades of density, soft, medium or hard grade (hardboard). They do not normally include a resin binder, adhesion being obtained by compression during the manufacturing process.

Straw boards:

Consisting of loosely bonded straw encapsulated between paper facings, this material is formed by heat (steam) and compression, and it is possible that it could have limited application in internal situations.

Inorganic boards

Plasterboard:

Plasterboards is manufactured from Gypsum plaster and paper liners, which provide much of the strength. The plaster is obtained from natural gypsum rock, essentially calcium sulphate, in an energy intensive process.

Mineral boards:

A generic term for boards manufactured by compression of a mineral material, which can be calcium silicate.

Generally, organic boards are of environmental benefit when they are made from acceptable renewable resources. On the negative side, the use of organic resin binders can be a potential health hazard. Inorganic boards utilize finite resources, and are not necessarily more durable or suitable than organic boards. The health hazards involved in the use of organic materials are to be preferred. The health hazards involved in the use of the inorganic are related to the release of dust and fibers on the installation.

Adhesives and Resins

Adhesives and resins are derived from renewable resources include animal glues based on the protein collagen, and obtained from slaughterhouse waste, vegetable glues such as starches and gums, and casein glue, made form dried milk curds. Their use should nevertheless be considered where appropriate (CIRIA–1995).

Adhesives

- Water-borne adhesives are preferred as alternatives to the solvent-borne systems.
- Water-borne contact adhesives are slow drying, and benefit from warm conditions on site in order to increase the rate of drying.
- The possibility of using hot-melt adhesives for an application bonding such as panel bonding should be investigated.
- Epoxy and polyurethane resins and their curing agents are reactive materials and can cause damage to human tissue by contact and/or inhalation of vapors.

Granite

It has a higher *Radon* emission than other materials, but still not at a level to cause concern in normal building use (Ove Arup & partners, 1993).

Plastics

They are all derived form non-renewable resources, although there is a scope for development of renewable resources into plastics. Reuse is virtually impossible and recycling is currently restricted to the production of a limited range of low specification products.

Chlorine

The basic raw materials for PVC are oil feedstock and salt, either rock or brine. PVC uses about a third of all manufactured chlorine. Chlorine is highly toxic to plant and animals. The PVC manufacturing industry has published comprehensive information on its environmental impacts -more information than many other manufacturing sectors (CIRIA, 1995).

Paints and coatings

- Water based decorative paints should be used internally whenever possible as an alternative to solvent based systems
- Water based decorative paints should be used externally as an alternative to solvent-based systems provided the paint manufacture can provide details of an equivalent durability for the water-based paints. Water-based gloss paints do not generally have the same early gloss appearance of gloss solvent-based paints, but after a time they appear similar
- Where relevant, factory-finished components should be used in preference to those that are site-finished
- Where protective coatings based on, for example, epoxy and polyurethane resins are to be site applied, solvent-free or low-solvent products are preferred
- Epoxy and polyurethane resins and their curing agents are reactive materials and can cause, damage to human tissue by contact and or/inhalation of vapors.

Acrylated rubber coatings should be preferred to chlorinated rubber coatings because of the potentially hazardous nature of the chlorine emissions produced during manufacture of the latter.

The construction process on site comprises different elements such as production, supply of building materials, equipment, on-site construction, operating and demolition. Demolition generates massive amounts of waste to be disposed of, adding to the considerable quantities already produced at other stages- from quarrying and mining to building maintenance and operations. All these create problems, some of them are foreseen and others are unforeseen.

But solutions to these problems exist. They involve careful siting and design of buildings, prudent choice and efficient use of buildings materials, re-use and recycling at all stages, the use of energy-and water- efficient building techniques and elements, as well, adequate maintenance and operation (Industry and the Environment-UNEP-1996). However, one of the most crucial elements during construction that need to be looked at more thoroughly is waste. Since it has various impacts during the construction phase and even long lasting after the product is produced maybe for several decades.

4.4.2 Waste minimization

4.4.2.1 What is Waste?

Ferguson et al (1995) defines waste as a product or material that is unwanted. In terms of practical waste management, waste is a legal term defined in European and UK law. Anybody who is going to be involved with construction waste must start with the definition 'what is waste', when does a material become waste and when does it cease to be waste. The most important definition of waste comes from the EC Framework Directive, which implies that:

> *"Waste is any material where the holder has an intention to discard the material as no longer part of the normal commercial cycle or chain of utility".*

4.4.2.2 The true cost of waste

The true cost of waste is equal to:

> *Purchase price and transportation costs of materials that are being waste +Cost of storage, transport and disposal of waste +Loss of income from not salvaging waste materials.*

Further Anink et al (1996) adds that when a product has fulfilled its function, the resulting waste may cause numerous problems, including difficult separation, poor degradability, airborne dust, occupation of space or leaching in landfill, as well as the release of noxious substances incineration. If waste enters the environment after the demolition of a building, either through landfill or in another way, then the environmental pollution created will depend on particular combination of the material's ability to cause harm to its degradability. Waste products including paint and construction materials should be disposed of at appropriate waste disposal sites.

4.4.2.3 Economic benefits of waste minimization

Ferguson et al (1995) indicated that the disposal of construction waste is becoming a major cost in construction projects. To be competitive, ways of minimizing construction waste need to be found.

- Prevent waste by proper maintenance
- Design with whole-life cost in mind to minimize waste
- Use techniques, which avoid creating waste.
- Reuse waste on site for other purposes or find profitable uses off site
- Dispose of inert waste on site.

Some techniques involve the very latest technology; others involve practices that have been carried out for centuries. In all instances, however, advance planning is required. There need to be a commitment by client, consultant and contractor to minimize waste. We have a legacy of cheap landfill sites handed to us from a time when environmental issues were less prominent. It should be realized that this is not the case anymore and it should not be, we should be careful when producing waste, due to the direct and indirect benefits that might be gained if the amount of construction waste going to landfill can be reduced, the following could be accomplished:

- Environmental amount from quarrying can be cut
- Energy consumption on transport can be conserved
- Profits on construction can be increased through reduced disposal costs.

Moreover, the financial benefits might include:

- Reduced costs for the transport and disposal of waste materials
- Reduced costs of using new materials
- Increased returns from selling waste materials for reuse.

4.4.2.4 Dealing with waste

It is self evident that the best way to deal with waste is not to create it in the first place. Just as a the waste industry will need greater economic incentives to explore recycling, so will the construction industry require inducements to initiate waste minimization measures. For example, design which does not require the cutting of large standard size materials or persuading a plumber to find a short piece of copper tube rather cut the end from yet another 6 meters. length, are measures which are within the direct control of the construction industry and yet which have hardly been addressed.

Moavenzadeh (1994) suggests that the push is on to eliminate at the source. Many manufacturers are hoping to install what are being called "clean production technologies" in their plants starting with source control if it is feasible. If not, the next preference is for recycling. There are five basic approaches to controlling waste at the source:

1. Change raw materials used in production
2. Change production technology and equipment
3. Improve production operations and procedures
4. Recycle waste within the plant
5. Redesign or reformulate end products.

"The two largest factors affecting quality were found to be in the transmission of information about design (classified as a 'design-side' problem) and lack of care (not skill) by trade people and operatives (a construction side problem). Markets for waste materials will have to be developed to make recycling a viable alternative to landfill (CIOB, paper no.49 Brigth and Lown).

Essentially, and in practical terms, if every one focuses their attention on reducing resource use and waste, the need for landfill, would be kept to a minimum. By looking at the waste management priorities illustrated below, concentrating on each stage, and by implementing these points, we have helped to minimize the use of raw materials and reduced waste production.

- Minimize raw materials used
- Reduce wastes
- Recycle wastes
- Recover energy from waste
- Send minimum amount of waste to landfill.

In practical terms, and by exploring some few examples, Concrete could be recycled for reuse as aggregate in new concrete or as unbound aggregate in roads or fill. The excavation of topsoil might be reused for landscaping, also Timber would be reused for chipboard, and finally Metals recycled by smelting. Coventry and Woolveridge, 1995 argue that before demolition begins, disposal options for the materials that will be generated ought to be reviewed. Reclaiming, where possible reusing materials, also the segregation for materials as they are generated. They refer to bricks arising from demolition that may have a reuse value waste or may be crushed and recycled as hardcore. Unnecessary wastage of materials could be avoided by not over-ordering materials. Segregate packaging wastes and return them to the supplier for recycling.

4.4.2.5 Waste separation

Anink et al (1996) emphasizes that the separation of building waste, a by-product in the construction of new houses, opens up opportunities for further use. Reuse saves material and reduces dumping and incineration. Primary reuse–where the material is used again following negligible or no further treatment–is preferable, and occurs more often in demolition or refurbishment than in construction of new houses. Secondary reuse (recycling) where the materials are reprocessed to new materials in a reprocessing plant demands additional transport and energy consumption and results in the release of harmful substances. Most building waste used to be dumped. It is recommended that dumping is drastically restricted in the view of the environmental implications landfill.

The separation of clean rubble, low-grade chemical waste, metals, wood, synthesis and a residual fraction generally incurs negligible cost. The separation of waste on site is generally preferable because it is best to tackle problems at their source. Some waste processing firms may prefer to separate the waste themselves, the disadvantage that the site personnel are not directly involved, which is not a healthy attitude, since they would not be committed to the waste minimization concept.

4.4.2.6 Client's and designer's checklists towards waste minimization

As the client and the designer represent two major contributors to the construction industry, Ferguson et al (1995) suggests checklists that could enhance the philosophy of waste minimization.

4.4.2.6.1 Client's checklist

- Waste prevention and minimization should be part of the brief-ensuring that the brief requires the designer to consider early in the design process the creation and after-use of spoil and construction waste, and that he and any contractors comply with the Duty and Care
- Use adjacent land for landscaping which can be landscaped using spoil or otherwise waste material, or on which materials can be stored for reuse on or off the site
- Beware contaminated land- if land is contaminated by previous process
- Use specialist demolition contractor to carry out safely and with maximum reuse, recycling or sale of the materials
- Avoid over-specification
- Determine the details of the proposals for reuse and/or disposal and check the details with waste regulation authority where there is any doubt any part of the arrangements.

4.4.2.6.2 Designer's checklist

- Not excavating spoil materials, concrete, or other materials, which can be left in place
- Attempting to recycle as part of the design, for example by providing sites and opportunities for crushing concrete, etc.
- Balancing cut and fills

- Using material, which would be unsuitable for construction in areas where material strength is not required
- Using contractors or subcontractors who can and will reuse materials on site or else where
- Specifying materials to the performance required.

Brigth and Lown (CIOB, paper #49) set a more broaden scope is taken by including other factors that would influence waste minimization.

- Awareness of recycling practicalities and possibilities must be a way of thinking for all those working within construction industry- from those at Board level (the policy makers) through to all personnel, especially management on site and site operatives
- Sustainability and reduction in the use of finite resources through recycling must be emphasized
- The potential simplicity of segregation and recycling of waste must be considered: it will mean that a change in attitude, rather than a change in approach, will be necessary. Waste still has to be dealt with and disposed of, but the methods employed must be changed
- A greater focus on waste is necessary, which will improve efficiency within the construction industry. A more structured approach will bring about a reduction in waste to the benefit of many, both environmentally and economically
- Investigations into material technology to find ways of increasing the use of recycled materials, which can be encouraged by demonstrating the commercial advantages arising, as well as the ecological benefits
- Labeling of waste by type should be considered, to assist with the identification for segregation.

4.4.2.7 Barriers against reuse

Ravindra K. Dhir et al, 1998 in their critique to waste reuse note that although the waste materials originated from construction sites or demolition work is termed as construction by-products that could be used in a range of applications. However, there are number of points that may become barriers to reuse, as described below:

1) Sufficient amount of raw materials (or by-products), which can be reused
2) The supply and the demand of recycled products are not balanced
3) All recycled product has to meet the quality requirement
4) The processing expense increases with the improvement of the quality level of recycled products resulting in the increase of waste
5) Expense for the separation of other materials increases the price of the recycled products
6) The recycled products are too cheap to provide a profit to the manufacturer
7) Shortage of recycling factory. For example up till 1998, only two or three processing plants are available for recycled aggregate concrete in Japan
8) The single factory for a recycled product is hard to be setup, for example; factory producing recycled aggregate and the factory of the road base aggregate should be build in the same place, and the concrete debris of higher quality should be used as a recycled concrete aggregate, and that of lower quality should be used as a road base aggregate

9) No standard for the recycled products is available
10) The reuse technology is not established
11) Too much energy may be consumed in recycling materials
12) Harmful materials may be released from the recycled products
13) The trust of purchaser or user is thin to recycled products, and there is tendency of disliking the recycled products.

Just controlling pollution and treating waste is not enough to reach the ultimate ideal of "sustainable development". Extensive research and development (R&D) is yielding new products and processes that minimize the use of energy and greatly reduce or sometimes even eliminate all harmful solid, liquid, or gaseous waste. But using the methods of the past cannot make substantive gains. The construction industry can be instrumental in moving emerging technologies into the marketplace and those companies adept at doing so may gain competitive advantage.

4.4.3 Construction and the environment

Moavenzadeh (1994) points that until the middle of the twentieth century, the environment's capacity for absorbing all kinds of waste was generally considered to be boundless. He further adds that this period, which extended from the beginning of the industrial revolution through the 1960s and into the 1970s, might be considered an era of environmental neglect, embracing the concept of an environment with limitless capacity to absorb waste products. It is important for those in the construction industry to be aware of the roots and the dimensions of the environmental movement. Now a day, clients will expect their construction contractors to be familiar with environmental technology so that they can help them deal with environmental regulations more efficiently.

It might be the case, that some construction firms-based on unawareness or other reasons-would consider solving the problem is through implementing simple environmental requirements at a building site, such as dust suppression, noise control, and the disposal of debris. In this respect, Moavenzadeh suggested four different types of needs for construction companies as a result of expanding environmental requirements.

> *First,* is the often-urgent need among a wide range of clients to clean up existing polluted facilities.
>
> *Second,* industry is recognizing the need to retrofit the existing means of production, capturing waste and pollutants right at the production site so as to minimize any release into the air, water, or soil.
>
> The *third* type of demand is arising as many industrial and commercial clients conclude that entirely new means of production must be developed that can eliminate the need for environmental control systems altogether. This strategy, commonly called "source control," it calls for owners, engineers, and builders to work together to either eliminate or minimize pollutants and waste, an to either reuse or find alternate markets for as much of the remaining waste as possible.
>
> *Finally,* industrial and commercial clients have realized that ever-increasing environmental considerations and requirements have begun to constrain site selection, permitting, design, construction, and operation of their facilities.

Consequently, Gutierrez et al (1999) suggests that the constructor's work should be careful and respectful concerning the environment. In order to do so, it is necessary to raise awareness on these aspects among construction leaders and workers through an environmental education program. Also, on site practical solutions should be implemented to mitigate the impacts that might occur.

It is well known that the vast majority of construction projects run against a known time scale with activities consuming known materials at given points in time. By combining pre-determined consumption rates and predicting waste levels. These can be then placed against the project time scale to predict the supply rate of each type of material.

As a matter of fact, one barrier to wide spread environmental sound buildings in the building sector is the broad range of decision makers and practitioners involved, including architects, urban planners, engineers, builders, developers, financing institutions, local authorities, and home appliance designers, (Industry and the Environment-UNEP, 1996). Mackenzie et al 1991, emphasizes that assessing the true environment impact of a product or construction can be done only if consideration is given to its effect throughout all the stages of its life "cradle-to-grave approach". Focusing on its impact during use, or on of its characteristics, such as recyclability or energy efficiency, gives partial, possibly misleading picture of its overall performance.

This will lead us to question the role of the designers within the industry, are they equipped to respond to the new demands? The answer is almost certainly no, as it must be for almost all professionals trained without reference to the environment impact of their activities. In most places, design has not been taught in context of its social and ecological impact. Many designers adopt the approach that their area of responsibility is limited to function and appearance.

The construction industry needs to adapt a more proactive attitude in regard to incorporating environmental considerations into its work, and to understand that building green means good business. Despite some clients will not be looking for enhanced environmental performance: the design professions have a particularly important role in persuading such clients towards a more-environmentally responsible approach by different means, amongst others would be the long term implications of non-environmental approach.

Pieters (1996) emphasized that the construction industry is confronted with many problems related to the environment; table (4.3) gives an indicative overview of the most significant of these problems.

Table 4.3

List of the most important Environmental problem of concern To the construction industry
▪ Depletion of the ozone layer: use of insulation foam
▪ Climate change: use of energy while buildings are occupied
▪ Dispersion of material harmful to the environment: paints, thinners, wood preservatives and other construction materials/maintenance products
▪ Disposal of waste products: construction and demolition waste
▪ Waste: resource of primary raw material, use of water while buildings are occupied
▪ Indoor environment: construction materials

Source: UNEP-Environment and the industry- (1996)

From the standpoint of the forgoing philosophy, "sustainable building" is in principle directed towards integrated life-cycle management (reduction in the use of raw materials, reduction in the use of energy, and improvement in the quality of building process).

He further illustrates that National action programs for construction and demolition waste for EU members were developed from the point of view of prevention, recycling and reuse, as well as, final disposal. These outcomes are due to the cooperation between authorities, manufacturers, designers, builders and contractors.

Those responsible for the construction phase must also seek to reduce the impact of their own operations on the environment. Their role is to translate a design into an operational scheme so their ability to redress any inherent environmental weakness in a design is limited. In contrast to designers, those responsible for the construction phase can find out what they ought to do as environmentally responsible contractors but guidance on how to achieve it is comparatively lacking (CIRIA, 1994).

Ueda and Yamamto (1996) illustrated the on-site green techniques by explaining that waste materials, exhaust gases, noise and vibration are generated as a result of production and construction works. Reduction and elimination of these negative environmental side effects can be attained through measures ranging from design up to site mitigation.

At the planning stage, environmental impact assessment (EIA) should be undertaken for large-scale construction. Various types of environmental plans need to be developed to preserve the natural environment and reduce the waste generated at the construction site. At the design stage measures should be taken to include energy saving technologies and intermediate water supply systems in order to reduce total water consumption.

4.4.3.1 On site green techniques (OGT)

Several areas and procedures on site can be tackled technically "green", the following procedures present some of these procedures;

Demolition

Coventry and Woolveridge (1995), points that before demolition begins, a review of the disposal options for the materials that will be generated should be considered. Identify local recycling options before works begin and if materials like concrete or masonry are to be crushed on site, consider screening the works. Dust from the demolition process may annoy neighbors and damage ecology near the site. If elephant chutes are being used, ensure that each section is securely fixed, that the skip or lorry at the discharge end is covered, and that materials are dampened before being sent down the chute.

Dredging

Dredging may affect the aquatic ecology; an appropriate dredging technique must be used to minimize the disturbance of sediment resulting in silting of the watercourse and potential mobilization of contaminants. Using dredges mats and silt curtains must be considered. Coventry and Woolveridge further adds that if necessary monitor and aerate. CIRIA-1999 highlighted that testing for contamination before works begin is essential. Working during breeding season and disturbance to aquatic ecology should be avoided.

Earthworks

Coventry and Woolveridge (1995) emphasized following good practice in managing stockpiles, and planning the disposal of surplus materials arising from earthworks before starting works, aiming to reuse spoil (e.g. for land profiling and raising) rather than disposing of it to landfill.

Excavation

They further added the reuse for topsoil by storing it in piles less than 2 m high to prevent damage to the soil structure. Also using excavated materials to form noise bunds and for landscaping.

Piling (including temporary works)

Piling is an early activity; the risk of spillage should be minimized in using oils and chemicals. Noise and vibration will annoy neighbors; noise levels created by piling vary with the method used. Wastes from bored piling may form a particular problem, as the waste is often wet and it should be disposed properly. Piling dose to watercourses forms a potential pollution risk. Contaminated ground may be encountered during piling; a contingency plan ought to be developed for dealing with it. Any contaminated spoil should be kept separately from uncontaminated spoil as it should be handled and disposed of appropriately.

Grouting

Enclose grouting operations. Pump out displacement water before works start Use settlement tanks to remove sediments. Use flocculants to separate grout fines. CIRIA publication-1999 in addressing management and site control points that the majorities of incidents could be avoided and are caused by: Ignorance, Negligence, Carelessness, and Vandalism, in order to handle the site more appropriately, the following should be considered

Housekeeping

Ueda and Yamamto (1996) illustrated on-site green techniques by separating it into eight categories (fig. 4.27) according to standard segregation rules of the building constructors society. It has been highlighted that waste should be removed frequently, and segregated as it is produced.

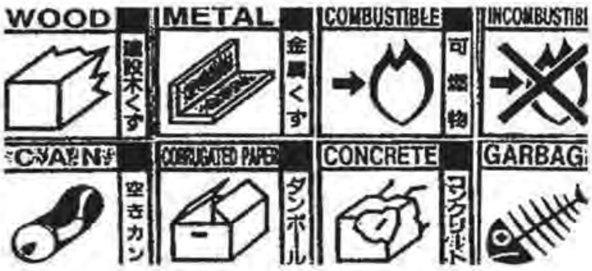


Fig 4.27
Segregation of materials on site
Source: Industry and Environment Vol. 19 No.2- (1996)

1. Wood
2. Metal
3. Combustible
4. Incombustible
5. Can
6. Corrugated paper
7. Concrete
8. Garbage

Managing materials (Ordering and receiving)

CIRIA publication (1999) emphasized ordering the right quantity and quality, when materials are needed. Delivery arrangements should be checked for unloading to the correct location, handling and storage.

Concrete batching

Position plant away from neighbors; erecting barriers to deflect noise, using water sprays in aggregate storage bays, considering self -contained plant to allow for water reuse. On site the following could be implemented

(i) A concrete construction method, which does not require moulds.
(ii) A plastic mould method reducing the volume of trees cut down.

Use of paints and solvents

CIRIA publication-1994 raised the issue of paints and solvents where the potential hazards and environmental concerns relate to the materials used:

The potential contamination of the internal environment from such processes as off-gassing. The potential hazard to the workforce from solvent fumes when applying paints, resins and related materials; sealant and glazing compound formulations using asbestos fiber as filler or lead as drying agent should be avoided, and the emphasis for the use of lead-free paint and primers.

Dimson (1996) points that sooner or later we will have to change our ways. But while our directions are clear, it is also true that old habits die-hard-in management terms it is known as, *change and change resistance*. Sooner better than later, because "later" maybe too late, when the ecosystem would be terribly harmed. He further adds that keys to persuading mainstream public include: public awareness, providing through both theoretical business cases and real-world projects as highlighted in an earlier section, that sustainable buildings does in fact create a competitive advantage, and gaining legitimacy through the support of one or major main stream developers.

No attempt has been made here, either to cover every industry aspect-in particular with relation to the environment-or to analyze all the type of pollution. Instead significant examples of the scale of the impacts of construction on the environment are given, and some proposed directions in the studied literature for improvement are examined.

Conclusion

Clearly, more environmental awareness should be encountered, although, there is evidence of the current misuse of our planet, and it is obvious that the outcome would be devastating, however it may seem that reliable detailed effects on the environment are not available. In this respect, on one hand, more research is required, on the other; it is crucial for the construction industry with those entire related activities-in particular designers-to act on implementing sustainability. The present abuse would not only effect the tourism industry, moreover, it has been argued that large areas of countries such as Bangladesh and Egypt will be flooded resulting in massive numbers of environmental refugees.

According to Dimson (1996) sustainable buildings must be lifted out of the abstract ethical sphere and into the world of action, he adds that all around us evidence pointing indisputably to the same conclusion; we are leaving the industrial age and entering the age of ecology, the industry is needed to be awaken from its somber. Hence, a holistic attitude is required towards the problems facing the industry; further, realizing fully what it is a 'green' approach, rather than using it as a slogan or as fashion to be 'green'.

It has been noticed that in the vernacular architecture era, the consumers of buildings understood the process of construction, even if they were not builders. This has led the research to examine the deeply rooted feng *shui*, nature interrelated Chinise tradition, not trying to enforce concepts that might not be relevant to our case or even culture, but in search of the approach essence that thoughtful environment related design could conquer problems that might occur.

However, it is essential to picture how the building would be used, and should be realized that hi-tech buildings also could be designed and provided for the comfort of the user, but within the context of a healthy building. The architect must not just enforce hi-tech solutions as a substitute for environmental friendly approaches; hi-tech schemes must be in conjunction with those 'green' aspects and lie at the heart of green architecture. In Egypt, 'Wind Catch' as an example has been one of the 'green' solutions commonly applied for natural ventilation, where the building would be described as energy efficient.

In Papanek (1995) opinion that within the 21st century there will be an increasing need for some designers who are specialist in ecological design. Furthermore, he argued that all design education must be based on ecological philosophy. In this respect, Mokhtar (1998) agreed that the designer must be aware of the extent of the earth's materials used as inputs in the composition of any designed system because the specific use of each material resource in the built environment incurs spatial alterations to the ecosystem and a depletion of that resource.

In the attempt to further explore the above, it has been vital to highlight Pieters (1996) notion, that there is no clear, all-embracing "black" or "white" lists of building materials, or construction in terms of sustainability exists as yet. However, quite a few initiatives do exist to reduce the impacts on the environment, and attention is generally promoted for the reuse and recycling of materials.

The chapter has illustrated certain built examples as environmental friendly symbols, Thomas et al (1999) concluded that The Environmental Building (fig. 4.19) is the most significant contribution in this sense, for its environmental approach, where it provides designers with a *'way of thinking'* about buildings as an important step towards sustainable, positive energy buildings. He highlighted that it is an 'organism' in which elevation and section are equally important and equally necessary to assist in maintaining the comfort of the 'body'. The Nederlandsche Middenstand Bank in Holland-NMB (fig4.23 A, B&C), in Brenda & Vale (1991) opinion, is a crucial model to symbolize 'green architecture' internally, as well as, externally.

Sydney and Baggs (1996) pointed that Holistic architects and designers must have a through knowledge of what comprises an environmentally healthy building in the biological and ecological sense. Furthermore, the designer should not limit his vision to the design phase, figuring out the consequences of his design on the construction phase, as a simple example, it has been noticed that waste created on site could be minimized by not creating it in the first place. It should be understood that waste for instance, in its simplest damage form could either take up space, which is also negative, or have damaging effects over a shorter time period if it degrades well.

Mackenzie et al 1991, concluded that evaluating the true environment impact of a product can be done only if consideration is given to its effect throughout all the stages of its life "cradle-to-grave approach". Focusing on certain life intervals would provide partial, possibly misleading picture of its overall performance.

All this has lead to question are designers within the industry equipped to respond to these new demands? The answer suggested, is almost certainly 'no', as it, for almost all professionals are trained without reference to the environment impact of their activities. In most places, design has not been taught in context of its social and ecological impact. Many designers adopt the approach that their area of responsibility is limited to function and appearance. Also those responsible for the construction phase must seek to reduce the impact of their operations on the environment readdressing any inherent environmental weakness in the design provided (CIRIA, 1994).

All those involved could contribute in an important way in reducing the impact of a building on its environment. Many designers tend to delineate their project sites as islands. However, in the biosphere, ecosystems are not isolated systems but have a spatial interlocking property, it might be the case that what has been suggested as not being harmful might prove to be so damaging.

However, this does not indicate by any means that no development ought to take place. Within this research, the intention is finding out the means for development bearing in mind the new demands and the aware-targeted markets. Tourism based on the environment is the most compatible option for development. Traditional construction methods in fragile ecosystems would produce neither sustainable developments, nor sustainable tourism.

The philosophy of sustainability in design, through to construction to produce sustainable tourism developments, neatly meets a number of demands. A holiday resort should provide an attractive healthy environmental milieu in an exotic setting with minimum impact possible on the ecosystem, a concept that would be eminently marketable with its positive impacts on the economy.

CHAPTER FIVE

RESEARCH METHODOLOGY

5.1 Introduction for the adopted academic thinking

Research methodology refers to principles and procedures of logical thought process, which are applied to a scientific investigation. A random search is unlikely to reveal much of significance for the topic under study, Fellows and Liu, (1997) emphasized that it is vital that the search should be structured. The methods by which research can be carried out, lies at the heart of research. Many good ideas remain un-investigated because the methodology has not been considered adequately. In determining and considering the methodology for research, attention should be given to 'DATA'; namely (Fellows and Liu, 1997):

> D *Definitions* of the main terms involved; it is essential to decide explicitly the definitions to be adopted, and why they have been adopted.
>
> A note the *Assumptions* that are made and the justification for them.
>
> T research, and critically review the *Theories*, principles and literature relating to the research.
>
> A evaluate what *Analysis* may be carried out with respect to data available, the objectives and any hypothesis, maximizing confidence in the results.

Greenfield, (1996) suggested that the methodology process contains four sections; first, a literature review to be carried out, second, a "theory" to be developed, third, testing the developed "theory". Fourth, reflecting and integrating the researcher own experience on the conducted study through the obtained results from the fieldwork.

In this respect, Strauss and Corbin, (1998) defined *Methodology* as 'a way of thinking', where *Methods* as 'a set of procedures and techniques for gathering and analyzing data'. Finally, *Coding* as 'the analytic processes through which data are fractured, conceptualized, and integrated to form theory'.

The way of thinking that administer this research is chosen to be objective approach, rather than being subjective, by reasoning and justifying the research course through the conducted literature review, and further not influenced by personal considerations. Hence, it is most likely that any other rational would come to the same unambiguous findings and conclusions.

5.2 Qualitative and quantitative research

Patton, (1987) noted that qualitative methods consists of three kinds of data collection: (1) in-depth, open-ended interviews; (2) direct observation; and (3) written documents, including sources as open-ended written items on questionnaires, and personal diaries.

Qualitative methods permit the evaluator to study selected issues, cases or events; the data collected is not constrained by prearranged categories of analysis, which contributes to the depth, and detail of qualitative data. Quantitative methods on the other hand, use standardized measures that fit various opinions into prearranged categories.

The advantage of the quantitative approach is that it measures the reactions of great many people to a limited set of questions, thus facilitating comparison and statistical aggregation of the data.

Qualitative data provide depth and detailed descriptions, direct quotations, and case documentation of qualitative methods are collected as open-ended narrative without attempting to fit peoples' experiences into prearranged, standardized categories such as the response choices that constitute typical questionnaires or tests.

5.2.1 Qualitative Versus Quantitative Research

In collecting qualitative data, the evaluator seeks to capture the richness of people's experiences in their own terms. Understanding and meaning emerge from in-depth analysis of detailed descriptions.

Quantitative measures are concise, parsimonious, and easily aggregated for analysis; they are systematic, standardized, and easily presented in a short space.

The task for the qualitative evaluator is to provide a framework within which people can respond in away that represents accurately and thoroughly their point of view about the program. Denzin and Lincoln, (1998) point that the word qualitative implies an emphasis on processes and meanings that are not thoroughly examined, or measured, in terms, of quantity, amount, or intensity.

In contrast, quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes. Inquiry is purported to be within a value-free framework.

5.2.2 Triangulated studies

The research employed both qualitative, quantitative techniques as triangulated studies recommendations, qualitative, and quantitative approaches may be employed to reduce or eliminate disadvantages of each individual approach whilst gaining the advantages of each. Generally, Fellows and Liu, (1997) argue that the objectives of the work together with the nature of the data collected, which determine whether the study may be classified as qualitative or quantitative.

However, Preece, (2000) emphasized that qualitative methods should not be seen as mere description. Though numerical procedures are not essentially involved, logical testing and argument are crucial for the adopted approach. He further adds that quantitative methods generally have developed further to include not merely counting and measuring but also the powerful analytical procedures of statistics and many other techniques such as mathematical modeling and linear programming.

Essentially, qualitative and quantitative methods could be seen as complementary, with different emphases in different disciplines, but sharing a heritage of logical thought.

5.3 Types of models and proposed model novelty

Fellows and Liu, (1997) highlight that it should be know for whom the model is to be constructed, in order to lend perspective to the modeling and to suggest sources of data, forms of outputs etc. The analysis stage comprises organized, analytic procedures to determine the operation of the reality, noting the location and permeability of the boundary of the system to be modeled.

Martin and March, (1972) suggested that a model is a representation of a reality to provide a simplified and intelligible picture in order to understand it better. Four main types of models can be distinguished: descriptive model, predictive model, explorative model and planning model, (fig. 5-1).

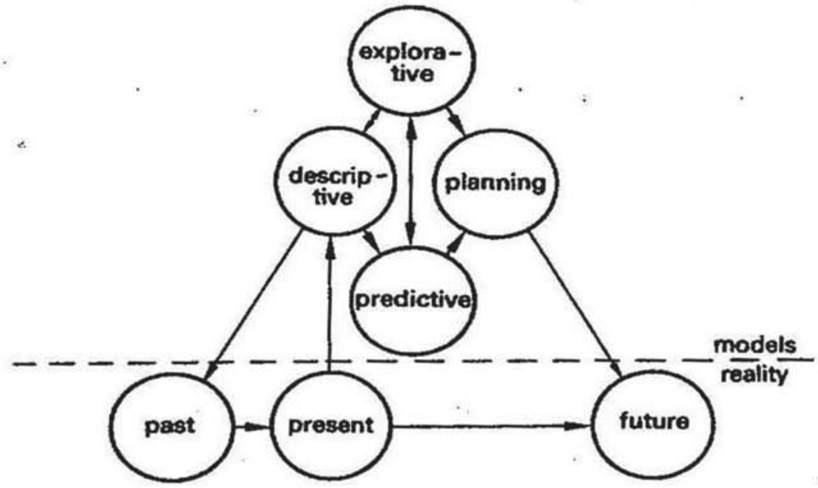


Fig. 5.1 Ideal process of model making in relation to reality
Source: Martin and March (1972)

- The main intention with descriptive model is the understanding of reality, usually in order to establish how a particular phenomenon comes about and to describe relationships between the relevant factors. In other words, the main intention is explanatory. This type of model is logically essential to any other type because it is not possible to predict, explore or plan without a previous description of the reality under study.
- The main intention with predictive model is to forecast the future. The predictive model is based on the assumption that the model represents the way reality is changing.
- Extrapolative, where only the continuation of present trends that were already in the descriptive model is stated; and conditional were the mechanism of cause and effect is governing, i.e. 'if *x* occurs, then *y* must follow'. The main intention with the explorative model is to discover by speculation other realities that may be logically possible.
- With the planning model, 'a measure of optimization is introduced in terms of chosen criteria in order to determine means of achieving stated planning goals' (Lowry 1965).

Martin and March, (1972) mentioned that planning models are often used as analogue devices that, for purpose of evaluation simulate the effect of different decisions within a system. The planning model is chosen in order to accomplish the stated goal of the research, which is providing environmental friendly holidays resorts.

However, as with any other model it has been built on the outcome of the descriptive outcome. This was achieved through the literature review, and the fieldwork that assessed the current status, investigated the factors affecting the decisions-making process. Further, a limited study was conducted in order to feed the framework with data regarding the locally available alternative environmentally friendly materials.

The research proposed model contributes possibly for the first time to the industry and stakeholders in Egypt a dynamic interactive framework. Most importantly it would enhance the logical way of thinking in the attempt to achieve environmental holiday coastal resorts.

5.4 Inductive and deductive methods

Deduction

Preece, (2000) argues that deductive argument is attractive to scientists since, if the argument is valid at all, hence, the conclusion is 100 per cent certain. The critique for this advantage is that the conclusion tells us nothing, where it is absolute within its own terms and in effect it is already contained within the evidence; it is not a creative or imaginative argument, which produces new ideas. Further, it requires a sufficient amount of evidence but no more; additional evidence does not add to the strength of the argument.

Induction

A second type of argument is known as inductive argument or induction. It has qualities opposite to those of deduction: the conclusion is not certain, merely probable, but the conclusion does contain new ideas. Also, additional supporting evidence strengthens the conclusion.

The classic inductive approach is goal-free evaluation in which the evaluator gathers qualitative data on actual program impacts through direct observations of program activities and in-depth interviews with participants, without being limited to stated, predetermined goals. Inductive designs begin with specific observations and build toward general patterns. Categories or dimensions of analysis emerge from open-ended observations as the evaluator comes to understand the existing program patterns.

The chosen approach within this study is based on the inductive technique, where the fieldwork findings are analyzed and interpreted, and then case studies are carried out to test the framework validity. The conclusions are subject to updating and upgrading that would support the framework implementation within the industry in general.

5.5 Research adopted methodology

Research is a dynamic process; a contingent way of thinking has been helpful until the methodology was adopted. The choice of the embraced method is affected by the scope and depth consideration. The methods have been amalgamated between a broad but shallow study at one extreme and a narrow and deep study at the other (fig.5-2).

Fellows and Liu, (1997) noted that for a number of years, the scientific method, with its emphasis on quantitative studies, has been in the ascending line, with a result that research in disciplines, which lie between the natural sciences and social sciences, notably management of technology and engineering, has been drawn or pushed towards adoption of quantitative scientific method.

However, the research adopted method lies between both qualitative and quantitative techniques, according to Strauss and Corbin, (1998) there are many valid reasons for doing qualitative research. One reason is preferences and/or experience of the researchers. Some persons are more oriented and suited to doing this type of work. Some researchers come from disciplines that traditionally make use of qualitative methods.

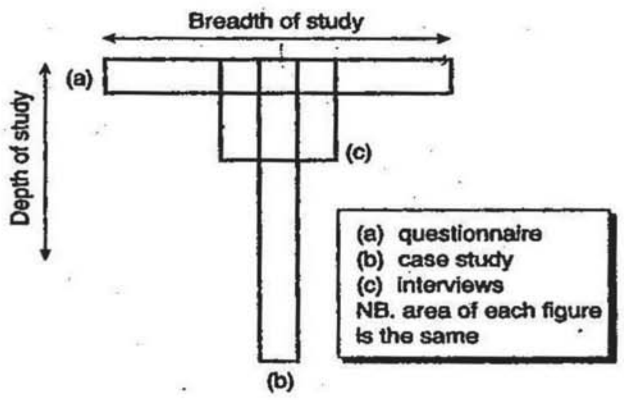


Fig. (5-2)

Some researchers gather data by means of interviews and observations, techniques normally associated with qualitative methods. However, the data is coded in a manner that allows them to be statistically analyzed as with the case of this research. In effect, qualitative data has been quantified, where data consisted of questionnaires, interviews and site observations, also documents where studied for the intended framework.

> Strauss and Corbin, (1998) mentioned that there are three major components of qualitative research. First, there are the *data,* which can come from various sources such as interviews, observations, and documents. Second, there are the *procedures* that researchers can use to interpret and organize the data. These usually consist of *conceptualizing and reducing* data, *elaborating* categories in terms of their properties and dimensions, and *relating* through a series of prepositional statements.
>
> Conceptualizing, reducing, elaborating, and relating are referred to as *coding*.

A more straightforward contrast is between close-ended questionnaires and open-ended interviews. A structured, multiple-choice questionnaire requires a deductive approach because items must be predetermined based on some criteria about what is important to measure. An open-ended interview, by way of contrast, permits the respondent to describe what is meaningful and salient without being pigeonholed into standardized categories.

No single method ever adequately solves the problem, since each method reveals different aspects of empirical reality; multiple methods are employed in this study within the context of the triangulation technique. The procedure adopted in the course of investigating the research objectives relied on questionnaires for the first objective; some close-ended and other open-ended questions were used. Semi-structured interviews were conducted to accomplish the second objective, unstructured interviews and site observation for objective three. Finally, case studies where carried out in order to validate the framework.

5.5.1 Hypothesis

Preece, (2000) mentioned that since a hypothesis is a statement made formally for the sole purpose of being tested, hence, it should be in a form that can be tested, the research hypothesis is tested through objective one, and two. In the former, indirect questions and site visits observations aimed at investigating the hypothesis presumption, in the latter, straight forward questions where directed to stakeholders in the final testing procedure.

5.5.2 Aim

Fellows and Liu, (1997) noted, the research is assessed once completed against the benchmark of the statement aim. The research aim is accomplished through the amalgamation of the literature review with the fieldwork output; further a validation procedure was adopted in order to tie the framework with real life.

5.5.3 Objectives

The study three objectives were accomplished through the following procedures:

> *Objective one* was achieved through carrying out questionnaires; these questionnaires were tailored for the stakeholders segment operating on construction sites from project managers to contractors, and also operatives.
>
> *Objective two* was accomplished through conducting interviews; the targeted stakeholders segment here was at a higher managerial level, policy makers, developers, and architects. Key personals where targeted for this interviews, either at the policy making level or at the contractors level.
>
> *Objective three* was attained through interviews accompanied with site visits, and literature review.

The following two sections are elaborating the procedures adopted to achieve the research objectives, the areas under investigation, also the reasons and the benefits for questions that have been asked, where the questionnaires are targeting <u>*what*</u> has been done, and the interviews are addressing <u>*how & why*</u> it has been done.

Due to the sensitivity of the environmental issue within the country, a certain segment of the stakeholders would be reluctant to declare any information regarding this issue. It has been agreed that in addressing issues regarding environment, the researcher would off-target his question to reach the intended target of assessing the current status.

5.5.4 Questionnaires design structure

The chosen sample is divided into two segments based on location at one end, and other based on job description, however they are operating on coastal resorts construction sites. As for job description, project managers and contractors are considered as one segment and operatives are considered the other.

With respect to location, (23) out of the project managers were interviewed on site in Hurghada city-Red Sea, a form was sent for the remaining (7) to Sharm EL Shiekh city-Red Sea to be filled in and returned. Regarding operatives (10) were interviewed on on site in Hurghada city-Red Sea, a form was sent for the remaining (5) to Sharm EL Shiekh city-Red Sea followed by the same procedure.

Two questionnaires formats were used to achieve the results for objective one (see appendices- B & C). One was designed for project managers and contractors. The second was tailored for operatives. The main difference between the two questionnaires was the terminology used in order to address each discipline, the headings, reasons and benefits are illustrated in tables below, but the main questionnaires segments were divided into three areas.

Number of sample:
Project managers and contractors (30)
Operatives (15)

5.5.4.1 Questions forms; open or closed

Although questions and inquiries are expressed here as nouns, according to Strauss and Corbin, (1998) they actually involve actions such as asking, doing, locating, and searching. Fellows and Liu, (1997) mentioned that open questions are designed to enable the respondent to answer in full; to reply with whatever content and to whatever extent the respondent wishes. Such questions are easy to ask but may be difficult to answer, the answer may never be full/complete and, often, the answers are very difficult to analyze. It is essential that answers to open questions to be recorded in full.

Closed questions have a set number of responses as determined by the researcher. However, such rigidity of available responses may constrain the responses, hence a response opportunity of 'other, please state' should be provided wherever possible.

They further emphasized that care must be taken that responses to open questions are not influenced by the response alternatives provided by related and previous closed questions. Thus, it may be preferable to place open questions before related, closed questions. It is possible to ask more closed than open questions, as responses to closed questions can be given more easily and quickly.

The procedure followed in this study is amalgamated between the two concepts, where certain information is required from certain question in order to screen other questions. Hence, the concept of setting open questions prior to closed questions is not applicable in the research case.

5.5.4.2 Piloting

The piloting as Fellows and Liu, (1997) stated will test whether the questions are intelligible, easy to answer, unambiguous etc., and through obtaining feedback from respondents, there will be an opportunity for improving the questionnaire. Piloting was carried out in this research through two different disciplines from the stakeholders; project managers and policy makers. The five versions (see appendices- B, C, D, E & F) form the questionnaires and interviews were done in sequence, i.e. after conducting questionnaires with project managers and contractors, the operatives version was modified, and so forth for the interviews.

5.5.4.3 Objective-1: Current practice assessment.

Questionnaires were designed to determine the current practice assessment and probe the views of the stakeholders on constructions sites. The survey was also intended to test a number of common perceptions. For example: Egypt's tourism assets, impact of coastal tourism, sustainable tourism principles perception on a construction site, sustainable tourism principles perception on a construction site, barriers against construction waste segregation, etc. The main areas are;

Area I- Tourism

Area one was addressing what is the impact of coastal tourism on the environment within the country. Assessing the planning and policies for tourism zones from on-site point of view. Further how sustainable tourism principles are perceived on construction sites. Finally, what are the challenges in achieving sustainable tourism development at the construction process level?

Area II- EIA

Area two inquired about the environmental policy implementation on construction sites, a crucial element investigated in this area was the EIA existence on site or is it just a document for a project permit, this was carried out by testing the perception on site of the EIA major components. This area was addressing what procedures are done on construction sites in dealing with the negative predicted impacts within the EIA. Also, the questionnaires investigated the EIA audit implementation.

Area III Sustainable design and sustainable construction

This area has been concerned with the area of sustainability within design and construction; one of the main concerns was addressing what has been done in dealing with the issue of scarcity of resources and reuse. Testing what has been done on real grounds regarding intelligent buildings design-orientation and its impact on energy conservation. The issue of materials selection, and if designers really consider this subject. Either from a design or a construction point of view what is done with regard to construction waste segregation and if there is any economical benefit in this respect? Finally, what are the barriers against construction waste segregation on site?

Area (i)
Tourism

Question Heading	Reason	Benefit
Egypt's tourism assets.	Awareness with the industry assets.	The tourism industry value for this sector.
Impact of coastal tourism; positive or negative, direct or indirect, short-term or long-term.	Current practice assessment from a field perspective.	An element to be used to evaluate the design impact on the existing developments.
Planning and policies for tourism zones in relation to economical goals.	Finding out stakeholders view towards state planning policies.	Assessing the planner interaction with real life.
Sustainable tourism principles perception on a construction site.	What does sustainability within tourism means for this sector?	A base to address the interviewed segment & to assist in framework structure.
Challenges in achieving sustainable tourism development.	What are the barriers to achieve sustainable development from a field point of view?	Highlighting the level of awareness in order to pinpoint the obstacles in achieving sustainability as a one of the baselines for the intended framework.

Area (ii)
EIA

Question Heading	Reason	Benefit
The environmental policy implementation on construction sites.	Does it exist?	Current practice assessment.
EIA existence on site in relation to dealing with its major components.	Detecting the existence of the EIA on construction sites.	Cross comparison to find out if EIA exists or not, also to cross relate with policy makers feedback.
EIA audit implementation.	Does it exist & what are the site procedures?	Cross comparison with the interviews feedback.
Dealing with negative predicted impacts.	Detecting at which stage it is expected that it should be dealt with.	Highlighting this issue within the framework to raise the level of awareness.

Area (iii)
Sustainable design and sustainable construction

Question Heading	Reason	Benefit
On-site sustainable development features implementations.	Level of awareness, what has been done towards	Points that need to be addressed within the framework context.

	implementation?	
Scarcity of resources and reuse.	The field resources handling as one of the major sustainability elements.	Current assessment feedback assisting in the framework structure.
Intelligent buildings design-orientation impact on energy conservation.	Current assessment.	The gap between research and real life, in order to consider the field feedback, as well as, cross comparison results within the framework context.
Materials selection consideration	What effects they produce on site from a field point of view.	The architect's role investigated for further framework consideration.
Materials energy consumption, on and off site (embodied energy)	On site awareness with the properties of the used materials.	Cross comparison with objective (3) feedback.
Construction waste segregation and the economical benefit.	Environmentally based or economically based.	Using the data in order to interrelate environmental issues with economical issue within the framework with respect to construction waste recycling.
Barriers against construction waste segregation.	What are the on site barriers?	Pointing out the barriers in order to tackle this issue within the framework.

Further than the questionnaires, which played a prime role in this research, interviews were also included in survey. These, for the most part, confirmed or cross-related with the questionnaire results as to elaborate the key issues under evaluation. One of the main aspects in the interviewing process has been the hypothesis testing, the following section is discussing the interviews in more detail.

5.5.5 Interviews design structure

The interviewed stakeholders were at a higher managerial level; key persons were targeted as Former Executive Director- UNEP, Former Minister Of State For Environmental Affairs, Former Chief Executive Officer-TDA, Chairman for The Arab, and the Head of the Environmental Department-TDA. Developers at Hurghada City, Red Sea, and designers with different backgrounds; working on environmental friendly projects, traditional projects, developers themselves, and finally newly graduates. The selection was based on detecting variety of views as to broaden the fieldwork spectrum.

Interviewed population numbers:
Policy makers (6 interviewed)
Developers (6 interviewed)
Architects (10 interviewed)

5.5.5.1 Interviews styles

Fellows and Liu, (1997) mentioned that interviews vary in their nature, they can be:

- Structured,
- Semi-structured and
- Unstructured.

The major differences lie in the constraints placed on the respondent;

- In a structured interview, the interviewer administers a questionnaire, perhaps by asking the questions and recording the responses, with little scope for probing those responses by asking supplementary questions to obtain more details and to pursue new and interesting aspects.

- In unstructured interviews, at the extreme, the interviewer introduces the topic briefly and then records the replies of the respondent. This may be almost a mono-logue; clearly the respondent can say what and as much as she/he desires.

- Semi-structured interviews fill the spectrum between the two extremes. They vary in form quite widely, from a questionnaire-type with some probing, to a list of topic areas on which the respondent's views are recorded.

Semi-structured interviews where more appropriate for the research, also at some points closed questions where used to stimulate certain answers in order to cross-relate with results from the questionnaires section. This procedure is clear in the following chapter, when analysis is illustrated the contradicting answers between the stakeholders segment on site and developers at one-end and policy-makers views at the other end.

According to a meeting carried out with Dr. Juile Woodfield, Loughborough University, UK, she had suggested that with permission of the respondents, tape-recording the interviews can be very helpful at the later stages of analysis, and this was the researcher attempt. However, after conducting the *questionnaires* phase, there has been a shift from this procedure, since some of the respondents were reluctant to give there name when the environment issue was raised, even though it was mentioned that the questions were designed in a sense not to address the issue directly.

5.5.5.2 Objective-2: Factors affecting decision-making.

The interviews where tailored for three different categories of the interviewed population, namely; policy-makers, developers, and architects (see appendices- D, E, & F). The interviews were structured on the same basis of the questionnaires areas, even some questions were repeated in the interviews stage for cross-relations to be carried out, but some questions where only addressing policymakers, or developers, as well, other questions were targeting architects, the following represents the interviews three areas;

Area I- Tourism

Area one is tackling he impact of the coastal resorts on the environment. Planning and policies for tourism zones in relation to economical goals from this segment of stakeholders to cross-relate with the construction stakeholders segment. How sustainable tourism principles are perceived at this end in relation to sustainable development. How and why challenges are facing sustainable development.

Area II- EIA

Area two is investigating the EIA issue with an emphasis on finding out if EIA exists on site, further the EIA role in providing alternatives. This area question how environmental policy is implemented on construction sites. Also, the views of the interviewed population in how the negative predicted impacts are handled on the different levels. Finally, the EIA role in the decision making process.

Area III Sustainable design and sustainable construction

This area is focusing sustainability, how is the scarcity of resources and reuse are perceived. The architect role in providing intelligent buildings design, and the building orientation impact on energy conservation. The designer approach in considering material selection, further more the challenges towards designing an environmental friendly building. Clearly, in addition to the indirect questions testing the hypothesis, directly questioning the designer role in mitigating the predicted negative impacts during construction.

Area (i)
Tourism

Question Heading	Reason	Benefit
The impact of the coastal resorts on the environment.	The level of awareness amongst this category of stakeholders.	Baseline data to highlight the awareness level in order to tackle this issue within the framework.
Planning and policies for tourism zones in relation to economical goals.	If they are implemented, how they are implemented?	Cross relation between policymakers view and the field feedback, by highlighting the gap- if there is any.
Sustainable tourism principles perception.	How is sustainability within tourism perceived for developers?	Understanding how developers ought to be approached within the context of the intended framework.
The relation between sustainable development and sustainable tourism	Finding out how strongly sustainability within tourism is related to the concept of sustainable development.	Better understanding why the current situation has been reached. An attempt to identify the distinction between the two sides of the coin, amongst developers and designers.
Sustainable development principles.	Finding out the essence of sustainability from their perspective.	Comparing the output with the literature in order to amalgamate what would fit to the Egyptian context with what has been indicated.
Challenges facing sustainable development.	What are the barriers to achieve sustainable development at this level?	Highlighting level of awareness to pinpoint obstacles to achieve sustainability as a baseline data for the intended framework.

Area (ii)
EIA

Question Heading	Reason	Benefit
EIA existence on site in relation to dealing with its major components	Does it exist, so how it has been utilized on site?	Is the EIA just a document fulfilled in order to grant a project license?
The EIA role in providing alternatives.	Do stakeholders realize how crucial is alternatives within EIA?	Further assessment for the role of the EIA on the real grounds.
Environmental policy implementation on construction sites.	Is it adopted? And how? And why from the interviewed point of view is it adopted?	Comparing the literature data with those involved perspectives.
EIA audit implementation.	Is such practice implemented, if so by whom? How its function value appreciated by each of the stakeholders?	Testing the level of implementation to evaluate the factors affecting the decision-making, also comparing the policy maker view with those involved in the industry.
Dealing with negative predicted impacts.	How is it approached by each of the key players?	Is their any consensus on mitigation methodology- as a key element in the framework structure?
EIA role in the decision making process.	How would it affect the decision-making process itself and why?	Factors affecting decision-making tested.

Area (iii)
Sustainable design and sustainable construction

Question Heading	Reason	Benefit
On site sustainable development features implementations.	Factors affecting decision-making tested.	Should it be designer instructions, or all those involved should participate in such process, in order not to destroy the environment.
Scarcity of resources and reuse.	Is it economical or environmental based?	Factors affecting the decision-making.
Intelligent buildings design- orientation impact on energy conservation.	How is it addressed on site?	Factors affecting the design decisions.
Material selection	Detecting the	Investigating the impacts that

consideration.	stakeholders' point of view.	might be caused by the decisions made by material selection.
Sustainable construction principles.	How is term perceived in the first place?	A better understanding to how sustainability affects decision-making.
Challenges towards designing an environmental friendly building.	The barriers against producing environmental friendly buildings.	Tackling this issue within the framework.
The impact of the 'Green architecture' on the design approach.	One of the concepts that sustainability can be built upon.	How such concepts affect the decision-making.
The designer role in mitigating the predicted negative impacts during construction.	Hypothesis testing.	Hypothesis testing.

5.5.6 Hypothesis testing

It was not the aim of the research project to 'prove' that some pre-conceived notion is true, the above questionnaires and interviews amongst other benefits were to test the pre-assumed hypothesis, baring in mind that the prime target in this respect to support the construction of the framework.

5.5.7 Case studies

Often, case studies employ a variety of data collection techniques. Unlike questionnaires and interviews when the case researched is the respondent and so a possibly large number of cases are researched for statistical significance, in a case study the case is the particular occurrence of the topic of research, (Fellows and Liu, 1997).

- Interviews may be used accompanied by collection of 'hard' documentary data.
- Questionnaires are less usual although they may be employed to gain, understanding of the general situation.
- A case study yields deep but narrow results. Commonly, it will employ triangulation both in the case study itself and to facilitate generalization of findings.

Patton, (1987) suggests that the depth and detail of qualitative methods typically derive from a small number of case studies, too small for confident generalizations. Case studies become particularly useful where one needs to understand some particular problem or situation in great depth, and where one can identify cases rich in information-rich in the sense that a great be learned from a few exemplars of the phenomenon in question. Field notes are descriptive for what has been observed, where they should contain everything that the observer believes to be worth noting.

The four case studies carried out in this research are to validate the constructed framework and find out after being piloted and refined that it is valid for implementation on real grounds. The case studies are carried out in Hurghada city-Red Sea, after conducting site visits accompanied by unstructured interviews not only to test the framework but also, to find out what has been implemented from the EIA output, in order to finally refine the framework.

5.6 The survey methodology discussion

Patton, (1987) mentioned that qualitative responses in relation to quantitative are longer, more detailed, and variable in content; analysis is difficult because responses are neither systematic nor standardized. Yet the open-ended response permits one to understand the world as seen by the respondent.

Triangulation was ideal to be adopted within study, however, most evaluation research involves quite limited short time frames, in the real world of limited resources, and attempts at triangulation may mean a series of poorly implemented methods rather than one approach well executed. Where possible, triangulation is highly recommended. Denzin, (I978) has identified types of triangulation amongst them: *Methodological triangulation*-the use of multiple methods to study a single problem or program, such as interviews, observations, questionnaires.

A limitation of the survey conducted within this research might be the limited number of the sample, where numerical values must be considered cautiously when interpreting the results of this research. Also, due to the unawareness with the term environment and its related terms could have made some questions ambiguous precisely on construction sites. It might have been better to carry out more case studies, but due to the timeframe, the case studies were limited to the mentioned number.

Another limitation of this research is apparent within objective three, where there is a lack of information regarding local environmental friendly materials, either from the scientific data point of view or even the suppliers provided information. The visit made to the Central Agency for Public Mobilization and Statistics was not of great support for the research area. However, the visit made for Housing And Building Research Center-Department of Raw Materials was of benefit for this area in providing Egypt's raw material map and the related industries, with the reservation on the lack of available scientific data.

Fellows and Liu, (1997) mentioned that although a number of texts are available discussing research methodologies and methods generally, there is a notable lack of such books in construction. Statistics, philosophy, natural and social sciences have produced relevant texts. Due to this notion, most of the reviewed literature within this research regarding questionnaires and interviews is based on the social science literature.

5.7 Conclusions

The fieldwork carried out is based on some technical understanding for the problem and as well of the production process and of the properties of materials. The adopted methodology is basically a combination between qualitative and quantitative techniques. Actually, it is based on the strengths of the triangulation approach within the context of an inductive methodology.

However, it is essential to be aware of the validity of generalizing the findings of a case study research project. It is important to be aware of methodological considerations, the advantages and disadvantages of particular methods, error sources possible bias for respondents coming from different disciplines as with this research in order that the validation of the study and, in particular, its results and conclusions can be appreciated.

CHAPTER SIX

RESEARCH FIELDWORK

Introduction

This chapter is demonstrating a major section from the conducted fieldwork, namely the questionnaires, interviews, and the site visits, where the case studies are *introduced* in the following chapter.

The questionnaires and interviews were carried out to accomplish the research objectives. As mentioned earlier, the objectives were divided into three main categories; *objective one* is to assess the current practices; o*bjective two* was aimed to study the factors affecting the decision-making process; and o*bjective three* is to investigate the available local alternative environmental approved materials.

Moreover, within the scope of the field study is the research hypothesis testing, such exercise was implemented on two phases; firstly, an initial testing during the questionnaires phase, secondly, the final testing during the interviews phase.

The initial testing was carried out through indirect questions, also through site observation, the direct testing was attained by implementing two approaches; indirect questions accompanied by site observations; and through direct question.

The questionnaires were tailored for the stakeholders operating on field, and were meant to comprise the different managerial levels, either horizontally, or vertically. Interviews were targeting a higher managerial level, where decisions are made. The attempt for this approach was to obtain views from the possible wide spectrum.

Before conducting the survey, key stakeholders were contacted in advance, and for the research benefit, a plan was preset for the interviews timing in relation to the initial fieldwork feedback. The following key personnel, Minister Of State For Environmental Affairs, Former Chief Executive Officer-TDA, and Former Executive Director-UNEP, were amongst others interviewed key players.

With respect to the third objective, it was carried out through conducting site visits to the locations of research interest, and meanwhile carrying out unstructured interviews. The output for the third objective is supported with photographs, mostly carried out by the researcher.

The structure of this chapter is based upon the following setup:

- The question heading is stated
- The reason this question was asked
- The benefit from the obtained answer
- The findings, either is it in a numerical output, or a content out put
- The findings' analysis, to discuss the numerical output, or the content analysis.

Finally, a discussion is preformed at the end of the chapter for the key areas that the fieldwork was initially based upon. The discussion is a balanced amalgamation between the fieldwork output, and the researcher reflections.

6.2 Objective-1

Current practice assessment.

Sample:
Project managers and contractors (30)
Operatives (15)
Analysis for objective-1 comprise findings across *the whole population at some* questions, also cross relations are made between answers from on-site feed back versus policy makers, developers, as well as designers

Note: The total number for the sample is 67, however the following percentages represent answers and not respondents, i.e. one respondent ticked 2 options is considered as two answers.

6.2.1 Area (1) - Tourism

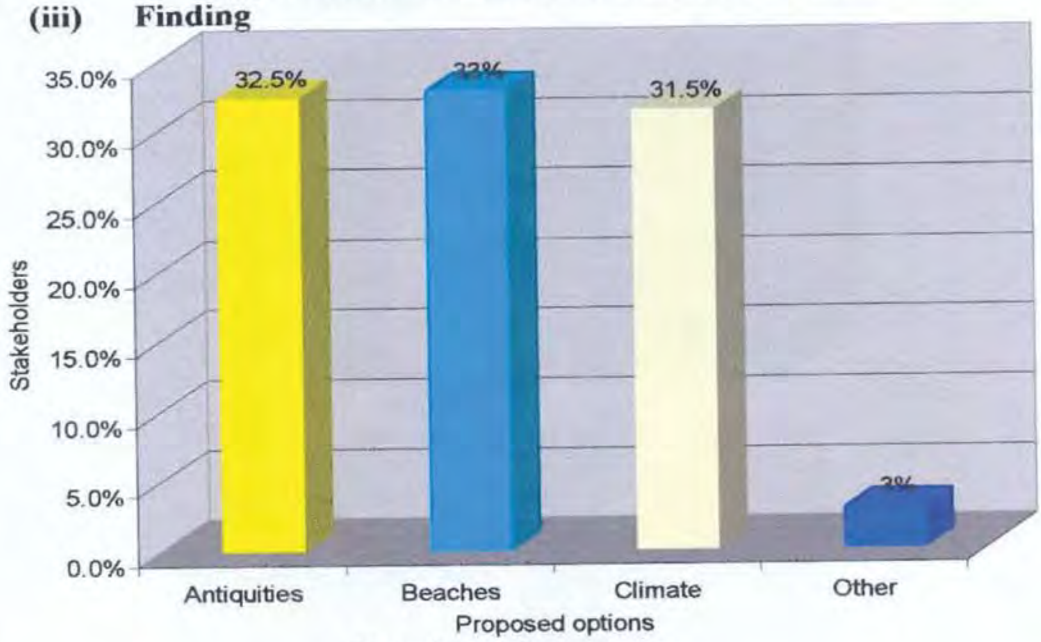
Question heading

6.2.1.1 Egypt's tourism assets.

(i) Reason
Awareness with the industry assets.

(ii) Benefit
The Egyptian tourism assets value for the stakeholders.

(iii) Finding



Egypt's tourism assets
Chart (6-1)

Analysis

The proposed options where almost at the same level of preference, for this sector, a slightly more emphasis has been made on the beaches asset. Although, the other assets are extremely crucial for the country, however, it has been expected that more emphasis on the beaches assets might be the case due to the relation between the targeted questioned segment and the type of projects they are involved in, indicating a level of awareness with the advantage the country posses.

Question heading

6.2.1.2 The impact of the coastal resorts on the environment.

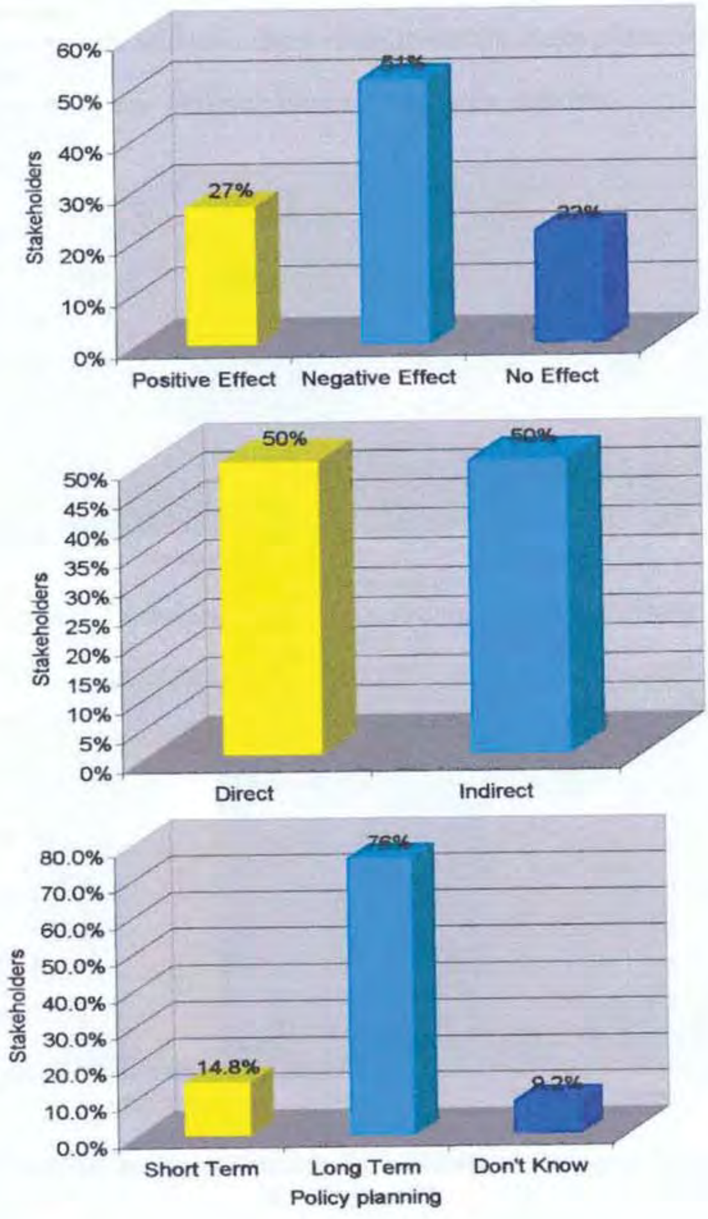
(i) Reason

Current practice assessment from a field perspective.

(ii) Benefit

An element to be used to evaluate the current design impact on existing developments.

(iii) Finding



Resorts effect on the environment
Chart (6-2.1.2.3)

Analysis

In general, the on-site feedback might give a reasonable impression with the level of awareness with the resorts impact on the environment. The percentages indicated that the negative effect is higher than the positive effect ranging between the direct and the indirect.

Question heading

6.2.1.3 Planning and policies for tourism zones in relation to economical goals.

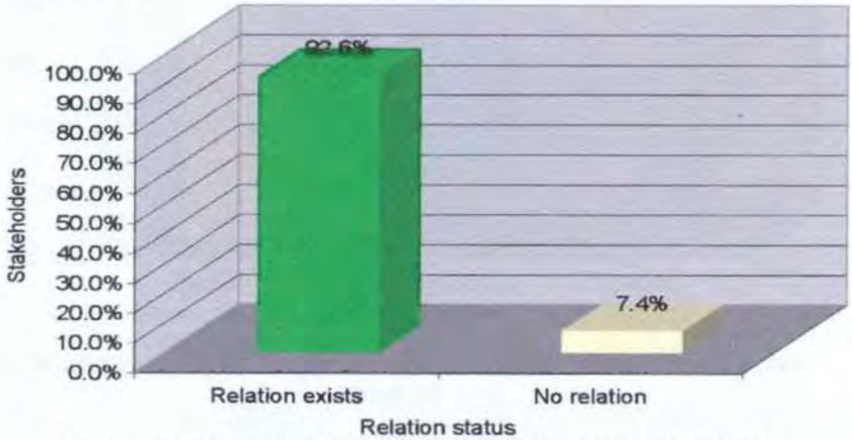
(i) Reason

Finding out stakeholders view towards state planning policies.

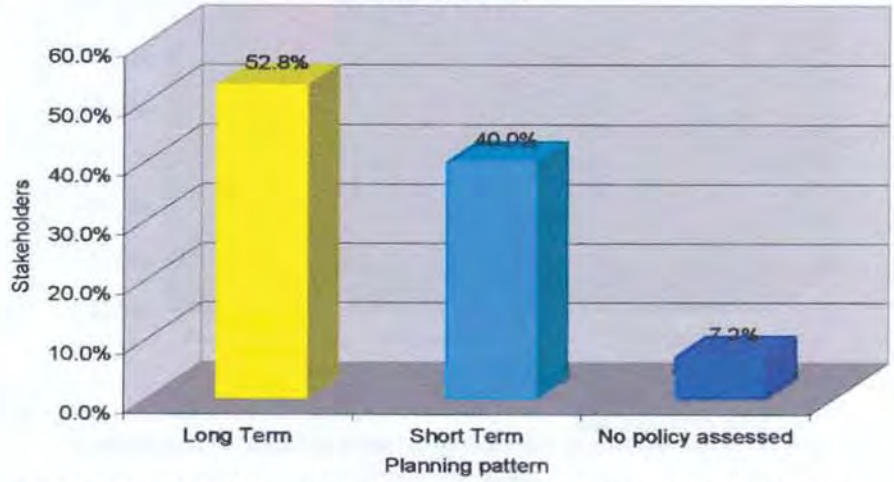
(ii) Benefit

Assessing the planner interaction with real life.

(iii) Finding



Relation existence between tourism and economy
Chart (6-3.1)



Economical policy planning in relation to tourism industry
Chart (6-3.2)

Analysis

The charts indicated that stakeholders are almost fully aware with the relationship between tourism industry and economy within Egypt. However, 40% noted that the state policies are short-term planned.

Question heading

6.2.1.4 Sustainable tourism principles perception on construction sites.

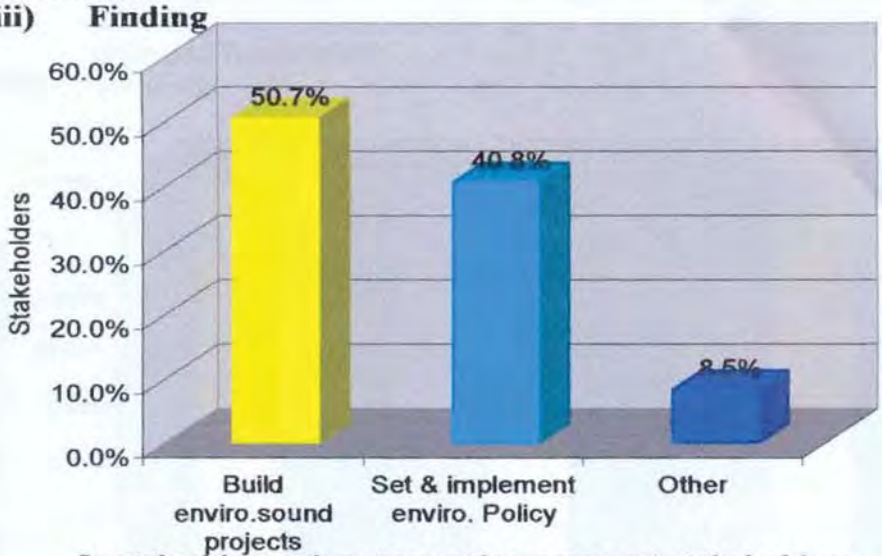
(i) Reason

What does sustainability within tourism means for this sector?

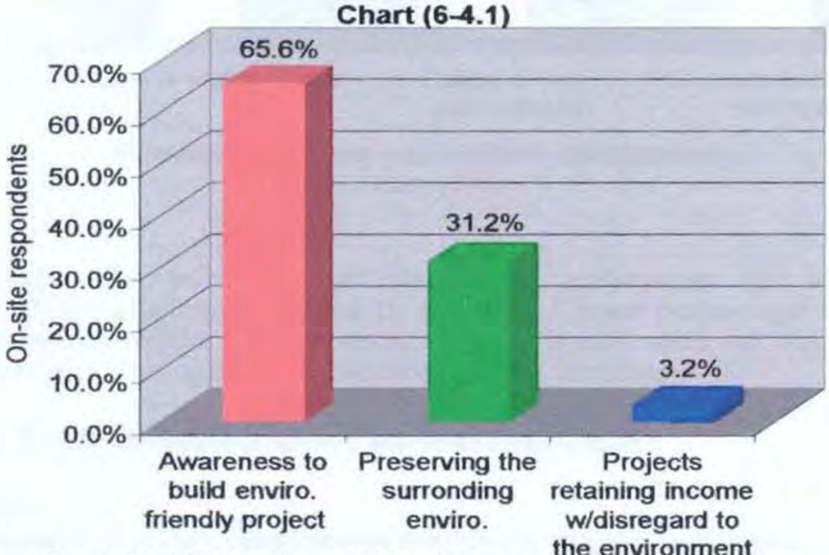
(ii) Benefit

A base to address the interviewed segment & to assist in framework structure.

(iii) Finding



Sustainable tourism perception amongst stakeholders
Chart (6-4.1)



Sustainable tourism perception on construction sites
Chart (6-4.2)

Analysis

The majority of the stakeholders noted that sustainable tourism meant for them-from the proposed options-building environmental sound projects. An emphasis should be made that environmentally sound projects wont exist unless environmental policies are set in advance, i.e. it the whole process, not only one aspect.

Question heading

6.2.1.5 Challenges facing sustainable developments.

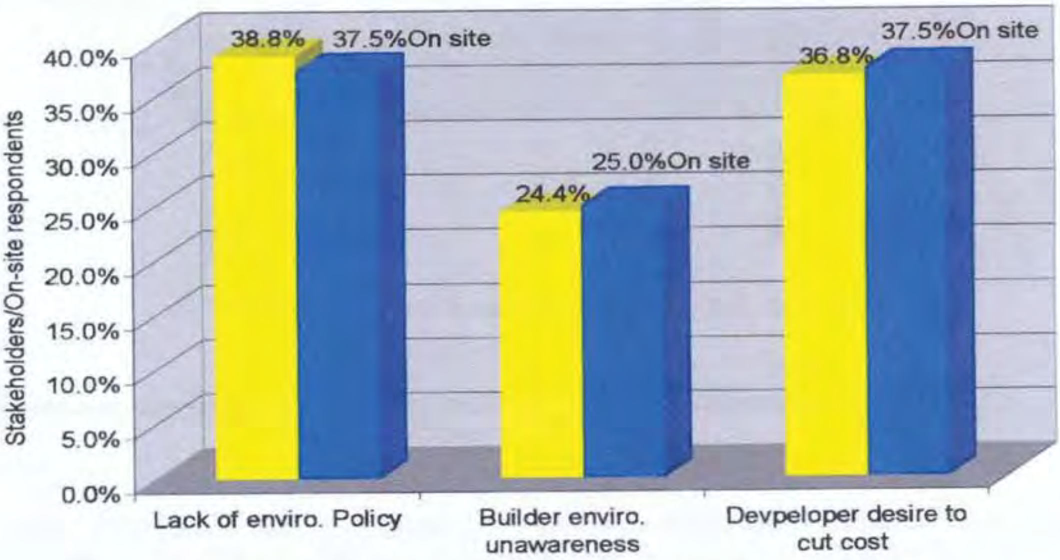
(i) **Reason**

What are the barriers to achieve sustainable development from a field point of view?

(ii) **Benefit**

Highlighting the level of awareness in order to pinpoint the obstacles in achieving sustainability as a one of the baseline data for the intended framework.

(iii) **Finding**



Challenges facing sustainable development
Chart (6-5)

Analysis

Generally, stakeholders pointed that the main challenges lie between lack of environmental policies and owner desire to cut cost. Lesser percentage indicated that the builders' unawareness might be a reason, but it is still one of the challenges. The stakeholders view is matching with the feedback from the site.

6.2.2 Area (2) Environment impact assessment-EIA

Question heading

6.2.2.1 Environmental policy implementation on construction sites.

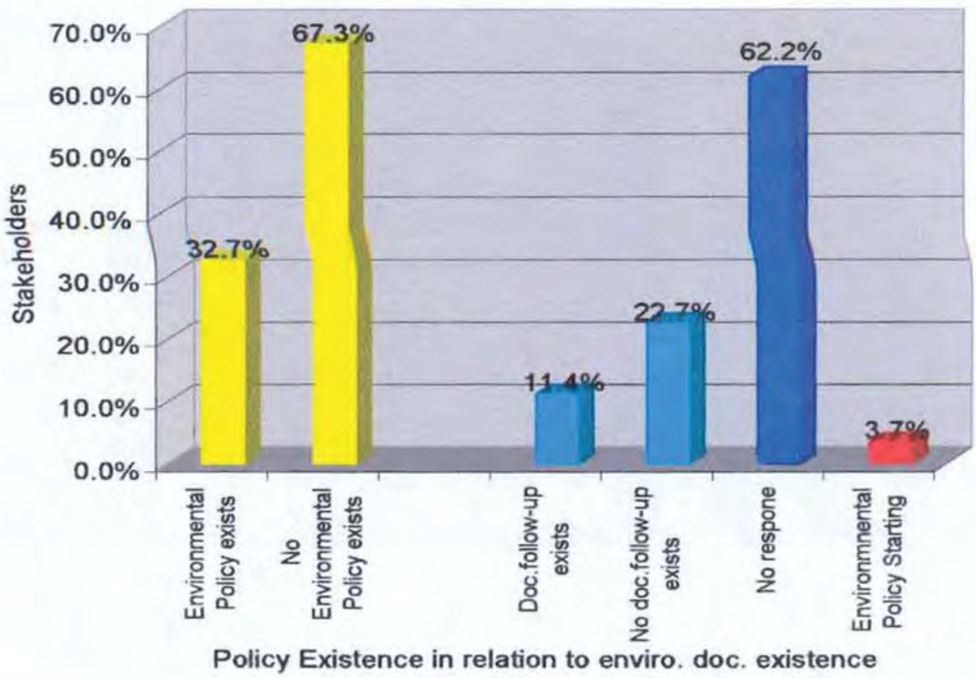
(i) **Reason**

Does it exist?

(ii) **Benefit**

Current practice assessment.

(iii) **Finding**



Detecting environmental policy implementation on construction sites
Chart (6-6)

Analysis

The above chart concludes that in general no environmental policy exists on most of the construction sites. Even the percentage indicating that policy exists, a whole view on the chart would show that the majority has no knowledge with any documents to follow up the policy implementation or its monitoring. Also, more than 60% didn't respond to the question, further a policymaker pointed that environmental policies on construction sites are starting to be implemented.

Question heading

6.2.2.2 EIA existence on site in relation to dealing with its major components.

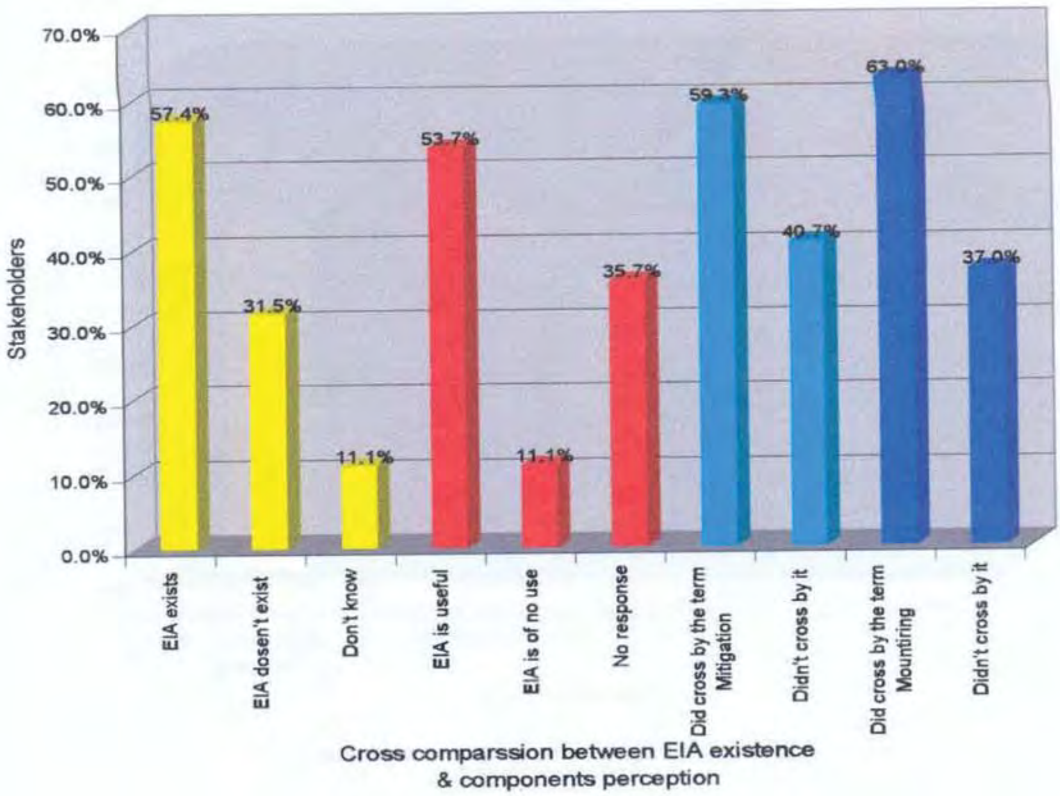
(i) Reason

Detecting the existence of the EIA on construction sites.

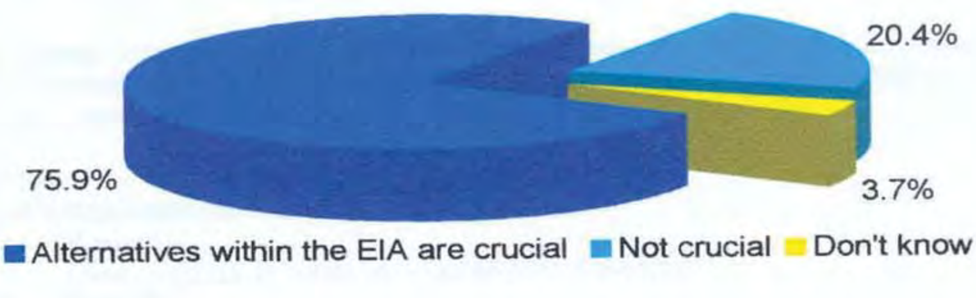
(ii) Benefit

Cross comparison to find out if EIA exists or not, also to cross relate with policy makers feedback.

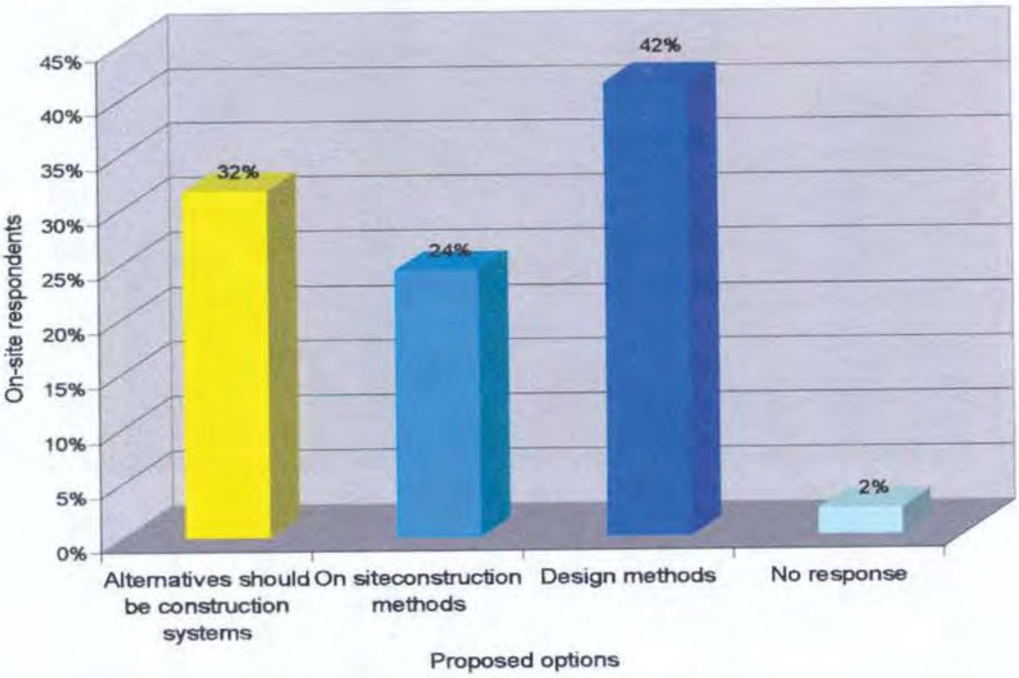
(iii) Finding



EIA existence on construction sites
Chart (6-7.1)



The importance of alternatives from stakeholders perception
Chart (6-7.2)



On-site alternatives approach rated
Chart (6-7.3)

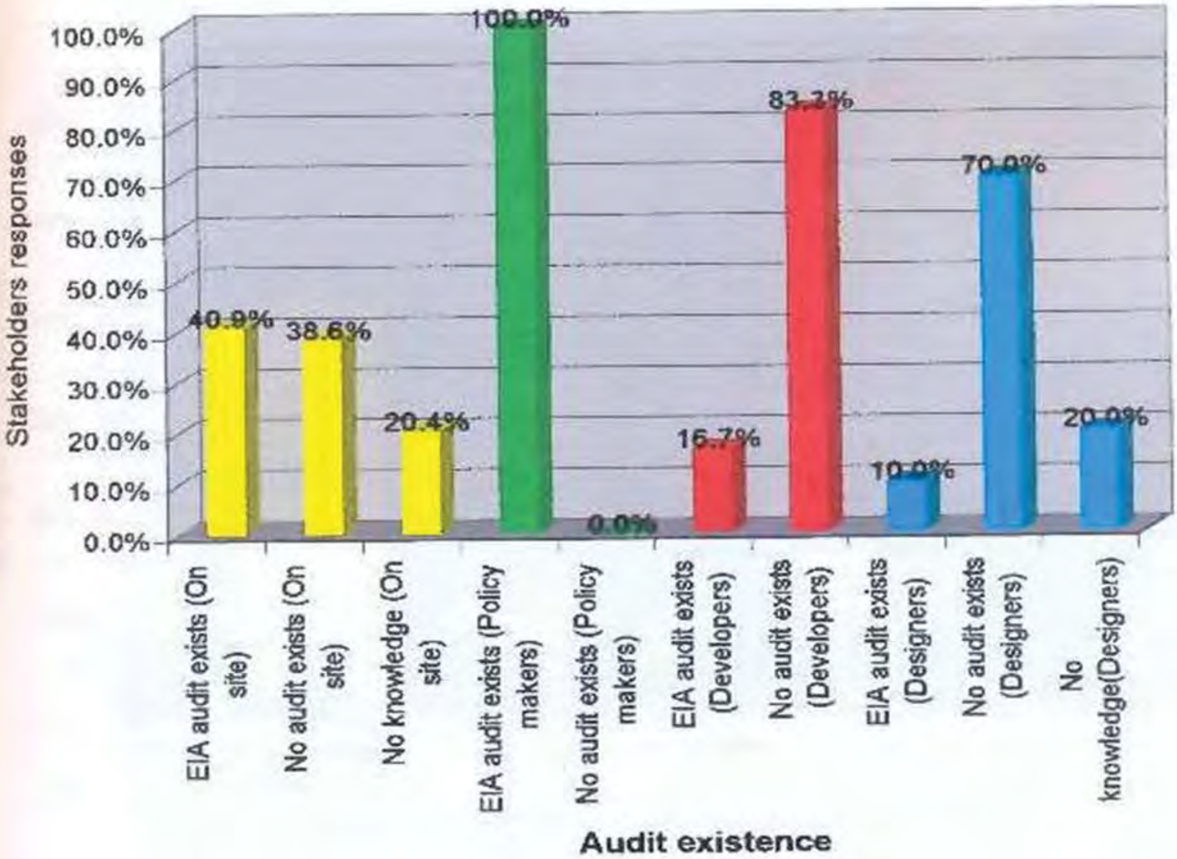
Analysis

The majority of the respondents pointed that EIA exists and found it useful, although the chart points that most of the same respondents didn't cross by some of the EIA major components-mitigation and monitoring. This reflects that even if EIA exists, it is of no essence; it is only a document to fulfill the project clearance.

Furthermore, the majority found that alternatives are crucial within the EIA; where they suggested that alternatives should be design methods, indicating the design process impact on the decision-making procedure.

Question heading
6.2.2.3 EIA audit implementation.

- **(i) Reason**
  Does it exist & what are the site procedures?
- **(ii) Benefit**
  Cross comparison with the interviews feedback.
- **(iii) Finding**



Auditing for EIA implementation
Chart (6-8)

Analysis

EIA process is taken a step forward by investigating if the EIA audit occurs on site. On site, the feedback is almost divided, either is it implemented or not implemented, however 20% has no knowledge, if it exists or not. Policymakers mentioned that auditing exists almost fully contradicting with the developers and designers. Although, the sample considered is a limited sample, however, it should be noted that this should highlight the gap between the stakeholders and the policy makers with its side effects on the whole industry.

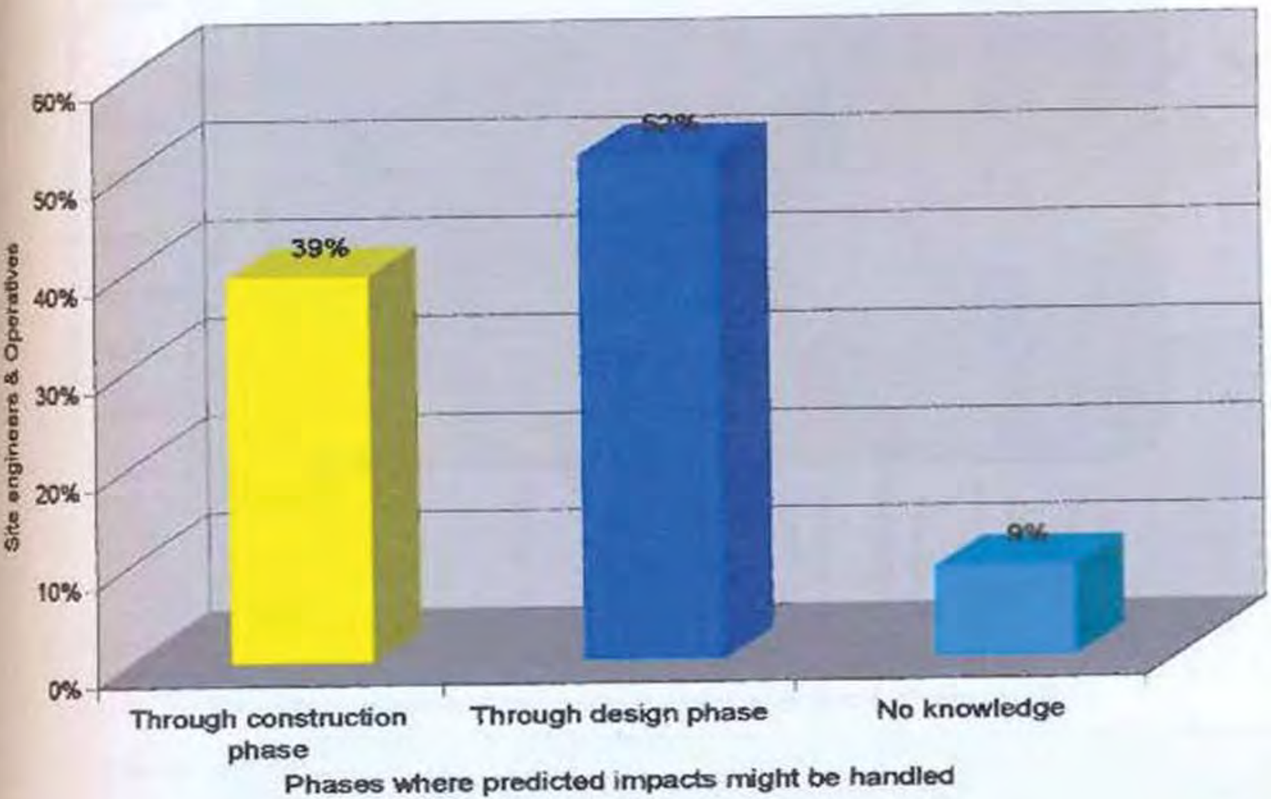
Question heading

6.2.2.4 Dealing with negative predicted impacts.

(i) **Reason**
Detecting at which stage it is expected that it should be dealt with.

(ii) **Benefit**
Highlighting this issue within the framework to raise the level of awareness.

(iii) **Finding**



Options in dealing with negative predicted impacts
Chart (6-9)

Analysis

Predicted impacts is a major element of the EIA process, 52% noted that it should be handled within the design phase, this might be a positive indication to detect the level of awareness that more than 50% for those on site would consider dealing in advance with the negative predicted impacts.

6.2 .3 Area (3)-Sustainable design and sustainable construction

Question heading

6.2.3.1 On-site sustainable development features implementations.

(i) **Reason**
Level of awareness, what has been done towards implementation?

(ii) **Benefit**
Points that need to be addressed within the framework context.

(iii) **Finding**

On-site environmental preservation existence Chart (6-10.1)

On-site environmental procedures implementation Chart (6-10.2)

Analysis

The chart results declare that preservation procedures are implemented on site. Although developers and designers noted that no environmental preservation procedures occur on site, this notion matches with the researcher own observation on the visited sites. Chart (6-10.2) highlights that when such procedures exist would be through company policy.

Question heading

6.2.3.2 Scarcity of resources and reuse.

(i) **Reason**
The field resources handling as one of the major sustainability elements.

(ii) Benefit
Current assessment feedback assisting in the framework structure.

(iii) Finding

Construction waste recycling
Chart (6-11)

Analysis

It could be concluded from chart (6-11) that construction waste recycling is minimal, further more most of the designers do not recommend recycling. Hence, it could be noted that the level of awareness within this crucial area is not high, and thus an emphasis should be made within the framework structure on this issue.

Question heading

6.2.3.3 Intelligent buildings design-orientation impact on energy conservation.

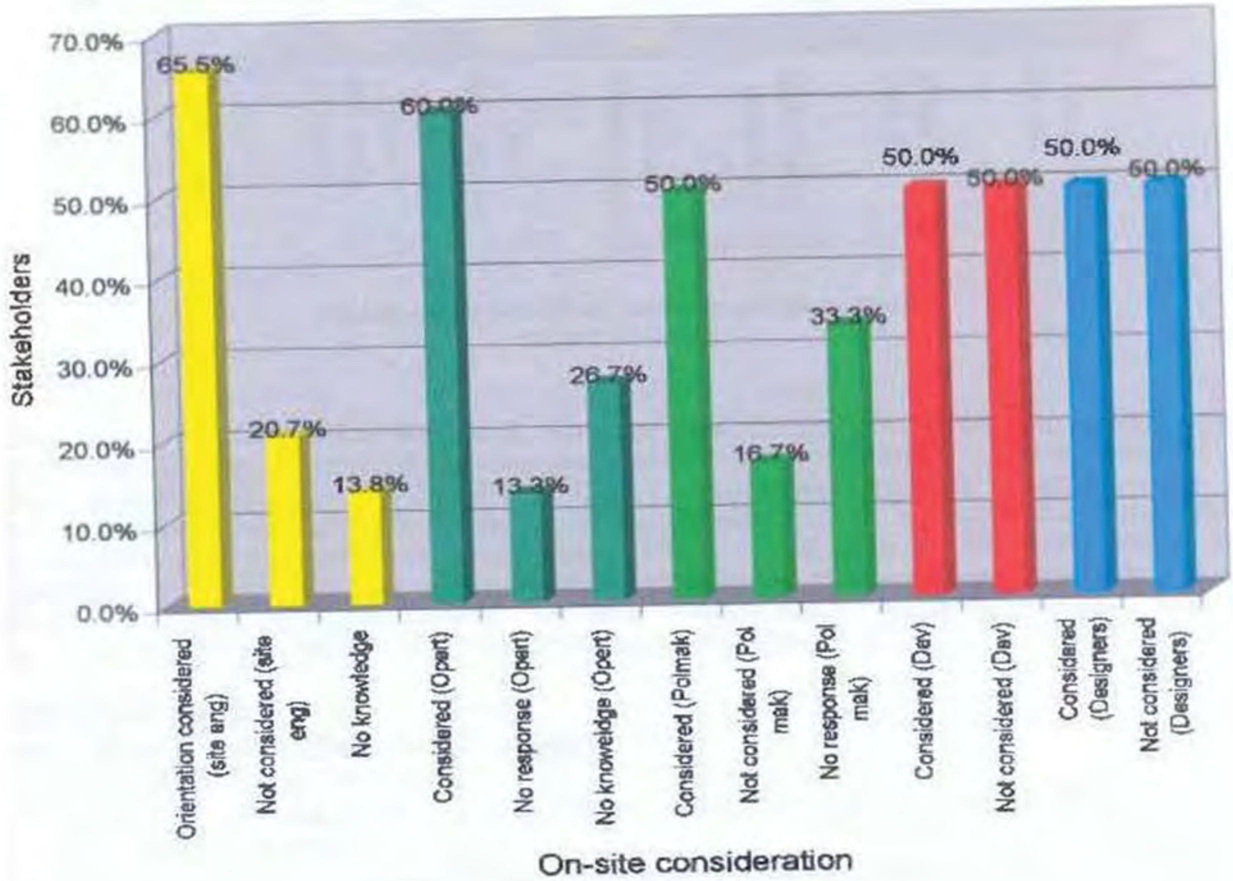
(i) Reason

Current assessment.

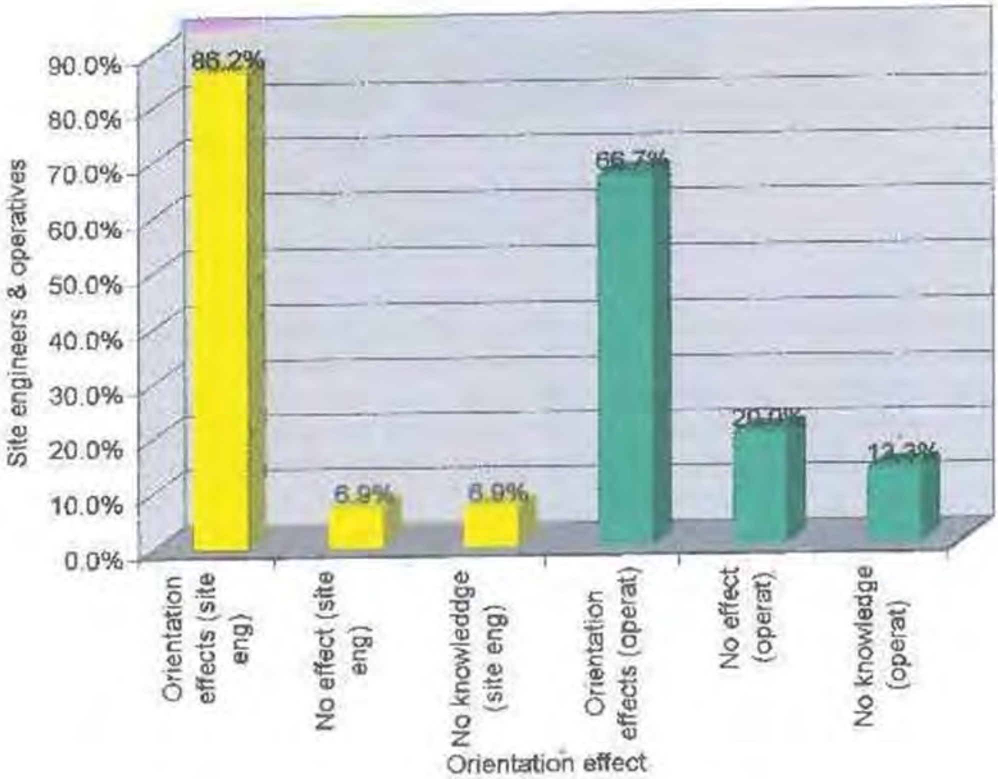
(ii) Benefit

The gap between research and real life, in order to consider the field feedback, as well as, cross comparison results within the framework context.

(iii) Finding



Building orientation consideration
Chart (6-12.1)



Orientation effect on energy conservation
Chart (6-12.2)

Analysis

With respect to orientation feedback, respondents basically indicted that orientation is considered. Although, 50% of the designers noted that orientation is not considered due to site determinants, some pointed that it is a luxury that couldn't be afforded. In this respect, it should be highlighted that there is confusion on site between the consideration of a sea view or a microclimate air streams. Chart (6-12-2) shows the considerable level of awareness for the impact of orientation on energy conservation; however, no real impact has been observed during the site visits, which declares the gap between knowledge or awareness and the measures that are implemented on real grounds.

Question heading

6.2.3.4 Material selection consideration.

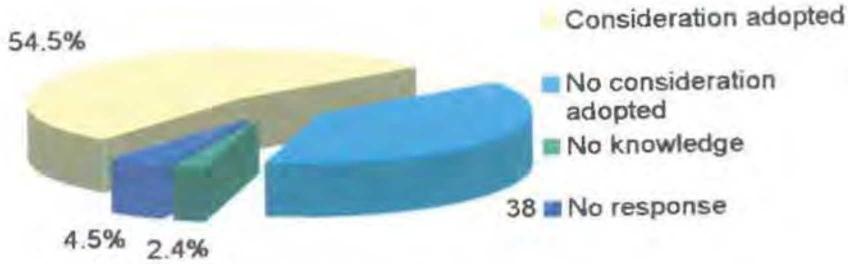
(i) **Reason**

What effects they produce on site from a field point of view.

(ii) **Benefit**

The architect's role investigated for further framework consideration.

(iii) **Finding**



Material selection consideration
Chart (6-13)

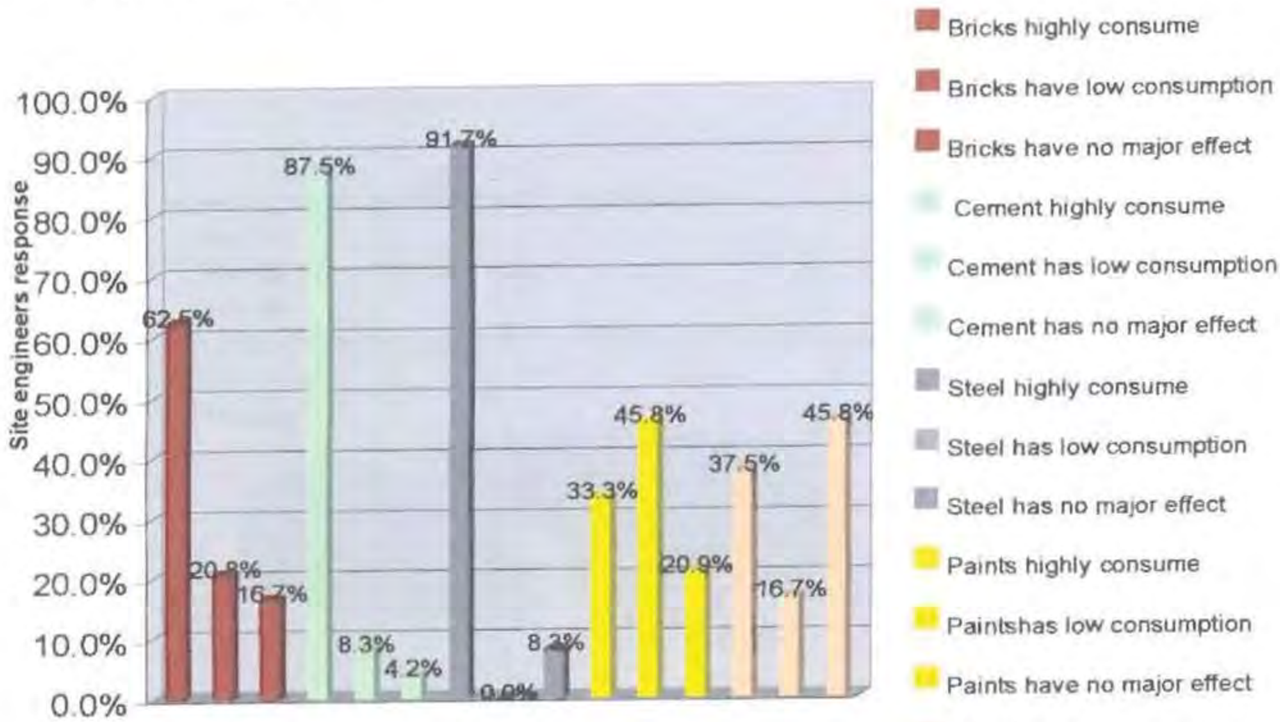
Analysis

More than 50% of the respondents noted that material selection is considered in order not to harm the environment, this notion might contradict with the site visits observations, where the initial observation indicated that material selections are traditional in general. This point highlights that the level of awareness for the on-site respondents need to be upgraded and that they ought to be introduced to programs that would raise the level of awareness in this respect.

Question heading

6.2.3.5 Materials energy consumption, on and off site (embodied energy)

- **(i) Reason**
  On site awareness with the properties of the used materials.
- **(ii) Benefit**
  Cross comparison with objective (3) feedback.
- **(iii) Finding**



Awareness for materials energy consumption
On & off-site (embodied energy)
Chart (6-14)

Analysis

Taking the investigation of materials a step forward, it could be noted that the level of awareness with respect to materials embodied energy is considerable, the question is how this level of awareness could be utilized during the design phase and interacting with those on site in order to obtain better levels of energy conservation.

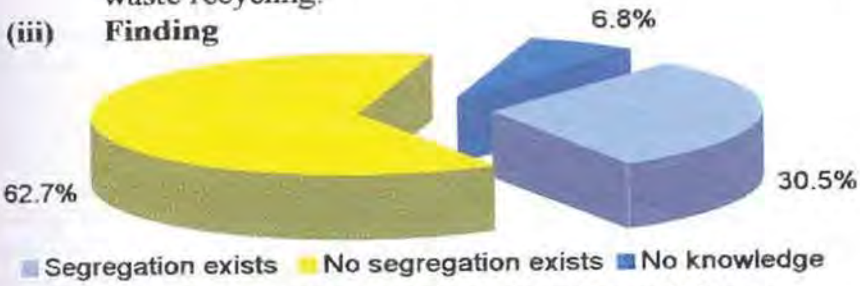
Question heading

6.2.3.6 Construction waste segregation and the economical benefit.

(i) **Reason**
Environmentally based or economically based.

(ii) **Benefit**
Using the data in order to interrelate environmental issues with economical issue within the framework with respect to construction waste recycling.

(iii) **Finding**



Construction waste segregation existence
From stakeholders point of view
Chart (6-15)

Analysis

The majority indicated that no segregation exists.

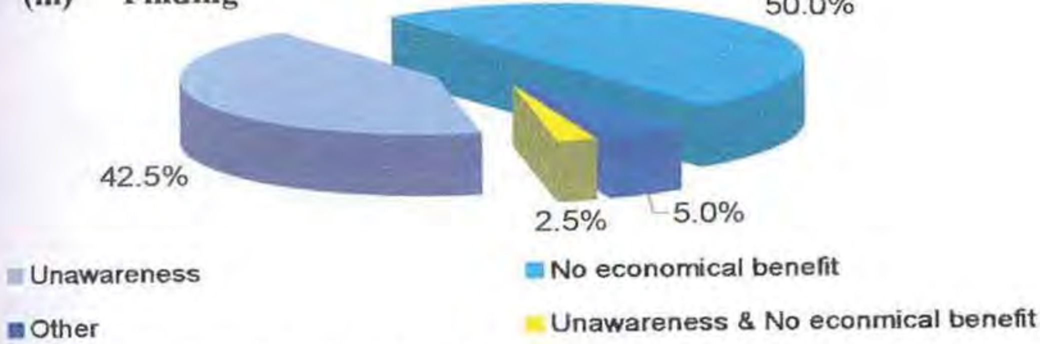
Question heading

6.2.3.7 Barriers against construction waste segregation.

(i) **Reason**
What are the on site barriers?

(ii) **Benefit**
Pointing out the barriers in order to tackle this issue within the framework.

(iii) **Finding**



Obstacles against waste segregation- Chart (6-16)

Analysis

The respondents were almost divided between the barriers towards segregation, are they due to uneconomical benefits or are they unawareness; less than 3% agreed that it is both. However, it could be added that unawareness could encompass both; hence a thorough study should be made to investigate the real economical benefits of construction waste segregation.

Question heading

6.2.3.8 Sustainable construction principals

(i) **Reason**
Finding out the principals from on-site point of view

(ii) **Benefit**
Basis for building up the intended framework

(iii) **Finding**

The project managers and contractors demonstrated different points, where several respondents have mentioned design consideration for the microclimate conditions. Also, the appropriate material selection for the surrounding environment, taking into consideration compliance with specs, moreover choosing materials to stand the coastal environment.

Further, it has been suggested that there should be no client interference with the materials specs in order to cut cost. It has been added that the industry should only use trained operatives, implementing quality, projector manger added 'do it right from the first time, but this should be followed by control form the authorities.

It has been mentioned that proper codes for design and construction is a must, precisely for the electro-mechanical lifetime, also consideration for future extensions.

One of the site engineers summarized the subject into the following points:

- Preserving the local environment
- Serving the society- by creating jobs
- Income for the country with no negative effects
- Accuracy and professional ethics in design and construction

Other noted that it is builder awareness and a stick and carrot approach must be followed within the industry, finally, a project manager subjected that it all boils down to the professional ethics.

Analysis

On-site, the issue is basically referred to awareness; aware design, aware construction and aware builder. From the points that need to be focused on is material selection, from specification compliance to microclimate appropriateness, especially coastal environment. Also, the points that have been raised are the socioeconomic aspects that need to be considered within the industry.

The final aspect highlighted by more than one respondent, as a keystone within the whole issue; is professional ethics, with all that this term might comprise.

6.3 Objective-2
Factors affecting decision-making.

Interviewed population:
Policy makers (6 interviewed)
Owners (6 interviewed)
Designers (10 interviewed)

Amongst the interviewed population, the following figures have been interviewed;
Prof. Dr. Mostafa Kamal Tolba
Former Executive Director- UNEP
With the rank of Under-Secretary-General of the United Nations.
Dr. Nadia Makram Ebeid
Former Minister Of State For Environmental Affairs.
Dr. Adel Rady
Former Chief Executive Officer.
Tourism Development Authority-TDA, Ministry Of Tourism.
Dr. Ismail Osman
Former Chairman for The Arab Contractors (65,000 employees).
Geologist Mohmed Hassanan
The Head of the Environmental Department,
Tourism Development Authority-TDA
Geo-Environmental Consultant

6.3.1 Area (1) - Tourism

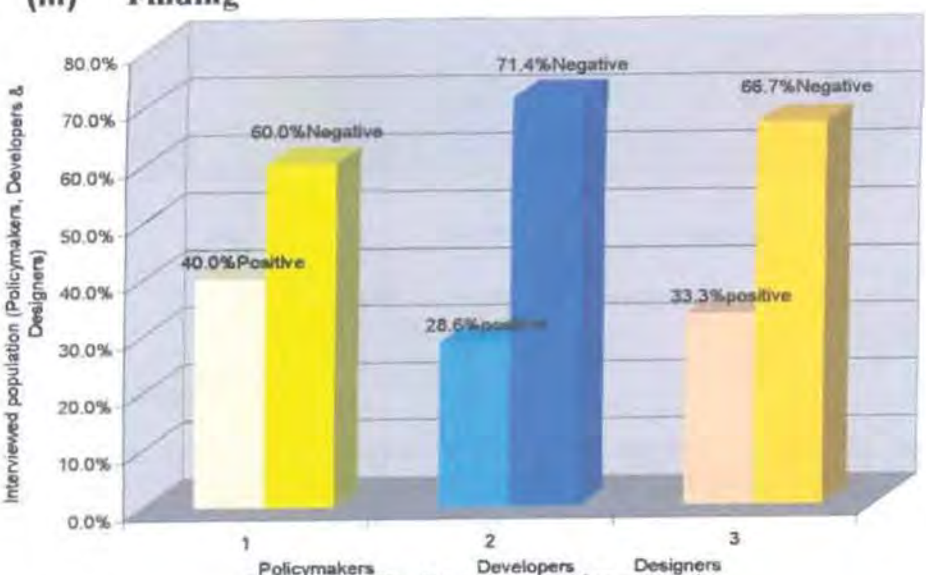
Question heading

6.3.1.1 The impact of the coastal resorts on the environment.

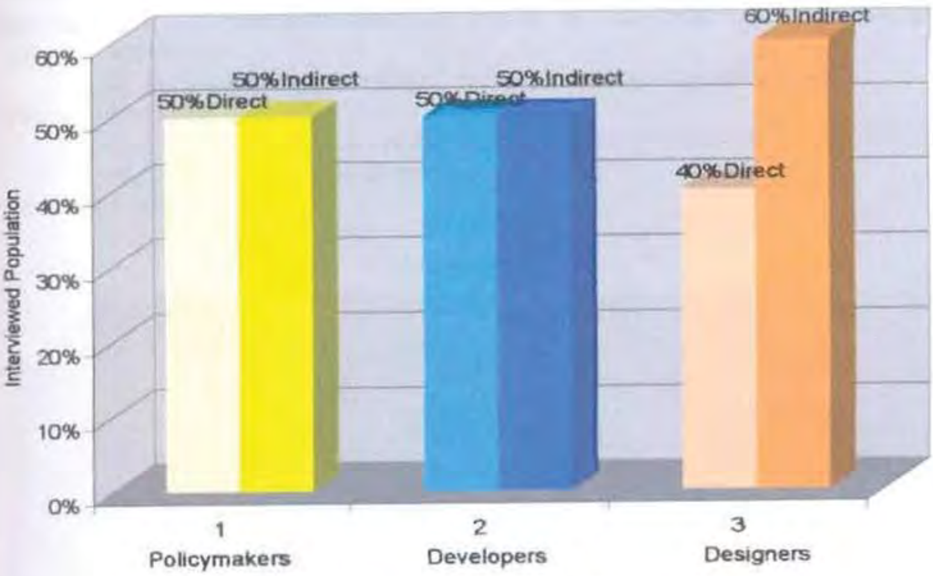
(i) **Reason**
The level of awareness amongst this category of stakeholders.

(ii) **Benefit**
Baseline data to highlight the awareness level in order to tackle this issue within the framework.

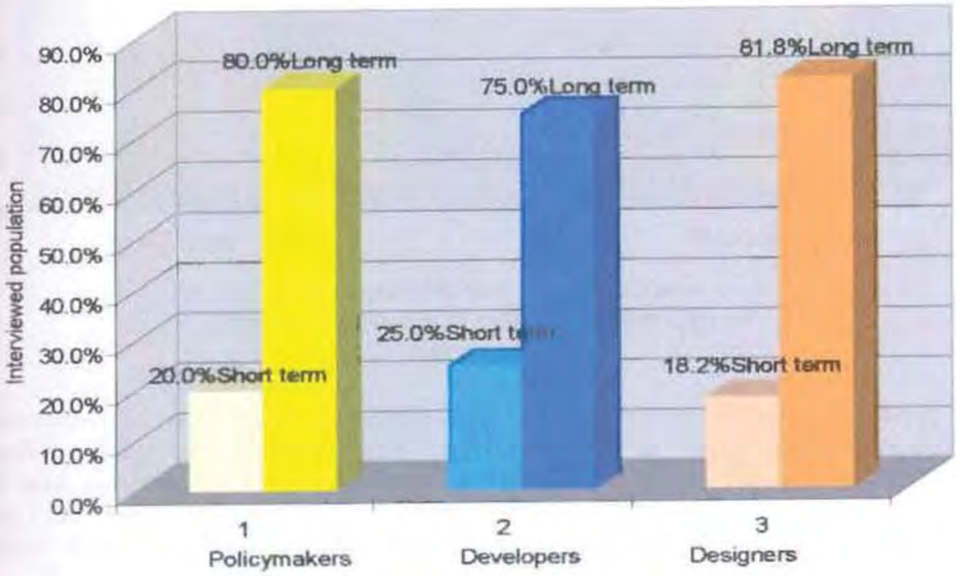
(iii) **Finding**



Resorts effect on the environment
Chart (6-17.1)



Resorts effect on the environment
Chart (6-17.2)



Resorts effect on the environment
Chart (6-17.3)

Analysis and interpretation

Most of the interviewed population found the resorts negatively affecting the environment. Also, they found it is generally long termed effect, ranging between direct and indirect, matching with the on site respondents feedback. It should be questioned if the majority bas the view that the resorts have a negative impact on the environment, how did this affect the decision-making process.

Question heading

6.3.1.2 Planning and policies for tourism zones in relation to economical goals.

(i) **Reason**

If they are implemented, how they are implemented?

(ii) **Benefit**

Cross relation between policymakers view and the field feedback, by highlighting the gap-if there is any.

(iii) **Finding**

The relation between tourism and economical policy within Egypt
Chart (6-18)

It has been noted by the policy-makers that it is short term relation, since it is a fragile industry affected by any action, and others found it long term, since investment is conducted and profits for a project might pay back after 15 years, these contradicting views have been summarized by Dr. Ebied where she has suggested that it is both short and long term relation.

Analysis and interpretation

Policymakers view is almost 100% contradicting with the developers' view, where they found that the policy in Egypt is based on short-term base, precisely; developers are not impressed with the state policies within the tourism industry.

Question heading

6.3.1.3 Sustainable tourism principles perception.

(i) **Reason**

How is sustainability within tourism perceived for developers?

(ii) **Benefit**

Understanding how developers ought to be approached within the context of the intended framework.

(iii) Finding

Form a developer point of view; sustainable tourism principles would be establishing policies based on short and long term plans, integrating the developers' efforts to achieve the targeted plans by pointing out each role description. Government provides facilities and marketing the product. Having only one governmental entity to deal with the issue. Providing rooms, services, infrastructure and upgrading what is available. Training those involved in this industry through specialized institutions. Creating new attraction points.

Analysis and interpretation

For policy makers and designers, they tend to take the line that sustainable tourism would be based on setting and implementing environmental policies. Where developers suggested that they should have a say in such policies and there should more facilities provided in granting projects clearances. Moreover, they referred it to upgrading those involved in the field of tourism. Cross-relating the above with the on-site respondents views, it is clear that it is more crucial for those on construction sites, policies implementation into tangible aspects as environmental sound projects.

Question heading

6.3.1.4 The relation between sustainable development and sustainable tourism

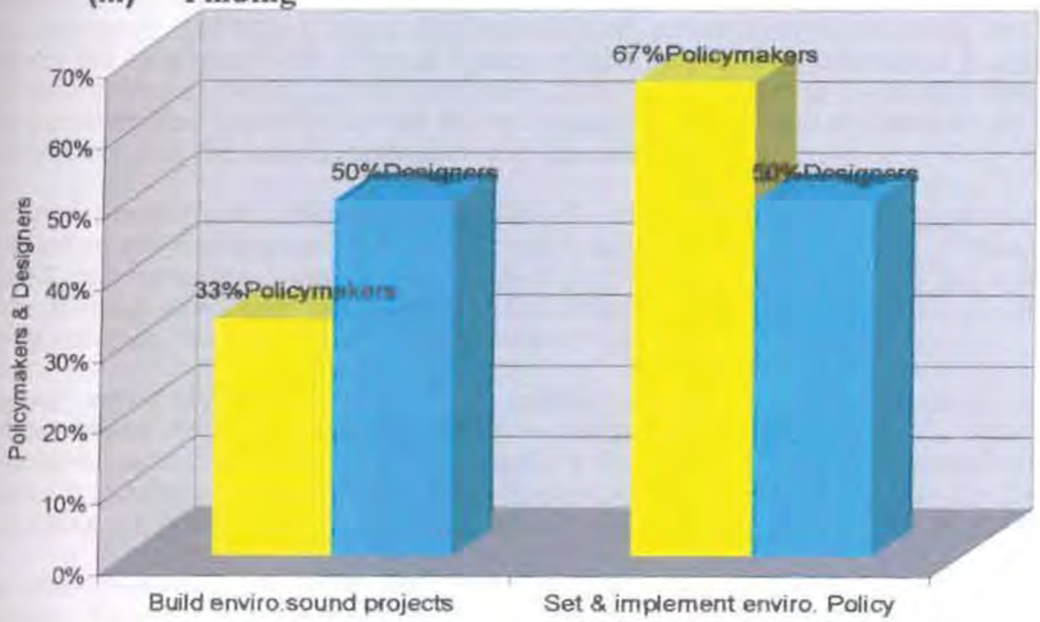
(i) Reason

Finding out how strongly sustainability within tourism is related to the concept of sustainable development.

(ii) Benefit

Better understanding why the current situation has been reached. An attempt to identify the distinction between the two sides of the coin, amongst developers and designers.

(iii) Finding



Sustainable development principals perception - Chart (6-19)

Developers suggest that over development kills sustainable tourism. The two grow directly proportional. One designer noted that sustainable tourism is a component of sustainable development. Alex beach is a striking example for sustainable tourism, the beach is not a limited ownership, and if this has been implemented we would have reached the Spanish experience. We should have more rooms to be interesting for the tour operators.

Analysis and interpretation

In general, there is almost consensus that the two components complement each other. However, the issue raised by one designer related to the Spanish experience demonstrates the level of unawareness amongst some architects in this regard. The Spanish experience has been tackled within the literature, where it has been proved that the development pattern adopted has been responsible for the environment destruction.

Question heading
6.3.1.5 Sustainable development principles.

(i) **Reason**
Finding out the essence of sustainability from their perspective.

(ii) **Benefit**
Comparing the output with the literature in order to amalgamate what would fit to the Egyptian context with what has been indicated.

(iii) **Finding**

Dr. Tolba noted that sustainability means that the three components economically, environmentally and socially should be acceptable. The environment should not be disturbed, no misuse of the market resources in any sector, each type of development would need its own type of management, also each type would have its own type of EIA. Dr. Ebied added that its more than one aspect, policies translated into action programs implemented into reality. Human developments are human resource base. It's a participatory approach- government level, private sector and civil society (NGOs). Dr. Rady mentioned that apart from the stereotyped statements, preserving the attraction assets for the developers. Dr. Osman further noted that it is a continuous economical and social return. Social return, if it is conducive to better utilization of natural resources and more environmental friendly, it would be conducive to more sustainable development. The environment is the whole institution not the environment per se.

Developers viewed it as maintaining the reason why are people coming, considering that the impact of the development would kill the reason people are coming. Some consider it as for all developments related infrastructure to be upgraded. Also, to provide database for the building materials available in the area, establishing factories to prepare the building materials, bearing in mind that it will not pollute the environment.

Designers argue that preservation of natural resources, and providing economical activities related to that context. Public participation would allow for the benefit of stakeholders. Social benefit with no impact on the environment, accompanied by proper planning. A newly graduate architect mentioned that we should search for the roots, if people are upgraded, developments can exist.

Some other respondents added that it is providing awareness for people starting with childhood. Maintaining the development location ecosystem. Using environmentally complying technology and the local community. Taking into consideration the microclimate, not imposing buildings that are not compatible with such climate.

Analysis and interpretation

The above-mentioned views have been briefed by Dr. Tolba where he suggested that the three components, economically, environmentally, and socially would make sustainability acceptable. But again, the level of awareness for developers is questioned, bearing in mind the key role they are playing within the context of development. Furthermore, the on-site views not realizing the importance of environmental preservation.

All these elements combined together would dictate a different pattern in the decision-making process with the negative impacts that might affect the environment on the short and the long term.

Question heading

6.3.1.6 Challenges facing sustainable development.

(i) Reason
What are the barriers to achieve sustainable development at this level?

(ii) Benefit
Highlighting the level of awareness in order to pinpoint the obstacles in achieving sustainability as a one of the baseline data for the intended framework.

(iii) Finding

The Head of the environmental Department-TDA, suggested that there is no governmental capabilities to follow up law implementation. Also, no coordination between involved parties. Dr Eibed mentioned if you do not have the right policy, you don't have the map to guide you. If the policy didn't set a strategy for the developer in handling his project, the owner target would be only profit; the developer would not consider the environmental aspect.

Dr Rady added that follow up requires organizations and high tech equipment; we only count on subjectiveness in follow up. However, Dr. Tolba highlighted that the blame is shared, since tourism development was based on dividing land with no real EIA and social impact.

Developers see that the project economics will dictate actions implemented. Feasibility studies are misleading, the performance of figures is not clear. There is no policy in the first place, follow up is almost zero, and the contractor is generally unaware.

They further pointed that the assets that make such development attractive should be maintained. The contractor is unaware where the damage occurs during construction and not through operation. At certain cases the developer doesn't want to cut cost, but the designer is not fully aware with the data.

Designers argued that the policy is not widespread, no one is aware of what is the real essence of sustainable development. The aim is the gains, and even if the policy occurs, it is not complied with. A general unawareness from stakeholders is dominating.

Analysis and interpretation

Essentially, it is a lack of capabilities, miss-coordination between involved entities. Further Dr. Tolba sees that the blame is shared, since tourism development was based on dividing land with no real EIA and social impact. One developer found that the project economics are the real determinant in this industry.

The stakeholders' lack of awareness for the real essence of the sustainable development principals is clear, so how would the decision made be trusted to lead to sound sustainable developments. Furthermore, developers view the contractor (builder) unawareness is a challenge although chart (6-5) indicated a low percentage for the builder responsibility.

6.3.2 Area (2) - EIA

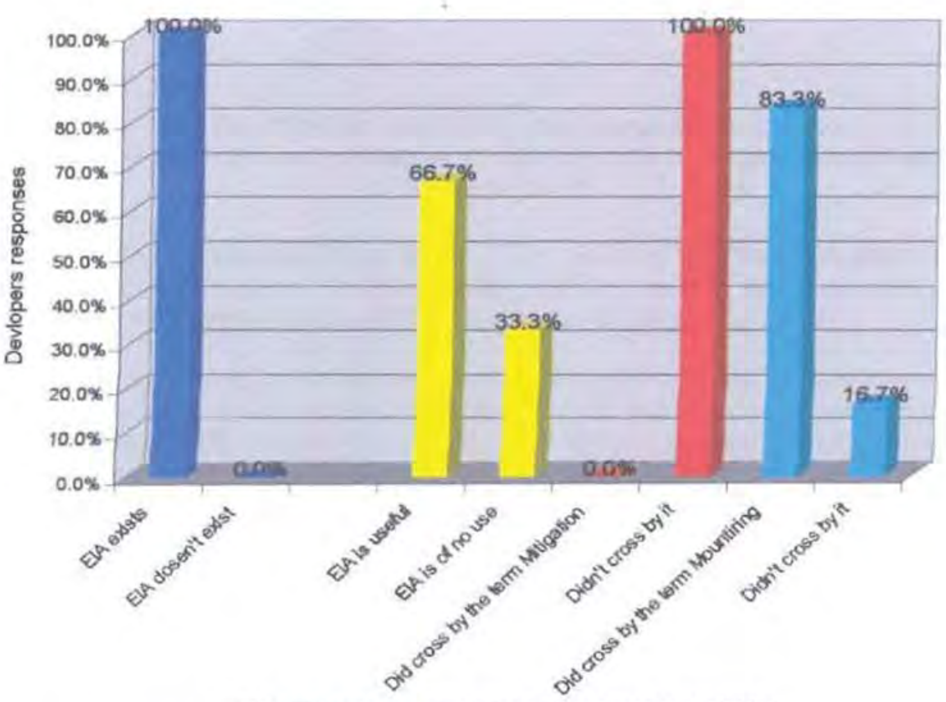
Question heading

6.3.2.1 EIA existence on site in relation to dealing with its major components

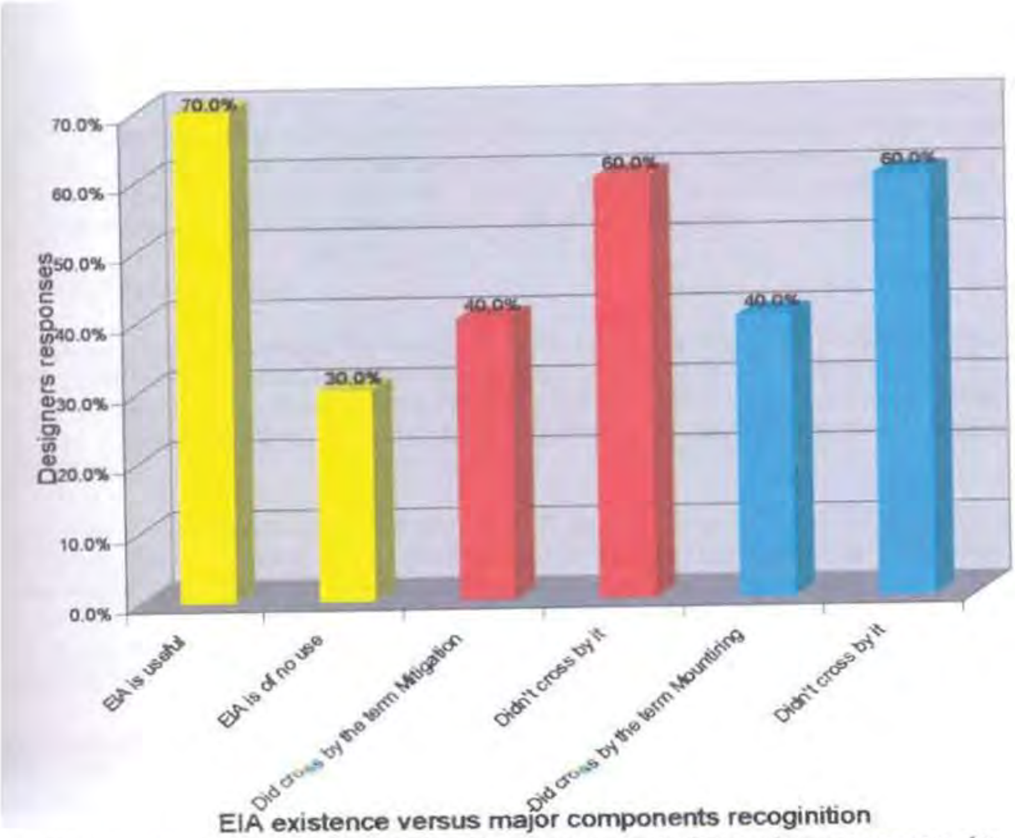
(i) **Reason**
Does it exist, so how it has been utilized on site?

(ii) **Benefit**
Is the EIA just a document fulfilled in order to grant a project license?

(iii) **Finding**



EIA existence on site in relation to dealing with its major components
Chart (6-20.1)



EIA existence on site in relation to dealing with its major components
Chart (6-20.2)

The head of the Environmental Department-TDA pointed that the EIA started in Egypt in 1994, implementation begun in 1995, the current status is a normal and logical development, and now awareness is prevailing amongst those involved.

Dr. Eibed noted that the EIA is the safety valve, trying to avoid the negative impacts and building on the positive side. Dr Rady criticized EIA by mentioning that it is a tool but still lacking other aspects, the person in charge of the environment is not yet well defined. Immature profession, the profession needs proper organization, it appears as the engineering profession within the 19th century. Bearing in mind that we are a Third World country, setting rules is something easy, but where is the base line data, GEF has conducted a research, but it is a general research.

Dr. Tolba noted that as a member of a general committee, we have tried the impossible to reach a consensus. The carried out research goal was to identify the activities an set out the planning for each sector, starting from the Suez gulf up till Eden gulf. The conclusion was a failure; basically, stakeholders are working in islands.

Developers pointed that it might be powerful tool if it is carried out and implemented properly, for Hurghada it is already too late. Other developer added that it is not useful, since it is not realistic in our current situation, no policy and unawareness prevails. Developers are business oriented and hence awareness should be initiated from the government. Other developer added that it is a joke because it is not taken seriously in most cases.

Designers think that it is only effective when the project is large, the microclimate will change, and as the project size is large. It would be effective if the consultant carrying it out follows the professional ethics. In the current status, it is just some documents that are not respected; it needs real audit not just approval. If proper givens were provided, the final outcome would be proper as well. Aimed results would be achieved in a shortcut manner. It is not useful because there is no audit implemented.

Analysis and interpretation

From the above chart, it seems that even if EIA exists, it is of no essence, matching with the on-site feedback. Where, most who dealt with the EIA didn't cross by its major components. Amongst policymakers contradictions exist, where Dr. Rady heavily criticized EIA. Moreover Dr. Tolba concluded that through his own experience planning was total failure.

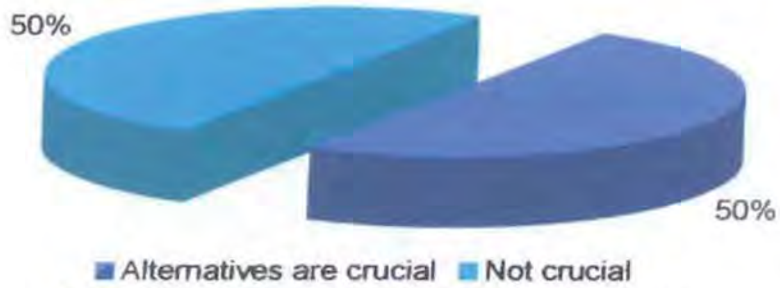
Developers have a negative view towards EIA and this is due to the applied pattern of implementation. Furthermore, some designers are not aware with the accumulative effect that resorts might create on the environment.

Finally, EIA is not appropriately received due to improper planning and unawareness; obviously, this is a pitfall within the decision-making process.

Question heading

6.3.2.2 The EIA role in providing alternatives.

- **(i) Reason**
  Do stakeholders realize how crucial is alternatives within EIA?
- **(ii) Benefit**
  Further assessment for the role of the EIA on the real grounds.
- **(iii) Finding**



Alternatives within EIA developers & designer
Chart (6-21)

The head of the environmental department-TDA mentioned that his role as a policy maker is limited where he only revises that certain percentages have been fulfilled. Dr. Ebied noted that it is the process of choosing the best options to minimize the negative impacts.

A developer viewed it as directly related with the developer business; no search for a solution, simply we wouldn't have guests. When it is directly affecting my business, alternatives would be provided.
One designer pointed that there is no one right answer, in the design process, each alternative should be assessed and then reassessed up till the final solution is reached

through a compromise. Other points that it should be a format and you as a designer you just fill in the blank.

Analysis and interpretation

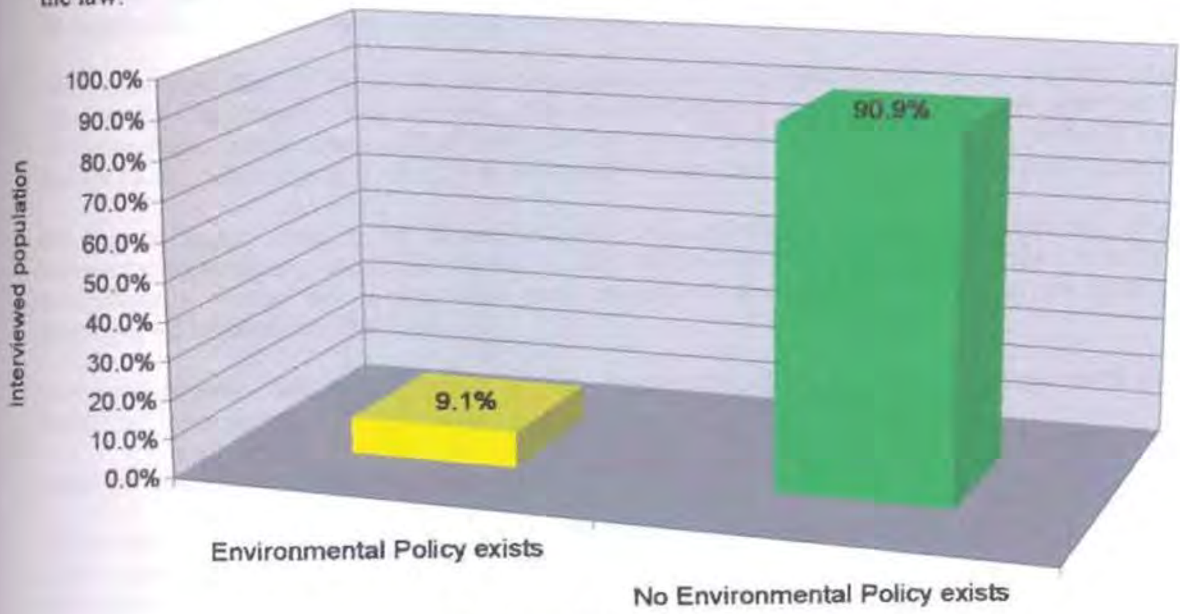
If unawareness is the main theme amongst the developers, so how would they assess what is affecting the environment and what is not? Unfortunately, this crucial element is not taking its right weight within the EIA process.

Question heading

6.3.2.3 Environmental policy implementation on construction sites.

- **(i) Reason**
  Is it adopted? And how? And why from the interviewed point of view is it adopted?
- **(ii) Benefit**
  Comparing the literature data with those involved perspectives.
- **(iii) Finding**

Policy makers argue that the law is supposed to be a policy, in this context, law #48, #62 and #93 define handling resources and waste disposal. Awareness is more important than the law.



Environmental policy existence on construction sites
Chart (6-22)

Analysis and interpretation

Unfortunately, it seems that there is no environmental policy existing on construction sites, matching with the on site feedback. Totally, contradicting with what has been mentioned within the studied literature, the quality of the final product would be questioned-environmental wise, if the policy does exist in the first place.

Question heading

6.3.2.4 EIA audit implementation.

(i) Reason

Is such practice implemented, if so by whom? How its function value appreciated by each of the stakeholders?

(ii) Benefit

Testing the level of implementation to evaluate the factors affecting the decision-making, also comparing the policy maker view with those involved in the industry.

(iii) Finding

The Head of the Environmental Department-TDA mentioned that the audit exists to empower the EIA study recommendations. Through well-trained staff, consultants and a work plan, also we have in the TDA a portable lab. Dr. Ebied suggested that it is inspection and not audit, are the EIA recommendations implemented or not. This is handled through the "preservation sector" within the ministry, checking if there is any environmental logbook or not, and hence revising this logbook.

Dr. Rady argues that the follow up should rely on the partnership approach and not on a "police" approach. Since this "police" approach would let the developer find a way to sneak around it and the pitfalls wont be cured. The EIA procedures should be more facilitated, some developers don't carry out the EIA not to skip this step, but because of unawareness. We have now different EIA categories and formats have been provided.

Dr. Tolba sees that if the EIA recommendations are implemented for a certain project, what about the global point of view, the audit mostly is only administrative and not field. Unfortunately, some unqualified individuals carry out EIAs. (The EIA should not be limited to the project but it should be handled within the context of the involved zone).

Developers noted that it is dependent on the personal ethics. Through an absolute bureaucratic manner, contradictions occur between the TDA and the ministry of environment. There no a one-plus-one situation, flexibility must exist to assist the developer to implement the EIA.

Designers argued that if it existed in the first place, it would be Just argument on the beach 'set back area'.

Analysis and interpretation

The on site feedback mostly contradicts with the policy makers view. However, Dr. Rady view is more realistic, although it is only critique with no plan of action proposed. But this could initiate a more appropriate approach in the decision-making process.

Question heading

6.3.2.5 Dealing with negative predicted impacts.

(i) Reason

How is it approached by each of the key players?

(ii) Benefit

Is their any consensus on mitigation methodology- as a key element in the framework structure?

(iii) Finding

The Head of the Environmental Department-TDA demonstrated that according to our limited resources, the developer is informed that there is a defect. If an available solution exists, hence it would be provided.

Dr. Ebied suggested that a study into what are the options provided, the best 'top-notch' experts provide us with the options, and with the developer himself we try to understand why it is negative. Simply, we can't say just no.

Some Developers mentioned that negative predicted impacts are not handled. Other argued that it occurs in combining the services and utilities to maintain the environment. A developer sees that it is normally handled through personal efforts.

Designers find that it is mostly ignored, and trying to hide the impacts in order not to be fined. Developers are not interested in this subject. Other added that there should exist an environmental logbook to deal with this issue and the project manager should be responsible but nothing from this happens.

Analysis and interpretation

The real essence of the EIA is not properly dealt with and according to the respondents predicted impacts are mostly ignored. Apart from the policy makers view, no consensus exists in dealing with the negative impacts. One would be skeptical if a proper decision would be taken unless the level of awareness is upgraded within this context.

Question heading
6.3.2.6 EIA role in the decision making process.

(i) Reason
How would it affect the decision-making process itself and why?

(ii) Benefit
Factors affecting decision-making tested.

(iii) Finding

Developers point that if it is going to save money, if not, it is not worth. Other developer noted that he was shocked with the damage caused to the environment, and his approach was environmentally complying only from conscious point of view. To review the design and make sure that the environment is not harmed. If all the measures have been considered to avoid the negative impacts, also that alternatives are provided. Emphasis is made that the best alternative has been selected.

Designers emphasized that EIA has a major role in the whole engineering process, more than the architect, his role is limited. As long as each one realizes his rights and duties, he shall abide by, it is a collective thing.

The EIA and the decision-making should be parallel to each other, the role is interactive. EIA has an effect but of no use- the designer would consider certain aspects during his design process, the owner will not be affected, and the builder is following the designer instructions. If there is awareness for the importance of the environment, there will be appreciation for the environment role. If EIA it started at an early stage, the data would be available to use.

During the EIA, environmental survey or profile occurs, the owner will take his site selection decision on the basis of the EIA outcome. Since a design could be finished and it doesn't fit in this location, so the designer should understand how he would deal with the site. The builder will come at a later stage, where the impacts have been studied and he has no problems, since there are guidelines that he should follow. It is seen as a powerful determinant in the design process. An architect added, that sure there might be a benefit in the decision-making but first of all, let the EIA study reach the involved parties.

Analysis and interpretation

EIA for a developer should be translated into economical benefits. Moreover, designers should be aware with the interaction between the design and the construction phase, as well as, the problems created during construction. Furthermore, a major problem that the EIA study itself is not reaching those involved in the business.

6.3.3 Area (3)-Sustainable design and sustainable construction

Question heading
6.3.3.1 On site sustainable development features implementations.

- **(i) Reason**
  Factors affecting decision-making tested.
- **(ii) Benefit**
  Should it be designer instructions, or all those involved should participate in such process, in order not to destroy the environment.
- **(iii) Finding**

Policymaker sees it as personal initiative if those involved are keen only. Developers suggest it might be through desalination plant during construction, to save money for the construction process. Also, preserving the fauna and flora on site.

Analysis and interpretation

Taking a further step to emphasize that environmental preservation is not seriously considered matching with the general on site view.

Question heading
6.3.3.2 Scarcity of resources and reuse.

- **(i) Reason**
  Is it economical or environmental based?
- **(ii) Benefit**
  Factors affecting the decision-making.
- **(iii) Finding**

Developers mentioned that it is cheaper for the contractor to dump the waste away. Where could it be used? No system giving an economical incentive, and ethics. A designer noted that building environmental friendly buildings is costly, traditional methods are cheaper, hence, the construction waste couldn't be reused. Another issue is the time factor, the quality of the material that would be reused, the availability of the required equipment, and finally, the trained labor.

Designer construction waste recycling recommendation
Chart (6-23)

Analysis and interpretation

Nor the environmental factor or the economical factor is clear for most of the involved in this industry as per the limited number questioned. The above chart confirm this view, since the majority pointed that there is no construction waste segregation existing, and only 10% of the interviewed designers mentioned that they recommend construction waste recycling.

Question heading

6.3.3.3 Intelligent buildings design- orientation impact on energy conservation.

(i) Reason
How is it addressed on site?

(ii) Benefit
Factors affecting the design decisions.

(iii) Finding

A policy maker mentioned that it is only amongst large entities, where they go by the book. Furthermore, other suggested that the project is supposed to be done by an expert in his field. Developers noted that the sun angle and wind directions are considered. However designers pointed that it is not as a first priority, and that it is a luxury that couldn't be afforded at most of the time as mentioned earlier.

Analysis and interpretation

Although that about 65% on-site found that orientation is considered, designers found it a luxury that couldn't be afforded. This would highlight more than one aspect, firstly, it seems that there are some confusion on site with what are the best orientation options. Developers are not really aware with the subject to judge it properly (is it the sea-view or is it the site favored air-streams). Finally, designers might not have done their homework properly to provide the best possible buildings' orientation according to the site microclimate. This area needs a more thorough investigation since it has a major impact on the design process decision-making.

Question heading

6.3.3.4 Material selection consideration.

(i) Reason
Detecting the stakeholders' point of view.

(ii) Benefit
Investigating the impacts that might be caused by the decisions made by material selection.

(iii) Finding

Policy maker suggested that more than 80% adopt a traditional approach. Developers see that lately, the designer became more innovative, precisely in the last decade. New generations are more aware, using paints to insulate heat. It has been noted through the conducted interviews engineering is the art of compromise between function, art and economy.

Designers mentioned it depends on the client, if he has a budget for the project or is it a limited budget. There should be innovation, but not only in the appearance, for example using curtain wall in a desert. Not only by the accumulation of experience. There should be more research and not just following what is fashionable; which might create negative impacts.

Analysis and interpretation

The economical factor is the keystone in this issue; the designer should demonstrate what would be the economical benefit on the long term when selecting certain material, also he should try to educate his client. On the other hand, refrain from adopting the short cut approach in materials selection.

Question heading

6.3.3.5 Sustainable construction principles.

- **(i) Reason**
  How is term perceived in the first place?
- **(ii) Benefit**
  A better understanding to how sustainability affects decision-making.
- **(iii) Finding**

The head of the Environmental Department-TDA mentioned that it could be adopted by using local materials form the site, creation through the variety of the visual impact (mother rock). Dr. Ebied suggested that it might be not really polluting the environment through sticking to ethical values and the business ethics.

A developer noted that it is economically inclined. The bottom line is the room rate; costs should be covered. Considering the principals through the design and the construction phases, also, managing the operation of the building after commissioning.

Designers see it as a legal matter; the only way to force the contractor to do his work properly is the law. In US, there is an insurance bond for any caused damage that might occur. Sticking to the ethical values, and the business ethics when building. At the design phase, trying to use the local materials and so forth, construction should be integrated with the same concept bearing in mind that there would be an economical return.

Analysis and interpretation

Although some respondents referred this issue to the professional ethics, but this might not be the only option. Since there might be individuals following the professional ethics but no awareness with what is sustainable construction is really after. Hence, the result would still be devastating.

Question heading

6.3.3.6 Challenges towards designing an environmental friendly building.

- **(i) Reason**
  The barriers against producing environmental friendly buildings.

(ii) **Benefit**
Tackling this issue within the framework.
(iii) **Finding**

Designers suggest that there has to be a body to enforce the law. Other finds that respecting the microclimate is environmental compliance. The follow up, the initial study is not properly and seriously conducted and finally coordination between parties. Moreover the project's economics, and the designer unawareness. Finally, time factor to provide an environmental complying building, and the developer awareness.

Analysis and interpretation

Basically, it could be deducted from the above that the initial study is not properly and seriously conducted or even introduced to the developer form an economical point of view that the concept wont be ignored.

Question heading

6.3.3.7 The impact of the 'Green architecture' on the design approach.

(i) **Reason**
One of the concepts that sustainability can be built upon.
(ii) **Benefit**
How such concepts affect the decision-making.
(iii) **Finding**

Designers see that it depends on the location, but basically, it should be taken into consideration. Also, selecting environmental complying materials.

A newly graduate architect mentioned that when she more realizes it, she would be affected in essence and not in the form only. Other added it should be considered for generations to come providing appropriate environmental atmosphere.

Other architect added that if he was aware with this subject, it would be by default to take it into consideration, and for him utilizing green architecture, would be for better health.

Analysis and interpretation

Essentially, the real essence of 'Green architecture' should be realized, some designers where clear about this issue, by mentioning that if they realize it appropriately, understanding the benefits that it might generate, it hence would affect their design process decision-making.

Question heading

6.3.3.8 The designer role in mitigating the predicted negative impacts during construction.

(i) **Reason**
Hypothesis testing.
(ii) **Benefit**
Hypothesis testing.
(iii) **Finding**

A policymaker noted that the architect has a role to mitigate the negative impacts on the environment, and that the researcher should check the TDA ecolodge booklets. Developers see also that he has a role, furthermore in educating the developer himself.

Moreover, he has a role, if he is aware with the natural resources, where the design should be started bearing in mind to mitigate the impacts and initiate the alternatives.

For the designers his role is basic, to choose the forms and the materials to comply with the surrounding environment. Prior to setting out his concept, he shall conduct site analysis building on it his design decisions. Some don't study (read) the site properly. His role is starting from inception, the environmental studies should be considered and it should be a powerful determinant during the design phase. Dr. Osman mentioned that the architect has a role to mitigate the impacts, however, it's 80% only with 20% left for the engineering side.

Analysis and interpretation

Basically, there is almost a consensus in favor of the research hypothesis. However, the policymaker notion to the ecolodge issue need to be looked into, since its not only ecolodge that need to be addressed, tourism has many facets, ecolodge will not solve the problem, its part of the solution. Dr. Osman notion that engineering bare 20% of the role need to be considered, from a coordination approach. Moreover the EIA coordinator role in handling and sharing the outcome with the whole team, hence what would be required is a teamwork pattern to be more powerful in mitigating the predicted impacts.

Within the interviews conducted, the respondents where asked to point for the excepted question that was not asked by the interviewee; the following points were thought to be worth mentioning.

One of the project managers asked, what we are supposed to do in order not to destroy the environment? He answered that engineers are those responsible for destroying the environment; engineering colleges bear 80% of responsibility. No student should be graduated unless he realizes what is the real essence of the term 'environment'.

Dr. Ebied asked, what is the role of the civil society within this context? We have 14000 NGOs in Egypt, only a small number is active, however, there is an awake within environmental societies. There work should be complementary with the government, the link to the society should be through NGOs. The environmental depth should be implemented within our educational curriculum.

Finally, a developer asked why should we be hit hardly to act, meaning damaging the environment worldwide.

6.4 Objective-3
Alternative environmental approved materials within the studied literature and the Egyptian local market

The impact on the environment over the whole life cycle must come into a judgment of environmental preference as Anink et al (1996) noted. Listed below are several distinct phases, as well as, some building materials investigated from their environmental aspect. The conducted study has taken the approach of looking into the available literature, carrying out site visits to some locations mentioned below;

During the site visits when possible some interviews have been carried out, in order to find out the most important environmental issues such elements would raise.

- Forest Plantations Irrigated By Treated Sewage Water
  Site Visit for Sarabium man made forest, 1000 feddans
  Ismailia, Egypt
- Center For Development Of Small Industries & Upgrading Local Technologies
  Dr. H. I. El-Mously
  Design & Production Department
  Faculty of Engineering
  University Of Ain Shams
- ASEC Co. For Environmental Conservation
  ASENPRO
  Cement Factories Filters
- FOSROC
  Chemical construction Co.
  Interview with the Q.A. Chiefs
- Housing And Building Research Center
  Department of raw materials
  Interview with Prof. Hamdy Abd Al Aziz Al Sayed
  Head for the Research Team of;
  The Egyptian Map for Available Resources & Related Industries
- Arab Abo Mousa'd
  Al Saf-Southern Egypt
  (260 of Egypt's 1000 bricks factories are located in this area)
- Forestry And Wood Technology Department
  Faculty of Agriculture & Environmental Sciences
  University Of Alexandria
- Alexandria National Iron & Steel Co.
  Interview with the Environment Manager
- Tabbin Institute for Metallurgical Studies
  Interview with Dr. Attia Saad El Din
  Executive Director
- Bitumode-Modern Waterproofing Company
  Dr. Waleed Gamal El-Din
  Board Member and head of the insulation and water proofing sector
  Chamber of Building Materials Industries, Egypt.

6.4.1 The construction process phases

6.4.1.1 Extraction phase

Prof H. Al Sayed (Housing And Building Research Center-2002) mentioned that the extraction of raw material, which can be extracted, is judged on technical, economic and environmental factors. Some materials will be depleted within the foreseeable future if present scale of extraction continues. Zinc, lead and gravel, for instance will be depleted within decades at the current rate of use. The alternatives for gravel are the limestone and basalt due to the scarcity of gravel quarries.

Within the Menia governerate around 170 to 180 quarries, with its dust by-product problem. It is pure Calcium and there are trials to reuse this waste.

Due to the presence of Dolomite Basalt is stiff. Normally, dynamite is used to quarry Basalt, when the Basalt is quarried, a product termed weather Basalt is produced which is not used and is thrown away.

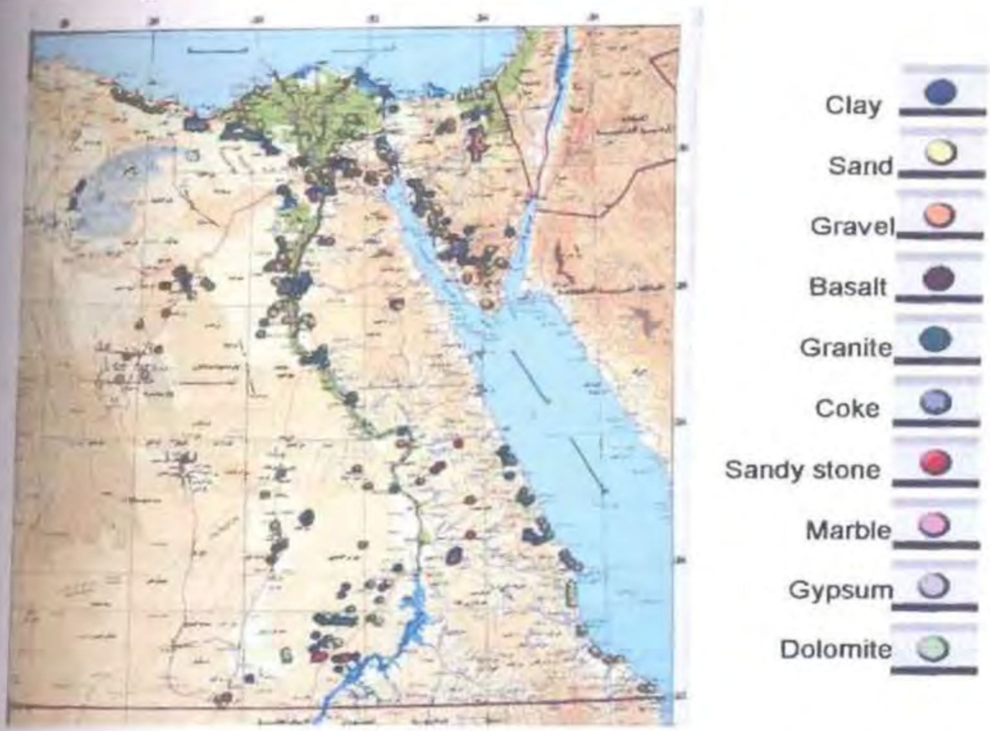


Fig (6-1)

Prof. H. Al Sayed has been the Head for the Research Team of The Egyptian Map for Available Resources & Related Industries. This research has been conducted to identify the locations of the local resources as well as the possible related industries. This map might assist specifiers in material selection, bearing in mind two aspects; the amount of energy consumed in transportation and resources scarcity.

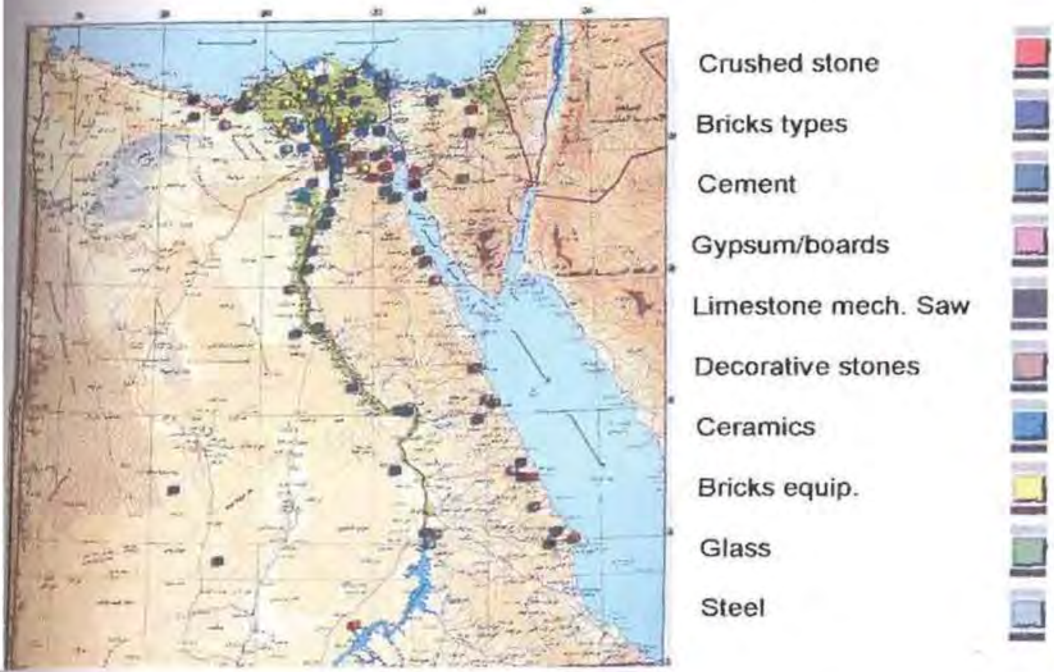


Fig (6-2)
Building materials industries locations
Egypt's map for resources and related industries

6.4.1.2 Production phase

During this phase the raw materials are processed, resulting in a material or product. Problems during this phase include harmful emissions into soil, air and water, as well as, the creation of waste, and energy consumption. In general, the more processing involved, the more the environment will be threatened.

6.4.1.3 Building phase

The most important environmental problems occurring during the building phase are the consumption of energy and the creation of waste and pollution (noise, vibration, dust). However, care taken during building influences the life span of building elements, and its life span of the overall structure.

6.4.1.4 Occupational phase

Environmental damage during this phase is determined to a large extent by choices and material selection made in earlier phases.

6.4.1.5 Decomposition phase

A large amount of rubble is created through demolition during the decomposition phase, taking the form of harmful emissions to air, water and soil (landfill). For recycling, it is important for the materials to be well separated and clean. Primary reuse, where building components could be used again; following minimal reprocessing.

Fig (6-3&4)
Primary use local markets

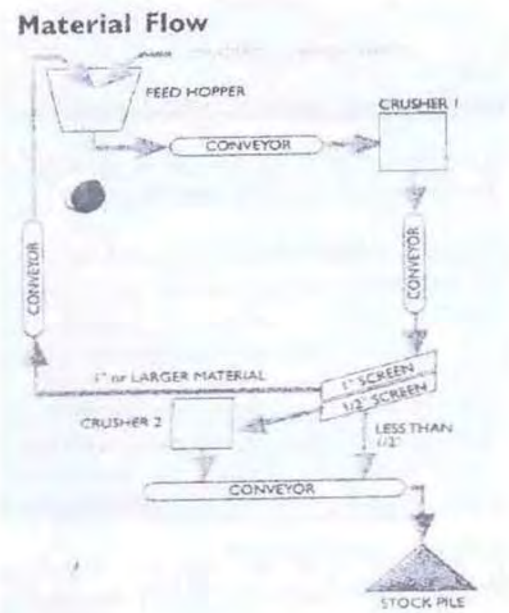


Fig (6-5)

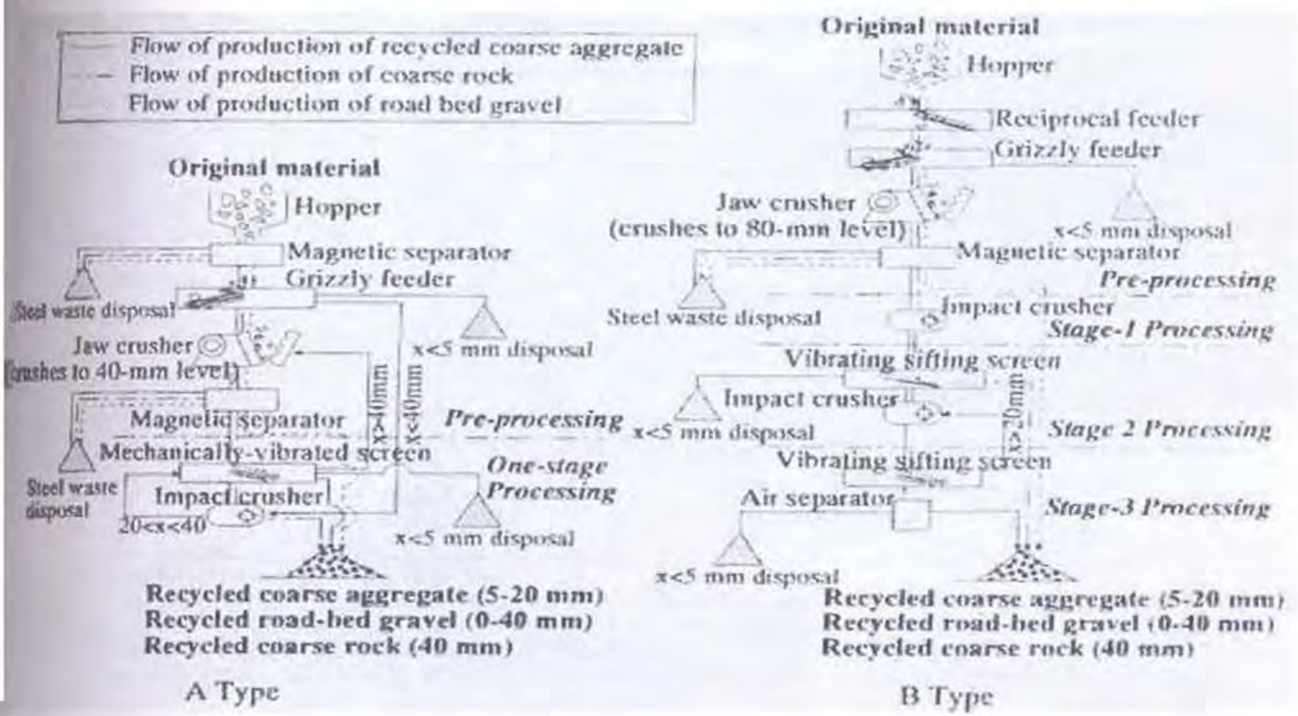


Fig (6-6)
Manufactured methods of recycled materials

6.4.2 Materials

6.4.2.1 Brick

The largest part of energy consumption in brick production is for drying and firing. (CIRIA, 1999). Avoid unnecessary wastage of materials by not over-ordering materials.

Dr. Saad El-Din (Tabbin Institute for Metallurgical Studies, 2002) noted that with respect to Clay bricks kilns, fuel number 6 was replaced instead of natural gas. Changing the combustion system, and some kilns is now using filters, however some kilns are still functioning with the conventional system. The purpose is to reduce the emissions.

In the year 2000 a law has been introduced stating that Co and So^2 should be measured and no smoke should occur. The previous law was more qualitative and now it is quantitative. The basic principle that fuel number 6 produced in Egypt contains Sulphur. Factories producing bricks cannot use "Solar" because it is expensive.

He further added that producing bricks with holes is better than solid, provided that the specs are respected. Now experiments are introduced to use the cement dust. Also experiments are ongoing to use slag in producing bricks by Al Ezz Group-Egypt.

Prof. Al Sayed (2002) noted that The clay factories are around 1000 factory in Egypt producing 6 Millar brick per year, 5% at least is waste, it is either grinded or thrown as waste destroying land. The cement bricks might be more environmental friendly, but the culture binds us to use clay bricks. In Al Saf area (Arab Abo Mousa'd)-on the beginning of Egypt's southern boarders, 260 of 1000 factories are located.

Fig (6-7,8 & 9)
The effect for bricks kilns on the environment

On the west side of Egypt-Siwa; conventional, as well as, innovative sustainable ideas for building materials. These building materials are produced from the "local-mother nature", the chosen building materials are, Kershef-dried salt rock- fig (6-11) and fig. (6-12). Isfah stone; figure (6-13), clay and straw bricks; figure (6-14). The consolidated dry salt (fig. 6-10) is used as glass blocks (new idea under implementation), secondly, fig. 6-12 for cladding, and the third (figures 13 & 14) used for building walls.

Fig (6-10)

Fig (6-11)

Fig (6-12)

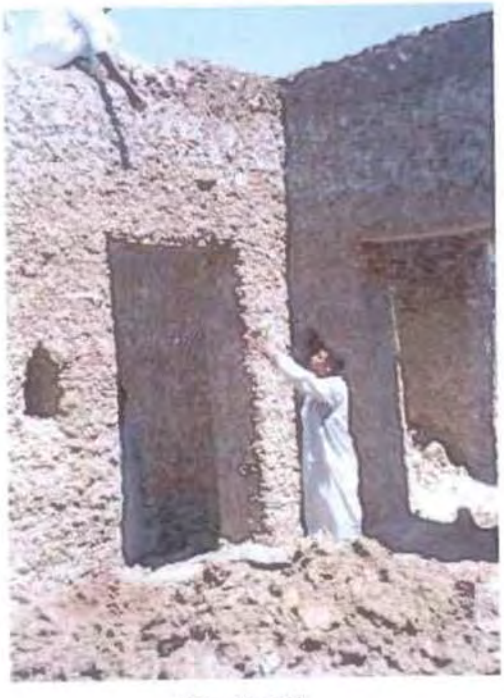


Fig (6-13)

Fig (6-14)

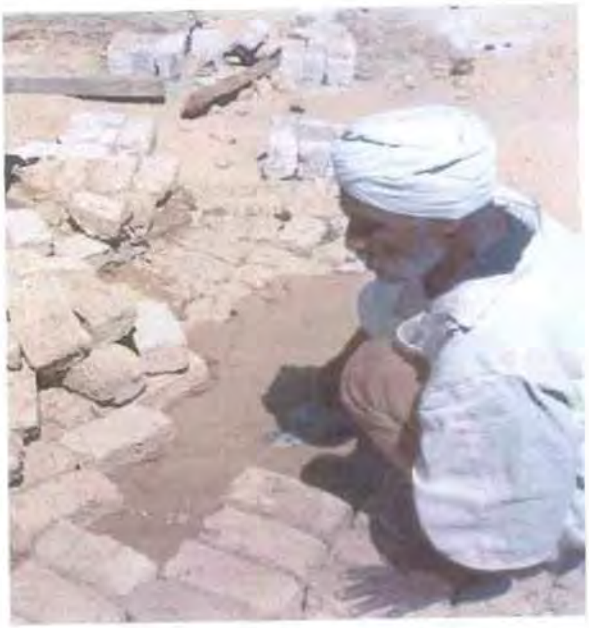


Fig (6-15)

6.4.2.2 Cement

The production of cement involves chemical and physical reactions that take place at high temperatures, and the process is therefore energy-intensive. There are two processes, wet and dry and their variants (semi-wet and semi-dry). The wet process uses almost twice the energy of the dry process (CIRIA, 1999).

In general the dry process is more environmental friendly, the wet process goes into the kiln in the form of slurry form containing 35% to 40% water to reach the temperature of $1450^{O}C$, clay+ limestone+ water, more energy is needed to evaporate the water in the slurry. The dry process the mixture goes into the kiln in the form of dry powder, it is more environmental friendly. However, it is basically used for more economical reasons due to the energy consumed. It must be noted that one third of the total cost within the cement industry goes into fuel. Starting from 1980, all Egypt's factories are heading towards the dry process.

Zaki (ASENPRO, 2002) Recommended that As much as possible, to using the mixed cement. To deal with the cement factories those are implementing iso 14001.

Fig (6-16&17)
Cement factory before and after implementing a Filter Source: ASENPRO

6.4.2.3 Sustainable Concrete

Dhir et al 1998 highlighted that many years of experience with concrete have shown that, when based on an adequate mix-design, and careful, engineering, this material has a very long service life.

6.4.2.3.1Concrete

Anink et al (1996) added that concrete consists roughly of 53% gravel, 26% sand, 14% cement and 7% water. Gravel, cement and to a lesser extent, sand are 'scarce'–mainly because the ecological implications of their extraction makes exploitation of all reserves impossible. The use of clean, reclaimed aggregate instead of gravel is a significant step forward.

6.4.2.4 Metals

After extraction, metals are transformed into the desired products by means of various refining and production processes. Products often require a number of surface treatments before use.

Most of the environmental effects are a result of the energy required for production and of the emission of harmful substances during surface treatment. An important environmental benefit of metals is their reusability. Melting down scrap is less harmful for the environment tban metal extraction from ores. Reusing metals is economically attractive (Anink et al, 1996).

6.4.2.4.1 Steel

The extraction of coal (coke) and iron ore, and the production of steel from iron cause considerable pollution, compared with other metals the energy content per kilogram of material is relatively low however. An advantage of steel is suitability for reuse.

Primary reuse for steel is preferred to secondary, because work with existing steel construction requires only little repair. Sectional construction enables Primary reuse.

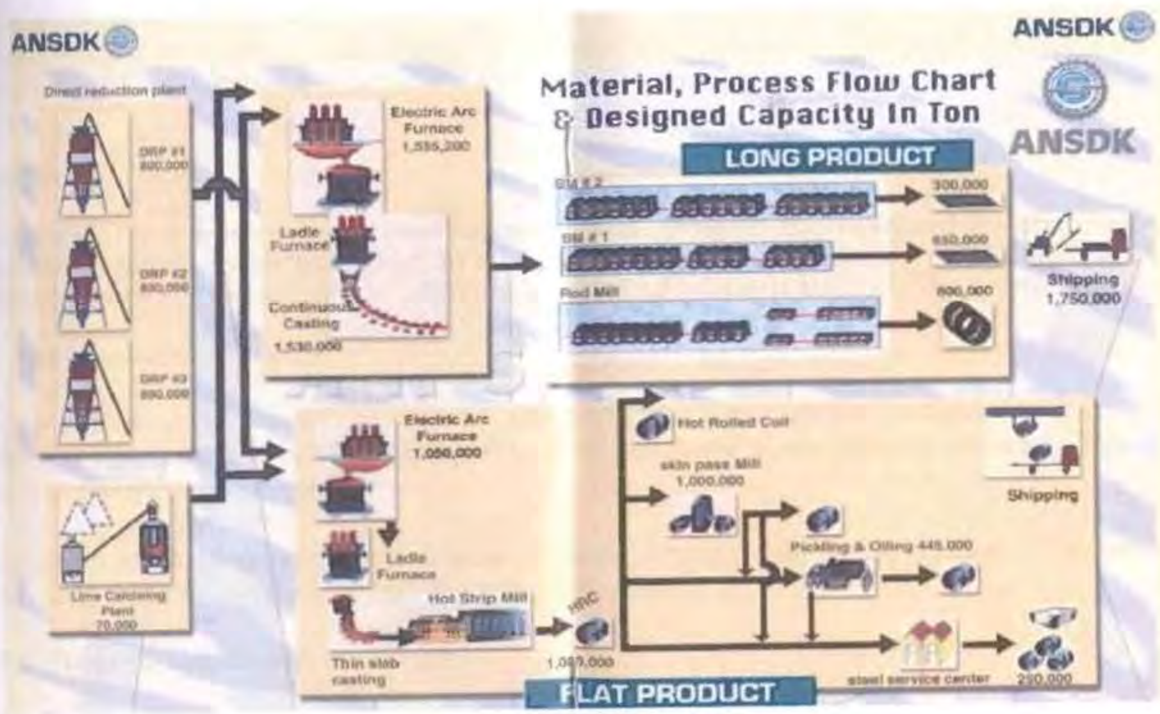


Fig (6-18)

A visit has been carried out for Alexandria National Iron & Steel Co. to look into the production phase of steel within one of the two largest steel producers.

Basically, the system implemented in this factory is environmental friendly, an EMS system is implemented-the specifier should investigate if the process implemented is environmental friendly, hence the steel used in the building would have a lower impact on the environment.

6.4.2.5 Flat roof insulation

Anink et al, (1996) pointed that cork has the advantage that it is a renewable raw material, the extraction costs little energy and is relatively clean, and the waste is degradable.

Extruded polystyrene and polyurethane (PUR) cause pollution which is considerably greater than that caused by mineral wool and EPS. The use of (H)CFCs as foaming agents for extruded polystyrene and PUR is not recommended on account of the damage to the ozone layer.

Dr. Waleed Gmal El Din (2002)-Board Member and head of the insulation and water proofing sector- Chamber of Building Materials Industries, Egypt explained the difference between the two systems of waterproofing within the country.

6.4.2.5.1 Conventional materials-Bitumenized jute

(a) Informal sector-handmade system:

Ingredients

Jute for reinforcement
Oxidized bitumen (petroleum materials)
Filling material Ca Carbonate
Sand

Procedure:

Three layers of hot bitumen and two layers of jute. Where the oxidized bitumen is melted by burning tires, leading to air pollution, in addition the operatives working in this field are know by their hands' burns for the system in handling the melted bitumen through the unsafe barrels.

(b) Mechanical sector

Only two factories in Egypt implement this system. The system comprises an approach to minimize the fumes and it is at better quality then the hand made system, precisely when the jute is soaked in the melted bitumen.

However, the mechanical system is higher in cost then the handmade system. The handmade is lower in cost, but it is ineffective and not recommended.

6.4.2.5.2 Modern insulation materials

Ingredients

100% recycled (PET)

Reinforcement – fiberglass, polyester
Compound- bitumen (vacuum residue)-polymers 100% recycled
Filler (Ca Carbonate and now cement dust is used to help to solve, even at a small portion of this measure environmental cement by-product problem.

Procedure:

No melting procedure is required on site, where the membrane is heated through a hot source to melt the layer facing the subject to be insulated for fixation. The system is totally mechanical; the side effects are lower then the conventional system.

Fig (6-19)

6.4.2.6 Wood

Due to shortage in local resources of wood it is important to search for other resources that could substitute solid wood. Date palm leaves' midribs (DPLM) are available as a cheap secondary product resulting from annual pruning of palms.

Lumber-like blocks with cross-section 70x70 mm and length 420 mm have been produced in a test rig under 4 different levels of pressure and 3 values of pressing time.

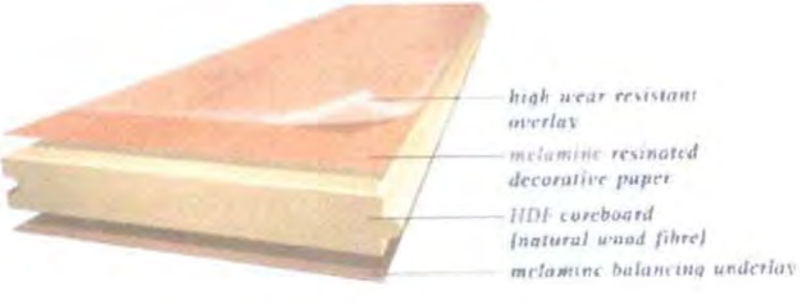
The gluing process is conducted at room temperature using Urea-formaldehyde as a resin and citric acid as a hardener.

The results indicated that the strength properties of DPLM blocks were comparable to those of European Redwood (the common softwood species used in Egypt). Taysseer, El-Mously and Megahed – 1997.

6.4.2.6.1 Site visit for the Sarabium man made forest, 1000 feddans, Ismailia, Egypt

Governorate	Forest	Area
Ismailia	Sarabium	500 Feddans
Menoufia	Sadat	500 Feddans
South Sinai	Tour Sinai	200 Feddans
New Valley	Al - Kharga	300 Feddans
	Paris	100 Feddans
Asswan	Edfu	300 Feddans
Luxor	Luxor	400 Feddans
Qena	Qena	500 Feddans
Giza	Abu- Rawash	80 Feddans
Alexandria	9 -N	60 Feddans

Fig (6-20,21 &22)



Products that could be used from local manmade forests
Fig (6-23 & 24)

Products used from local produced wood at Ain-Shams University
Fig (6-25, 26, 27 & 28)

6.4.2.6.2 Types of available local wood

Acacia nilotica ("Al Sant")
Grow in salty and sandy lands, the wood is stiff and dark in color.
Used in boats structure, trucks, and the seeds are used in dying
Albizzia lebbek ("Lebbek")
Fast growing tree, black color wood, used locally in furniture.
Casuraina sp. ("Al Casuraina")
Used as Windbreakers in desert lands medium salty, the trunk reaches 1.25 mts in 15 years, used in different wood factories in Egypt.
Cupressus semperuiens ("AL Sar'u")
Fast growing in sandy lands, of good quality, strong, medium stiff and light in weight.
Dalbergia sisso ("Al Sersu'a")
Succeeds in sandy lands and stands salinity, used in furniture.
Eucalptus sp ("Al Kafur")
Used in different industries, in addition to producing "Kafur" oil which is used in pharmaceuticals
Melia azedersch ("Al zenzlehket")
Fast growing tree, strong and a mixture of red and white, accepts paint.
Populus alpa ("Al Houre Al Abied")
Fast growing
Populus nigra ("Al Houre Al Aswed")
Fast growing, white color, used in flooring, it stands flames
Salix tetvasperma ("Al Sefsaf")

Used in fruits and vegetables boxes
Swietenia Mahogany ("Al Mahogany Al Afericy")
Hard wood and used in furniture
Taxodium distichum ("AL Sar'u Al Mutasaket")
It produces high quality wood
Terminalia arjuna ("Alterminilia")

6.4.2.7 Paints

In the most general terms, paint consists of a *pigment,* which gives it hiding power and color; a *binder,* which creates the film that, holds the *pigment*, and a *carrier, which* keeps the binder and the *pigment* in liquid form so it can be applied to a surface (EBN, Vol.8#2-1999).

There are many types of paint, with various compositions. Paint consists of bonding agents, solvents, fillers and additives. Additives are for example, pigments, drying agents, polishers and anti-foaming agents.

An important environmental aspect of many paints are organic hydrocarbons, mostly released during application. They harm the health of painters and of the occupants of buildings and contribute to an increase in the concentration of organic hydrocarbon in the atmosphere. All paints contain additives harmful to human health and the environment. Pigments may contain heavy metals.

6.4.2.7.1 Acrylic paints

Acrylic paints have acrylic resin as the bonding agent. The amount of organic solvents in acrylic paint is reduced to +10%. Acrylic paints use water as the main solvent, which explains the name 'water-based acrylic paint'. A disadvantage of acrylic paints is, however, that they contain many harmful substances, such as biocides, anti-corrosion agents and emulsifiers.

6.4.2.7.2 Natural paints

An advantage of natural paints is that the raw materials are mostly of vegetable or animal origin. This is in contrast to the other types of paint, which have petroleum as the main raw material.

6.4.2.7.3 Guidance for specifiers

- Water-based decorative paints should be used internally whenever possible as an alternative to solvent based systems.
- Water-based decorative paints should be used externally as an alternative to solvent-based. After a time Water-based and solvent-based gloss appear similar.
- Where protective coatings, based on for example, epoxy and polyurethane resins are to be site- applied, solvent-free or low-solvents are preferred.
- Epoxy and polyurethane resins and their curing agents are reactive materials and can cause damage to human tissue by contact and/or inhalation of vapors (CIRIA, 1999).

6.4.2.7.4 Paintwork

Anink et al (1996) suggested that there is no need to preserve wood, which is only used internally. Water-based natural stain has recently been introduced on the market, which is produced from renewable materials and which has a low percentage of solvents. Water-based acrylic paints contain less organic solvent than alkyd paints.

6.4.2.7.5 Site visit to FOSROC factory

According to the interview conduct with Q.A. Chiefs, he pointed that the environmental friendly approach within their process is based on the site handling through the MSDS (material-safety-data-sheet-fig.6-29). The factory has an environmental policy implemented.

In general the water based products initiatives are introduced and solvent-based products are prevented. He further added that the system is customized to the cultural pattern. Also, it has been highlighted that compliance is based on; law, culture, environment and business. If the documents are adequate or not and fulfilling the standards.

6.4.2.7.6 Adhesives

In this respect, Anink et al (1996) suggested that water-borne adhesives are preferred as alternatives to the solvent-borne systems. Water-borne contact adhesives are slow drying and benefit from warm conditions on site in order to increase the rate of drying.

The possibility of using hot-melt adhesives for applications such as panel bonding should be investigated. Epoxy and polyurethane resins and their curing agents are reactive materials and can cause damage to human tissue by contact and/or inhalation of vapors.

6.4.2.8 Aluminum

Anink et al (1996) pointed that the most important environmental effects of aluminum occur during extraction and during conversion of the raw material, bauxite into a semi-manufactured product. This is done electrically, demanding a large quantity of energy. Aluminum is a material, which is eminently suitable for high-grade recycling. The pollution from secondary aluminum is considerable less than that from primary aluminum, while the quality is equal.

6.4.2.9 Floor covering

Linoleum is preferable to tiles as a floor covering in rooms; linoleum is a natural material consisting of renewable raw materials. These materials are cork dust, linseed oil, sawdust and jute (EBN, Vol.7#9-1998).

It should be noted that ceramic tiles are made of the less renewable material clay with additives for, among other purposes, color and hardness. They have a much greater energy content because of the firing process, and offer the advantage of being harder and therefore less vulnerable to damage. Terrazzo flooring is poured concrete floor to which natural stone has been added, giving the appearance of granite. The composition and finish of the floor is such that it is smooth, hard and waterproof. An advantage of this type of floor is that no sealant is needed to make the wall junctions water roof as the floor can have a raised lip at its edges.

6.4.2.9 Hard landscaping

Recycled concrete slabs are preferable for paving as they consist, in part of secondary raw materials. Slabs are generally preferable to clay tiles due to their lower energy content. Wood chippings-made by shredding branches and other pruning-are the most appropriate medium for semi-hard paths, but a footpath will need additional new material after about four years. Sand is less desirable, in comparison, because its extraction carries consequences for the land ecosystem (Anink et al, 1996).

FOSROC

SAFETY DATA SHEET

1: IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

Product Name:	**CONBEXTRA UR63 HARDENER**
Application:	Hardener component of two part PU injection grout
Company:	Fosroc International Limited - International Technology Centre
Address:	Bourne Road, Aston, Birmingham B6 7RB England
Telephone:	0121-328-6866 Fax: 0121-327-2843

2: COMPOSITION/INFORMATION ON INGREDIENTS

Composition: diphenylmethane-4-4'-diisocyanate (mixture of isomers and polymers)

Hazardous Ingredient(s)	Symbol	Risk Phrases	Other Information	%
diphenylmethane-4,4'-di-isocyanate (isomers)	Xn	R20, 36/37/38, 42	Cas No: 101-68-8	>50

All constituents of this product are listed in EINECS (European Inventory of Existing Commercial Chemical Substances) or ELINCS (European List of New Chemical Substances) or are exempt.

Refer to Section 8 for Occupational Exposure Limits.

3: HAZARDS IDENTIFICATION

Harmful by inhalation.
Irritating to eyes, respiratory system and skin.
May cause sensitisation by inhalation

HARMFUL

4: FIRST AID MEASURES

Eyes:	Irrigate immediately with copious quantities of water for several minutes. Obtain medical attention urgently.
Skin:	Wash thoroughly with soap and water or suitable skin cleanser as soon as possible.
Inhalation:	Remove from exposure, rest and keep warm and obtain medical attention urgently.
Ingestion:	Wash out mouth with water. Obtain medical attention urgently.

5: FIRE FIGHTING MEASURES

Suitable Extinguishing Media:	Carbon dioxide, powder or foam.
Special Exposure Hazards:	Toxic fumes. For further information see Section 10.
Special Protective Equipment:	Self-contained breathing apparatus.

Issue No: 01 Date: 25.07.95 Product Name: CONBEXTRA UR63 HARDENER Page: 1 of 4

Fig. (6-29)

Anink et al (1996) emphasized that the ultimate aim is to integrate the life cycle as much as possible.

Dr. Saad El-Din on his interview pointed that it is better to use the expression "cleaner production" in general in producing building materials and recommend them in the construction industry. From a global point of view, to get a product with the minimum material and energy used. The general approach in the building materials would be based on the specific consumption; Amount of material/the unit of each product.

Conclusion

It could be concluded from the above that the basic concept in material selection is sustainability; this philosophy could be conducted by adopting the following measures:

- ❑ Prevention of unnecessary use.
- ❑ Efficient use of materials
- ❑ Use of renewable materials
- ❑ Use recycled materials
- ❑ Selection of materials with the least impact on the environment.

Designers should adopt an efficient approach, by minimizing the resources needed, optimizing the components sizes, avoiding demolition waste during construction and not using composite materials that cannot be separated at the end of the life cycle. Finally, the expected lifetime of the selected material should be adjusted to its technical lifetime.

One of major tips in the design approach that could be learned from the studied literature is, 'designing buildings for dismantling, not for demolition'.

With respect to recycling issue, is direct reuse of components or complete building.

Finally, the designer should be aware with the newly environmentally friendly products introduced to the market. Furthermore architects should avoid the notion made by Lacasse and Vanier (1999), that architects frequently prefer 'short cuts' based on their experience in order to save time, with disregard to the impact this selection might cause on the environment.

A further study should be made in what is meant by an environmental friendly material. How relatively is the material environmental friendly? More important where might these materials be found and produced by whom?

6.5 Key issues for discussion
Introduction

Objective-1 intended to assess the current practices within the research areas through questionnaires, objective-2 focused on the factors affecting the decision-making process through semi-structured interviews. Objective-3 looked into the subject of local-alternative environmental friendly materials through site visits and the studied literature review, the following is discussing the objectives findings as a basis for the intended framework.

6.5.1 Policymaking phase key issues
6.5.1.1 Current practices within coastal resorts

Policies and awareness are two major components within the area of study, although, awareness might exist, but the measures to mitigate the predicted impacts are not adequate, also the pattern of the current policies implemented could be responsible for the environmental damage by the Hurghada coast.

With respect to awareness amongst stakeholders, charts (6.2-1 & 6.17-1) indicated a higher percentage of awareness for the negative impact of the tourist resorts on the environment, while the measures to mitigate such impacts are not fully adopted as shown on chart (6.10-1) through the developers and designers' view towards the environmental preservation procedures implementation.

The relation between tourism and economy is strong as chart (6.3-2) indicated, although in assessing the state economical policies, chart (6.3-2) pointed to a 40% short term economical policies planning, giving the impression that problems exist but not severe. However, a close look on chart (6.18) highlights how the problem is striking, where the gap is extremely wide between policymakers and developers' view.

Unawareness, is a major component, as well as, economical short term planning, both could lead to environmental destruction, demolishing one of Egypt's assets and a crucial source for the country's GNP.

6.5.1.2 Sustainable development

Sustainable tourism is interrelated with sustainable development; both are not fully realized amongst stakeholders, and are faced with challenges either on site or on a higher level of policymaking.

With reference to the interviewed population sustainability is regarded as maintaining the reason why tourist are coming in the first place, on a broader level, it is seen as three interwoven economical, environmental and social aspects. Charts (6.4-1, 6.4-2 & 6.19) indicated a low percentage towards setting policies or preserving the environment, where challenges varied between the lacks of policies, unawareness or projects' economics as indicated on chart (6.5).

It should be noted that the whole process within the tourism industry is lacking to the implementation for the real essence of sustainability. Mostly, those involved in the industry are working in different islands; miss-coordination is the common theme. A better perception for sustainability principals would dictate a different pattern in the decision-making process, which is currently leading to an adverse effect on the environment on the short, and the long term. Within the tourism industry, follow-up for the policies action plans tools might not be currently effective.

6.5.1.3 EIA audit implementation.

It has been pointed out through the literature review that EIA is a crucial tool to accomplish sustainable developments, and it is now obligatory item in Egypt for tourist resorts to obtain a project's permit. But after conducting the study, how would the concerned body be certain that the EIA output is implemented, the answer that it is only through follow-up, in other words, auditing.

Emphasizing the gap between the stakeholders with its side effects on the whole industry, policymakers' notion that auditing exists contradicted with the developers and designers notion, (chart 6.8).

In this respect, it should be mentioned that Dr. Rady pointed out that the follow up should rely on the partnership approach and not on a "police" approach, an argument that is worth considering, since this might be "one" of the problems that lead to the current situation for the EIA as just a document for the project permit, where the developer is worried to declare an impact that would let him face penalties.

6.5.2 Design phase key issues

6.5.2.1 The designer role in mitigating the predicted negative impacts during construction.

Although, there is almost a consensus in favor of the research hypothesis, however, the interaction between the design team members needs to be highly considered, also the role of the EIA coordinator might as well be highlighted within the intended framework.

Furthermore, it should be mentioned that, newly graduates have been interviewed within the selected sample, for them; the problem was not awareness but 'knowing', at certain cases, the term EIA it self has been explained when asking a related question, and so forth for sustainable development, this is pointing to the education issue raised during the conducted fieldwork that this subject needs more emphasis during undergraduate studies.

6.5.2.2 Material selection consideration.

Materials selection has an impact directly and indirectly on the construction, as well as, the tourism industry, where the resources would be depleted on one hand, on the other the occupants (tourists in this case) would be directly affected, if the materials were harmful.

The relation between the adverse effect of certain material and loosing tourist on the short or the long term is clear and crystal, tourist, as well as, tour operators are getting more aware, more environmentally conscious, destinations are erased from world tourism maps due to reasons within the context of unaware environmental decisions.

Emphasizing the existing confusion within this context; chart (6-13) declared that more than 50% noted that material selection is considered, however policymakers suggested that 80% from the architects are implementing a traditional approach, matching with the own researcher site visits observation.

Figures (6-10 up to 6-15), objective-3 gives an example for the implementation of innovative ideas by using the pure 'salt dried rock' as a substitute for the glass blocks, further, using local materials in wall erection, as well as, cladding. Figures (6-25, 26, 27 & 28) show some products that could be formed from locally produced wood; these efforts might be a guide towards developing new concepts towards selecting sustainable building materials.

It might be the case that the short cut approach in materials selection is the norm. The economical factor shall be the keystone in this respect; where the designer should provide what would be economically viable on the long term in selecting certain material; this could be adopted, if the designer upgraded his skills by researching for new products and implementing innovative ideas. Further, the designer shall work on obtaining the building materials 'embodied energy' information, in order to decrease the energy consumed on and off-site.

6.5.2.3 Orientation impact on energy conservation.

Proper building orientation has a positive impact on energy conservation; energy conservation is one of the crucial aspects within the concept of sustainability.

On-site confusion occurs on what are the best orientation options (chart 6.12-1 & 6.12-2), is it sea-view, or is it the site current air streams? Although, it should be mentioned that 50% of the designers mentioned that orientation is not considered due to site determinants, some pointed that it is a luxury that couldn't be afforded.

In this respect, such issue needs to be thoroughly studied due to the impact it might have on energy consumption. Designers might not be conducting their study properly to provide the best possible buildings' orientation according to the site microclimate.

6.5.2.4 EIA impact on the decision-making process

EIA is keystone towards sustainability, further, environmental policy is a must on construction sites as has been mentioned within the studied literature; mitigation for the predicted impacts is the *principal aim* of the EIA. Moreover, environmental auditing is a part of a whole in accomplishing sustainability.

According to the conducted fieldwork, it would appear from a mathematical point of view on chart (6-7.1) that the respondents indicated that no EIA exists are those whom didn't cross by the term mitigation or monitoring-which mostly is not the case on real grounds. Contradictions exist amongst policymakers and have been described as total failure by Dr. Tolba. Developers mentioned (chart 6-20.1) that EIA exists and 66.7% from the respondents mentioned that it is useful, however 100% from the developers didn't cross by the term mitigation and 83.3% didn't cross by the term monitoring. Thus it should be questionable how it has been regarded useful and on what basis? Further, 70% from the designers noted that EIA exists, but 60% didn't cross by any of the two above-mentioned terms.

In this respect, it might be questioned, how would the EIA as a tool has affected the design process? It should be added that if it is assumed that the quality of the conducted EIA is acceptable, an EIA coordinator should make sure through effective communication that the study out put has reached the design team members, further those involved on site also.

6.5.3 Construction phase key issues

6.5.3.1 Scarcity of resources and reuse.

With respect to the local resources; it has been noted that some materials will be depleted within the foreseeable future if the present scale of extraction continues.

Construction waste recycling is almost not considered on the visited construction sites, only 10% from the interviewed designers mentioned that they recommend construction waste recycling. Matching with the researcher observation and the respondents' views concluded from chart (6-11) that. Further, chart (6-15) results regarding construction waste segregation is matching with the current recycling construction waste highlighted by chart (6-11) results.

The Egyptian Map for Available Resources and Related Industries (figures 6.1 & 6.2) might be a guide for the designer in his material selection decision-making. Also, within the local markets as shown on fig (6-3 & 6-4), building components that could be used again, are available, such primary reuse would allow minimal reprocessing.

The fieldwork feedback is confirming that the recycling issue is not on the construction industry agenda-through the limited sample investigated. The point that need to be raised that upgrading the awareness level amongst all the stakeholders is necessary, the designer, developer and the builder should understand that recycling means economical benefits if properly handled.

6.5.3.2 Environmental policy implementation on construction sites

Unfortunately, on construction sites; it seems that there is no environmental policy existing as highlighted on charts (6.6 & 6.22), further confusion is almost dominating on which phase predicted impacts should be tackled (chart 6.9). Furthermore, no real environmental audit exists according to the developers and designers view contradicting with Policymakers' notion that it exists. Dr. Rady arguing that follow up should rely on a partnership approach and not on a "police" approach, is worth considering, since this might be 'one' of the problems that lead to the current situation for the EIA as just a document for the project permit.

Even if EIA exists, it seems that it is of no essence, with the current status, how might the decision making process be proceeding with respect to development within the tourism industry. The real essence of the EIA is mostly not well defined for the included sample, although it should be mentioned that the case offshore with respect to marine life and coastline might be slightly different, where stakeholders are aware that certain activities might cause environmental damage. On the other hand, they might not be aware that the construction onshore as well might cause environmental damage directly and indirectly.

Thus, the quality of the final product would have an effect on the environment since the adopted approach shouldn't be a piece-meal one, the whole process must follow one pattern up to commissioning. Translating EIA into economical benefits-on the long and the short term-for the developer might well assist him in the decision-making process, the interaction between the site and the design team in dealing with the predicted impacts may allow the EIA to be more beneficial for the stakeholders.

6.5.3.3 Sustainable construction principles.

On-site, the issue is basically referred to awareness, a point that the industry is lacking for, as the fieldwork feedback has indicated. Socioeconomic aspects are to be considered within the industry, where it should be realized that if the industry would damage the environment, thus there would be no tourism, i.e. no projects, consequently no jobs.

A keystone within the industry is the professional ethics, it should be pointed that the professional ethics issue is not limited to a builder, but it will start with the project inception up till its air-borne, as a matter of fact, it should be a cradle-to-cradle approach.

CHAPTER SEVEN

RESEARCH FRAMEWORK

7.1. Introduction

This chapter describes the proposed framework; the research aim, where its construction is illustrated based on the piloting-refinement procedure. Furthermore, the validation procedure is demonstrated in details, exploring the (4) case studies conducted in Hurghada City-Red Sea to complement the process of data triangulation.

It should be highlighted that neither the case studies precise location, names are mentioned nor the interviewed personal posts are identified, and this is due to the sensitivity of the environmental issues. Also, three out of the four case studies are still under construction, hence confidentiality was considered.

However, the case studies features are pointed as holiday coastal resorts within the city of Hurghada, precisely the south of Hurghada, within the TDA territorial zone. Meaning that they should follow the TDA guidelines and procedures, which are different and stricter than the Local Council territorial zone, which unfortunately are less strict. The four case studies room capacity are ranging from 160 to 600 guest rooms, in addition to the public areas and layout facilities. The selected cases are either within an integrated development or developments parcel within the zone urban planning.

The following sections demonstrate how the framework has been constructed and refined up till the final framework form is concluded.

7.2. Framework construction

The frame structure is represented by a flow chart with three main lines flowing in a cyclic pattern, and that it is conceptual for the framework to follow a *'cradle to cradle'* approach. The main spine is the *Main Design stages*, the left side is the *Environmental Procedure Support (E)*, and the right side is the *Design Procedure Support (D)*. From the peripheral right and left are data support related to each side either it an awareness/training program data or for example as pointed on the other side as management system data.

> The *Main Design stages* presents the main spine, which are based upon studying the Project Delivery System, Public Works Canada, Amendments, (1,4,5,6,7,8,9,10,11) and dated 10.11.1982. Also, the Project Procedures, Chapter 11, Architect's Handbook Of Professional Practice, September 1969, AIA- The American Institute Of Architects. These two procedures were looked into and adapted to fit the research aim requirements by means of the researcher input.
>
> The *Environmental Procedure Support (E)*, located on the chart LHS is based on two components; the literature review related to this area with the fieldwork data input. However, the common thought is based upon the EIA procedure with the researcher adaptation to fit in the design common stages.
>
> The *Design Procedure Support (D)*, located on the chart RHS is based on the literature studied and the output of the research three objectives, where the sustainability principals have been basic when outlining the design procedure support. Further, the interrelation between the design and the construction process is clear either on the LHS or the RHS, which has been a conceptual line of thought in the framework construction.

The framework structure is build up upon putting bits and pieces together in a manner that would assist stakeholders in providing environmental friendly approach.

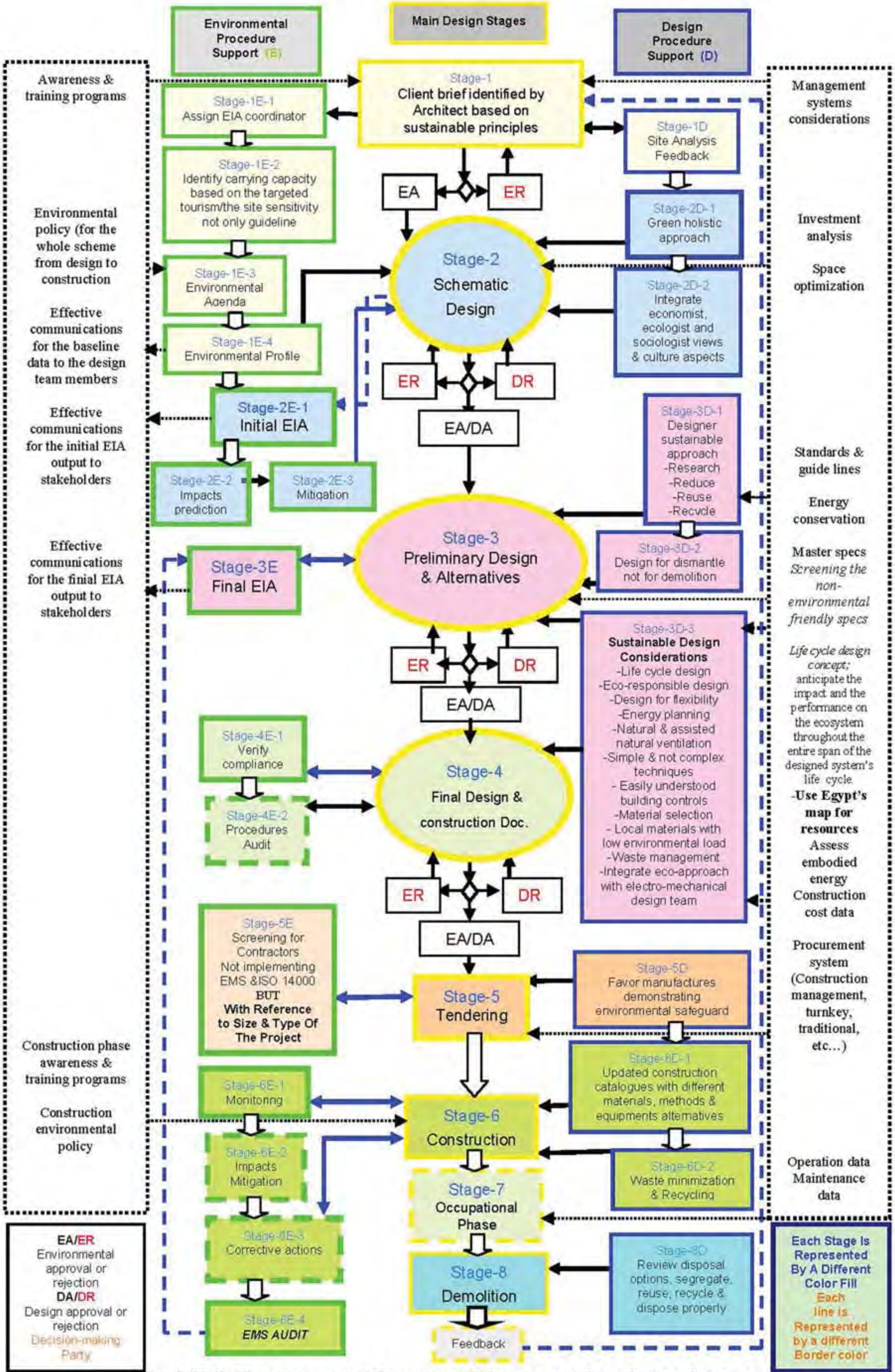


Chart (7.1) The proposed Framework for a sustainable tourist resort

The framework flow lines are based on horizontal and vertical relations; the vertical lines are flowing into the chart three main streams. The horizontal lines are feeding data into the main design stages boxes from the supporting environmental and design boxes. An internal decision-making party is to approve/disapprove each stage on environmental and design basis; if the stage output is disapproved it is returned back to pass through the same process again. When approval is granted for both design and environmental aspects, the process move on to the next stage, the following section is exploring the relation between the different boxes and reason this relation is suggested.

1) Stage-1 Client brief identified by Architect based on sustainable principles

(i) Stage-1D Site analysis feedback

(ii) Stage-1E-1 Assign EIA coordinator

(iii) Stage-1E-2 Identify carrying capacity based on the targeted tourism/the site sensitivity not only guideline

(iv) Stage-1E-3 Environmental agenda

(v) Stage-1E-4 Environmental Profile

The framework starts with the *client brief*, and it is based on the sustainable principals. The site analysis feedback is feeding data to the architect in setting out the brief from the design support side. At this early stage an EIA coordinator should be assigned in this early stage since several consultants would be involved, the EIA coordinator will need to ensure that all parties are basing their assessments on the same, most up-to-date version of the proposed project. It is particularly important to ensure that all impacts of the mitigation measures outlined in separate analysis are fully agreed upon and assessed.

Carrying capacity is mostly a question of both measurement and judgment of what the attraction or place can withstand without threat of damage or deterioration to the micro or the macro environment. Hence, this aspect identification is vital at this early stage where the output data moves vertically to feed the environmental agenda and through to the environmental profile boxes, and consequently horizontally to the schematic design box.

The *environmental agenda* for the whole process must be appropriate to the nature, scale, and environmental impacts of the project including a commitment to continual improvement and prevention of environmental degradation. The environmental agenda will provide a framework for setting and reviewing environmental objectives and targets through the project life cycle.

The aim of the *environmental profile* at this stage is to provide the baseline description to identify the current state of the microenvironment, against the PPPs expected impacts. The baseline description is generally linked to the environmental indicators, focuses on the key environmental components identified during the scoping process. It will inevitably include a commitment to comply with relevant environmental legislation and regulations and with other (voluntary) requirements to which the project should be abided with. The environmental profile will be documented, implemented, and communicated to stakeholders, although it should be updated after the EIA is carried out and even when the project is air-borne, thus it is not supposed to be a static document.

Moreover, from the LHS supporting aspects are provided related to *awareness and training programs*, which target the project team members. It was located at this early stage due to the feedback from the conducted fieldwork, which indicated lack of awareness with the meaning of the term environment and even its benefits.

The *environmental policy* should be a published statement with clear objectives, dealing with the project as an organization until commissioning stage, where the project is transmitted to a different body. A stakeholder should be appointed with environmental responsibility. The policy is set at the top, and owned at the bottom. As the middle management will be in charge of implementing environmental policy, it is crucial that they are included in the policy making.

An *effective communication* plan-proposed on the framework LHS-is vital, where staff needs to be aware of the organization's policy and fully trained to hold responsibility for their actions, the policy is worthless with no horizontal/vertical communications plan.

From the RHS, the project team should consider the *management system* to be adopted, which will dictate the pattern of relations between the design team and the contractor, is a conventional system, or one of the construction management approaches.

The internal *decision-making party* is to approve each stage on environmental and design basis, at this stage; only the approval or disapproval is environmentally based, and hence only an upward arrow is drawn for brief reassessment, when it is disapproved.

2) Stage-2 Schematic Design

- *(i) Stage-2D-1 Green holistic approach*
- *(ii) Stage-2D-2 Integrate economist, ecologist and sociologist views & culture aspects*
- *(iii) Stage-2E-1 Initial EIA*
- *(iv) Stage-2E-2 Impacts prediction*
- *(v) Stage-2E-3 Mitigation*

Schematic design is based on the brief approval and the carrying capacity data feeding where it defines the number of guests or/rooms, with the impact on the lay out, as well as the developer's investments payback, which is considered on the framework RHS. This relationship assists in obtaining a balanced relationship between tourism and the environment on economical viable grounds.

A *green holistic approach* is required, where the building is designed constructed operated and demolished in an environmentally mode engaging a complex relationship between a building and its materials, systems, occupants, and its microenvironment with the impact on the global environment. It is essential for the designer at the schematic design stage to '*think globally and act locally'*.

Further, the designer needs to provide a sustainable product-the framework prime target-based on *the economist, ecologist and sociologist views*. Hence, these views would be incorporated into the design to be assessed through the *initial EIA*, where the schematic design *impacts prediction* are carried out, *mitigation* measures are conducted passed again to the schematic design stage. The EIA process examines the environmental consequences of development actions in advance, although the EIA is systematic and the steps are outlined in linear fashion, the EIA methodology is a cyclical activity. In this respect, the process at this stage is meant to be cyclic between the EIA and the schematic design. The design procedure is not granted to proceed to the next stage until an approval is granted form the internal decision-making party.

From the LHS *effective communication for the initial EIA output* to stakeholders is carried out, where the engineering team involvement is required prior to the *next* stage taking place.

3) Stage-3 Preliminary Design & Alternatives

(i) Stage-3D-1 Designer sustainable approach, research, reduce, reuse, and Recycle

(ii) Stage-3D-2 Design for dismantle not for demolition

(iii) Stage-3D-3 Sustainable Design Considerations

- *Life cycle design*
- *Eco-responsible design -Design for flexibility*
- *Energy planning*
- *Natural & assisted natural ventilation*
- *Simple & not complex techniques*
- *Easily understood building controls*
- *Material selection*
- *Local materials with low environmental load*
- *Waste management*
- *Integrate eco-approach with electro-mechanical design team*

(iv) Stage-3E Final EIA

The *preliminary design stage* is combined with an important element for the whole process, which is alternatives, the decision-making party, on economic, technical, or regulatory grounds will reject/approve alternatives that arise.

This stage is based on the *designer sustainable approach*, which should follow a *research, reduce, reuse, and recycle* methodology; scarcity of materials in our planet made sustainable design a way of life for generations. The data feeding this stage is based on sustainability perception, it is no longer sufficient that the design satisfies the client, he must realize the liability that resides in making any part of the built environment.

Since the framework is after providing a product with the possible minimum impact on the ecosystem. Therefore, *Design for dismantle not for demolition*, should be a way of thinking adopted at this stage for design techniques based on ecological methods and ideas. At this design stage, sustainable design consideration is incurred, where significant impacts could be mitigated, by studying the possibilities for reuse of existing buildings.

Furthermore, through designing a building to be as efficient as possible, by minimizing the resources needed and using techniques as EPM, in material selection. A crucial point that is mentioned on this box is integrating eco-approach with the electro-mechanical team, since the framework is targeting for a consistent methodology, it is not only about architectural consideration; it is about a holistic design integration. The role of the *final EIA* is to ensure that environmental criteria are also considered at the preliminary stage. Alternatives are *"the heart of the environmental impact assessment"*, proper presentation and comparison of alternatives allow for implicit comparisons.

The arrows are going fore and back between this preliminary design/alternative stage and the final EIA process, to allow forecasts to be prepared with accuracy, a clear objective in EIA report preparation should be providing post-project monitoring. *Effective communication* for the final EIA output for the stakeholders should be adopted at this stage as mentioned on the LHS.

4) Stage-4 Final Design & construction Doc.

(i) Stage-4E-1 Verify compliance

(ii) Stage-4E-2 Procedures Audit

The *sustainable design considerations* are incurred also at this stage, where the arrows are coming out from this box to the preliminary design stage, also the *final design and the construction documents stage*. On the RHS, the data feeding the final design box are the *master specs* screened from the non-environmental friendly specs. A life cycle design concept is adopted, where anticipation for the impact and the performance on the ecosystem throughout the entire span of the *designed system's life cycle* is implemented.

A fundamental point on this stage is highlighted which is the use of *Egypt's map for resources*, so the designer/specifier would use the possible alternative local materials, minimizing the embodied energy incurred in transportation. This map is introducing the raw materials locations and the accompanied industries providing the designer with a better vision. At this stage of the framework, the designer should base his approach on real grounds by feeding the final design with the *construction cost data* mentioned.

Internally, the design team should *verify compliance* through an internal audit system, making sure that the EIA recommendations are implemented, emphasizing that the sustainable design considerations are into place, energy efficient designs are adopted and so forth. The *audit procedure* is an environmental protection system, which is at the heart of the framework and is carried out prior to the process being moved a step forward to the decision-making part approval/rejection procedure.

5) Stage-5 Tendering

(i) Stage-5D Favor manufactures demonstrating environmental safeguard

(ii) Stage-5E Screening for contractors not implementing EMS &ISO 14000 but With Reference to Size & Type Of The Project

Procurement system (construction management, turnkey, traditional, etc…) mentioned at the framework RHS is vital at this *tendering* stage, where this to affirm the management system that would be adopted on site. The management system language in its self, would allow the contractor to be easily integrated in the proposed framework, where the flow chart is proposing a way of thinking through the project life cycle, requiring a level of awareness, it might as well not be found amongst those who are implementing the above-mentioned systems. However, the possibility for the level of perception could be higher, moreover, *screening for contractors* not implementing EMSs is required.

Although, the scale and the type of project is to be considered, since this framework is not tailored for large scale projects only, it is meant to assist the tourism industry in general with coastal projects size variety. The framework is looking to the process from a global perspective, hence favoring manufactures demonstrating environmental safeguard is considered to be a designer liability at this stage.

6) *Stage-6 Construction*

(i) *Stage-6D-1 Updated construction catalogues with different materials, methods & equipments alternatives*

(ii) *Stage-6D-2 Waste minimization and recycling*

(iii) *Stage-6E-1 Monitoring*

(iv) *Stage-6E-2 Impacts mitigation*

(v) *Stage-6E-3 Corrective actions*

(vi) *Stage-6E-4 EMS audit*

Sustainable construction is generally used to describe a process that starts well before construction, in planning and design, and continues after the construction team has left the site. Hence, at this stage and based on the fieldwork feedback, *awareness and training programs* mentioned on the LHS are required at this stage. Also, *construction environmental policy* is vital and following the concepts mentioned on stage-1.

Updated construction methods equipments that will provide enhanced environmental friendly construction process are favored. There need to be a commitment by client, consultant and contractor towards *Waste minimization,* to be competitive, ways of minimizing construction waste need to be found. Internal *monitoring* for the construction process based on the EIA recommendations is imperative; otherwise there would be no consistency between the philosophies adopted on the design and the construction stages.

Impacts mitigation is not carried out only on the EIA statement, it is probable that other impacts could take place during the construction phase, hence *corrective actions*, are implemented. The cyclic and the interrelation approach allow a feedback to the EIA through internal *auditing* for any design modification that might be required.

7) *Stage-7 Occupational phase*

At this stage operation and maintenance data are provided, since it is the design team duty to make sure that the environmental concepts are still flowing after handing-over.

8) *Stage-8 Demolition*

(i) *Stage-8D Review disposal options, segregate, reuse, recycle & dispose properly*

(ii) *Feedback*

The framework is following a *'cradle to cradle'* approach; hence *demolition* should be environmentally handled. Moreover, the feedback from the demolition process is passed to the stakeholders to provide information about the best practices available, further providing knowledge on more effective methods for primary and secondary use from demolished buildings.

7.3. Framework piloting and refinement

7.3.1 Piloting

The chart initial structure has been revised and modified in order to build on already existing common design stages rather than suggesting new terms, building on a justified course. The framework was adjusted several times before reaching the piloting/refinement stage explored later on; the following is elaborating each of the main framework sequential lines.

The framework piloting is a crucial step explored in the following sections, this provide an initial feedback if the chart is ambiguous, hence there will be an opportunity for improvement, adjustment and so forth. The piloting procedure was carried out with an environmental planner.

Adjusting the framework to implement the discussed and agreed points was followed by the refinement stage discussed in the following section.

7.3.2 Refinement

The refinement stage has included the assessment for the framework from (7) individuals coming form different disciplines. A walk through methodology was followed (see appendices for the walk through refinement format used), the feedback from each individual was taken into consideration, where the comments are studied in total at the end of the followed procedure, the sample chosen included the following:

1) Head for an Architectural Department.
2) The manager for Environmental Department within a consultant office.
3) Prof. of environmental health-former Consultant For the State Minster of environment
4) Assistant manager in the Red Sea Park (senior ranger).
5) Former Chief Executive Officer, Tourism Development Authority-TDA, Ministry Of Tourism.
6) Architect, MSc. in Eco-lodge Design Criteria
7) Project manager for a construction site in Hurghada city, Red Sea.

The refinement out put was in general minor, a consensus occurred amongst the above-mentioned individuals, where Dr. Radi the Former Chief Executive Officer for the TDA mentioned that this framework would participate in the industry enhancement. The crucial comments that did have an impact on the framework refinement are stated below;

a) Modifying the term *'preliminary design'* to *'developed design'*, *'final design'* to *construction document'* with an emphasis made upon the need to justify the main spine. A reference is made to the AIA Project's Procedure, and Project Delivery System, Public Works Canada.

b) Two contradicting comments were made regarding detailing within the framework; on one end, it was pointed out that the framework should be more concise, on the other end; the framework needs more detailing. In this respect, it should be mentioned that the framework should be handy for the user, hence too many details would lead to confusion, and even it might be of no interest.

Although, it should be mentioned that a more detailed framework, exploring most of the stages is attached in the appendices section (appendix- A).

c) The specification used on the final design stage should be environmental friendly, and this could be implemented by going through the common specification sections and screening out what would be non-environmental friendly.

d) The flowchart presentation constituted a consistent non-confusing presentation pattern, since it would enhance the quality of the introduced framework.

e) The carrying capacity aspect included the carrying capacity of the environmental conservation, and not only the capacity stated by guidelines for the tourism type. A detailing element that is worth mentioning but with a more in-depth study.

f) The locals' culture should be included within the design approach; the culture point has been raised in two different patterns, during the framework refinement, where a policy-maker, as well as, a project manager on a construction site, both raised the point. This version would be only applicable if the locals are involved as a community in the project, however, in our case studies; unfortunately, the communities are at the fringe of being involved.

   The point made by the project manager on a construction site mentioning that the framework should consider the culture for those who are responsible to implement the aimed sustainable construction. He mentioned that the lack of awareness is dictating the current practices; this argument will be valid if the framework did not consider the training and awareness programs highlighted at different stages of the framework.

g) A focus was made on the area sensitivity within the carrying capacity box due to the point raised regarding the Red Sea sensitivity map for the ecosystem underwater. Although, this should be included within the environmental profile highlighted within the framework. However, this point will be emphasized within the detailed framework, the EIAs looked into did mention the underwater ecosystem and how to preserve this resource from constructing a marina or from a plant discharge, but the relation between the construction phase off shore and the damage that it might cause to the underwater ecosystem is of no real weight.

In order to justify the above mentioned point regarding the EIA quality some of the EIAs content should be included within the research appendices, however, the EIA content is copyright protected by the developer, thus the researcher was able only to look into the related content and was able to make such comment.

The above-mentioned argument did assist in adjusting the framework to appear in the final flowchart illustrated above. A project manager on a construction site mentioned that this framework could very much fit for developers in order to follow up the work sequence within an environmental context, the following section is investigating in depth the framework on site by finding out if this process practicability on real grounds.

7.4. Framework validation

A site visit was made to Hurghada City-Red Sea, to carry out the four case studies, the case studies are based on site observation documented by photographs; the photographs for three of the case studies were taken on different time intervals since the case studies were chosen at an earlier time and this was helpful to monitor the construction progress and at one case the final product.

Case studies hard documents were provided when available, couple of EIAs was available, where the other two has started before 18 February 1995, before it became compulsory for projects to conduct EIA studies. Although during the project construction stage, when the marina works started, they were asked to conduct EIA for the marina works, one of them was available for the researcher. Drawings as layouts and certain case details were also available; such documents were of benefit for the in-depth study.

The conducted interviews where basically unstructured, even field notes were not taken down on spot but after the site visit was concluded. This interview style is selected in the process of the non-formal data gathering versus the expected answers from a personal when approached with documents to be fulfilled regarding an environmental topic, it was a sort of a common chat, which was successful with a project site technical office manager in providing valuable internal data regarding the EIA implementation on site. As mentioned earlier the concept was to off-target to reach the research target, in this case, the target was to test the framework validity.

7.4.1 Case study (1)

Case study (1) design started on 1992, where the construction phase was initiated on 1993, which means that the developer was not asked to provide an EIA study. Since the EIA became obligatory only on 18 February 1995. Although an EIA was carried out for the marina, since the construction for this phase started after 1995.

This case was chosen as an example for a development with no EIA, however an environmental awareness was sensed in the whole approach. This environmental measure was considered during the design phase from an energy conservation aspect. Although the figures below indicate some unfriendly environmental actions, it also demonstrates environmental friendly measures, which were considered from an economical aspect.

In order to validate the intended framework, unstructured interviews were conducted with the designer and the site project manager who is still present on the site as an owner representative, where in this case the developer is the contractor as well. The researcher was able to collect data on different intervals starting form site selection up to the operation stage.


Fig. (7-1&2)
Site selection (the virgin land lot)

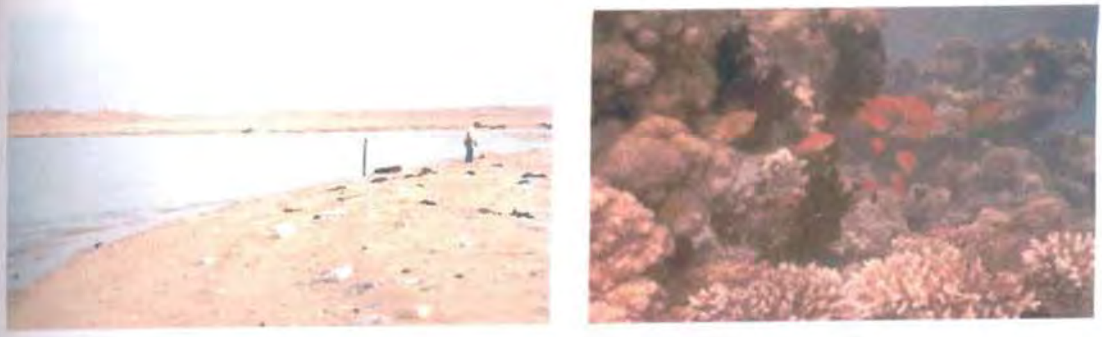


Fig. (7-3&4)
Beach area and the under water ecosystem

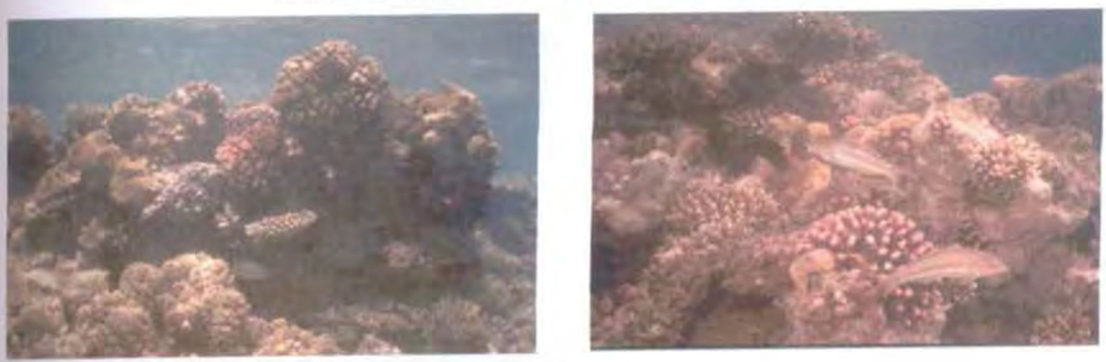


Fig. (7-4&5)
Underwater ecosystem, recent images after operation

7.4.1.1 The virgin site

The above figures represent the site before being intact and recently; figures (7-3, 7-4 & 7-5) are illustrating the underwater ecosystem. As a matter of fact, this is one on the major reasons that tourists are coming to this area, continuous degradation for this asset will make tourists refrain from flowing into this area.

Fig. (7-7)
Case study- 1 layout

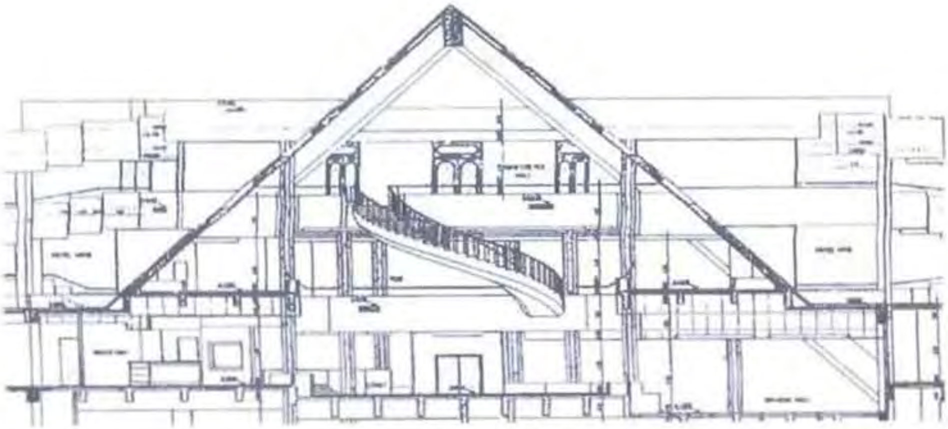


Fig. (7-8)
Main building atrium cross-section

Fig. (7-9&10)
Main building study model and side façade sculptured study showing the slots design solution on the east western façade

7.4.1.2 Design stage

The above figures are demonstrating a sample from the design phase where the layout expressed the client brief phase, taking into consideration the authorities requirements from setback to percentage coverage area and so forth. The foot print percentage in case study (1) is 9%, the setback is 50 meters, and no sea sand filling is occurring on the proposed design. The main building atrium cross section is showing a sandwich section with heat insulation in between two reinforced concrete, also shown on figure (7-14) on the construction phase.

This façade section was meant to minimize the energy consumption, with the positive impact of this aspect on the environment, the designer mentioned that this measure was considered from an economical point of view, environment was not a real concern at that time, but now he is more aware to take such aspect into consideration form an economical and an environmental perspective.

The chalets and villas where oriented in a manner to minimize the use of air-conditioning when ever possible (see figures 21, 22, 23 & 24 for orientation effect). The landscape in this case study was based on changing the desert arid environment to a greener environment, which is not the best design provided option as the figures (7-28 & 7-30) illustrate another alternative from a neighbouring site.

Fig. (7-11)
Ariel view for the site during the construction phase On the bottom RHS, a bricks factory, **tiles/interlock factory, and a joinery workshop**

Fig. (7-12)
Closer image for the site bricks factory, tiles/interlock factory, a joinery workshop, the stored products, and operatives camp.

7.4.1.3 The construction stage

The construction process effect is apparent on the virgin site, however, producing bricks, tiles, interlock, and even all the required joinery, as well as, the resort furniture, has its positive impact on the environment. This is due to reduction for the energy consumed in transportation (embodied energy). Obviously, during this period as mentioned earlier this was done from an economical point of view and because the developer is the contractor, and since it was more easier for him to produce these products on site.

Fig. (7-13)
Foundations water proofing
Unfriendly approach towards the environment by burning used car tires to melt bitumen

The above approach has been prohibited on construction sites by the Red Sea due to the negative impact that this action has on the environment, air and soil. Although some would still take the approach of burning wood, under the impression that the problem is only created by the effect caused from burning used car tires. Here the contractor followed the approach that would save him more money, and this to prove that he was not environmentally conscious in what was considered to be environmentally sound.

Fig. (7-14)
The main building atrium under construction
The RHS illustrates the first sandwich layer before the heat insulation was placed.

7.4.1.4 Energy conservation measures

Not only heat insulation is placed between the two reinforced concrete layers to minimize the amount of energy consumed, but also the atrium orientation was considered to minimize the sunrays penetrating the glass façade for the same reason. However, as mentioned by some of the interviewed architects that 'orientation is a luxury that you could not afford', might be a valid point in this case, where the best orientation consideration was not provided for the whole rooms on the main building. Even with the measures implemented during the design phase and are clear on chalet images below (figures 7-21, 22, 23 & 24).

Fig. (7-15 & 16)
Interlock, curbs and joinery workshop products produced on site

7.4.1.5 On-site products

The interlock and the curbs were produced on site in the same tile factory but by using different moulds, figure (7-15) is illustrating a sample for the proposed walk way, where the three elements used are the interlock, the curb's units produced on-site and the crushed stone form a near by quarry. Figure (7-16) is showing a headboard, the bed and the nightstand, where the wardrobe and the bed head were made from block boards. The unused parts were not disposed but were used in the nightstand construction.

Fig. (7-17) Initial plantation experiments for using silt found in the watersheds paths

7.4.1.6 Landscaping

According to the Egyptian law and to preserve the valley fertility, it is forbidden to relocate fertile soil from the Delta. Since *the need is the mother of invention*, the contractor piloted an experiment (figure 7-17) during the construction to use the silt found in the watersheds paths near by the construction site. The experiment proved to be successful during the construction stage and after 5 years form operation as well (figures 7-18, 7-19 & 20) with regard to softscape. However, from a hardscape point of view the amount of interlock used to cover the walkways is excessively used even if it is produced on site, figures (7-28, 29 & 30) are showing a different approach used on different site.

Fig. (7-18)
The development after five years operation

Fig. (7-19&20)
Plantation prosperity with dates growing in palm trees

Fig. (7-21&22)
Orientation images at early morning and mid-day

Fig. (7-23&24)
Orientation images after mid-day and at about 4 o'clock

7.4.1.6 Orientation

Orientation was considered during the design phase, figures (7-21, 22, 23 & 24) are indicating images taken at different intervals during the day for a semi-detached chalet. A shot was taken early morning, a shot at almost mid-day, a shot after mid-day with around an hour, and finally a shot was taken at about four o'clock. After a chalet was constructed as model and the developer was sure about this point, he refrained from adding pergola since this would mean a non-justified extra cost, since it is only added as an architectural decorative element and non-functional. In addition to the above-mentioned point, an energy saving device was installed in all guest rooms so energy is only consumed when the room is in use, but this is not applied for the mini-bar.

Fig. (7-25&26)
The atrium internal façade and the slot detailing mixing aesthetics with function.
The slot during day is lit by sunrays during night, illuminated from inside

Fig. (7-27)
The atrium at night, the slots illuminate the side façade

7.4.1.7 The final product

Figures (7-25 & 26) are showing the main building atrium after it has been finished, the sandwich concrete façade finishing from inside, also the effect for the used slots allowing the minimum sunrays to penetrate in colour the inclined façade. Figure (7-26) is focusing on the slot detail, the wall thickness that included the two concrete layers and the heat insulation. Figure (7-27) indicates how these slots are utilized as an architectural feature during night time, emphasizing that designs which take account of the environment can be functional and highly aesthetically attractive; the framework message.

Sydney and Baggs (1996) mentioned in chapter four, that the pyramid provides the most interesting possibilities in terms of the shape of aboveground houses. According to the famous 19th century esotericism H.P. Balvatsky, the pyramid represented a tree; at its apex, the link was made between heaven and earth.

Fig. (7-28, 29 & 30)
Landscaping; a different approach

7.4.1.7 Laudscape different approaches

Figure (7-28) illustrates the ongoing construction process of preparing the site hardscaping; it is worth mentioning that this the final phase for this area, indicating that at certain cases, no ground covers would be added, but only few palm trees. The pathways in figure (7-29) are made from in-stu concrete and crushed stone, a different approach for the path way are the pre-cast concrete tiles. These examples are contradicting with the interlock pathways approach, and also the attempt to cover and change the site nature into a complete green zone as implemented in case study (1).

7.4.1.7 Comment and framework validation

Although no EIA was conducted for case study (1), since it was not by that time obligatory, certain measures within the research proposed framework were implemented, not due to environmental consciousness but because for pure economical reasons as mentioned by the site project manager.

Hence, it could be argued that even if the main intention of the framework is providing coastal environmental sound holiday resorts, it is not contradicting with any economical measures that would make a developer worried that implement environmental approach would mean extra cost.

From the above figures, it is obvious how developments would affect a virgin site, not only off shore but also on shore. Figure (7-13) is to confirm that considering economical aspects only, could damage the environment, when waterproofing material is melt.

However, in this case study, unintentionally, some environmental consideration came as a by-product of the economical measures implemented. Having bricks, interlock, tiles factories, and joinery workshop on site minimized energy consumption (embodied energy), by eliminating transportation from Cairo to Hurghada.

Design consideration affected the project positively with respect to energy consumption as described above either in the main building atrium or with the chalets orientation, on the other hand, the landscaping approach was not at the same level of awareness. The excessive use of interlock to change the land nature, has its negative impact on the environment as resources utilization, energy consumed for production, etc…

Based on the designer and project manager feedback, the framework would have been effective in considering environmental aspects either on the design or the construction process. No interrelation has occurred in this case study between the environmental depth and economical measure, according to the project manager, 'the project was only handled on absolute economical basis'. Even he mentioned that if it was not forbidden to sand fill by the sea, when he started the marina works, he would have done with the negative impact on the coral reefs due to the sand filling.

However, after the project operation, he had the chance to experience the benefits of an awareness program prepared by an organization operating within Hurghada. This experience has changed way of thinking towards the environment regretting some mal-environmental actions. Such notion emphasizes how crucial is the training and awareness raised on the proposed framework. With respect to the issue of demolition he places the blame on the authorities not providing enough dumpsites for the construction waste.

The project architect planner mentioned that the learning process gained since the project design (1992), would allow a different pattern of environmental awareness. Although he mentioned that despite the fact that when this project was designed, environment was not on the top of his agenda, however he was keen not to damage the coral reefs, since from his point of view, this was the main reason for the tourists' arrivals.

7.4.1.8 Framework implementation

For each of the four case studies a walk through is carried out to find out the framework elements that have been adopted, either intentionally or not, only the concerned items are highlighted for each case study. However, it should be noted that this assessment is only based on the available or provided information, although, the attempt is to tie the framework with real grounds.

Stage-1 Client brief identified by Architect based on sustainable principles

A client brief was carried out but not based on sustainable principals, but with reference to the TDA guidelines available by that time.

Stage-1D Site analysis feedback

The brief is based on the initial site feedback analysis, as a matter of fact, by the time this resort was designed; land lots were available-not as the current situation-for client choice. For this reason, the architect was involved in the site selection.

Stage-1E-2 Identify carrying capacity based on the targeted tourism/the site sensitivity not only guideline

Carrying capacity is based on the TDA guidelines; the footprint with respect to the total area is 9%. This is even below what is permitted, and it was according to developer requirement, where he was aiming for a non-dense holiday resort.

Stage-2 Schematic Design

Stage-2E-1 Initial EIA

By the time the design for the project started, it was not obligatory to carry out EIA.

Stage-3 Preliminary Design & Alternatives

The preliminary design incurred alternatives but based on economical, and space optimization basis, and not on environmental grounds.

Stage-3D-1 Designer sustainable approach, research, reduce, reuse, and Recycle

The design approach was based on space optimization, reducing the use of materials, recycling was not on the designer agenda. However, the procedure was implemented on site due to economical reasons.

Stage-3D-3 Sustainable Design Considerations

Energy planning
Natural & assisted natural ventilation
Simple & not complex techniques
Easily understood building controls
Local materials with low environmental load

There was no energy planning for the project as such, although the atrium design and the chalets locations show that the designer was energy aware. Natural ventilation was considered when possible, precisely for the villas and the chalets, it was not considered on the main building due to contradictions with view and form.

Simple techniques as energy saving devices were placed within all guest rooms for economical reasons, though; adopting such measures have dual effect, economical and environmental.

Stage-3E Final EIA

EIA became compulsory during the project construction, when the marina works started, an EIA was carried for the off shore works, where the EIA procedures implementation took place, resulting in an environmental sound beach. The underwater images for this case study are recent images, indicating that the corals are at still intact.

Stage-5 Tendering

No screening procedure took place; the developer himself was the contractor.

Stage-6 Construction

Stage-6D-1 Updated construction catalogues with different materials, methods & equipments alternatives

Stage-6D-2 Waste minimization and recycling

Stage-6E-1 Monitoring

Stage-6E-2 Impacts mitigation

Stage-6E-3 Corrective actions

The methods implemented on this site were traditional; however producing building materials on site did have an impact on the environment even unintentionally. Also, waste minimization was carried out for economical reason, this might be in the framework favor, when environmental issues are properly introduced to developers to assist in decision-making process. The monitoring, mitigation, and corrective actions were only carried out for the marina works, although the monitoring and auditing activities were external, the framework points to in-house auditing approach.

Feedback

As a matter of fact, this case study has seen strong interrelation between the design and the construction phase, the designer was deeply involved, at several cases modification were implemented due to a site better vision. Buildability was governing the provided solutions; lines of communications were efficient, although this might be due to the prompt decisions, where as mentioned earlier the developer was himself the contractor.

7.4.2 Case study (2)

Case study (2) design started on (1993), where the construction phase was initiated on 1994, and construction is still on going up till this day (2002). Site observation indicates developer environmental awareness within the whole approach, either design or construction as the figures below will illustrate.

In the process of the framework validation, unstructured interviews were conducted with the designer and the site project manager during the site visit. The researcher was not able to collect hard documents for this case study.

However, since this case study was chosen some time ago, a site visit was carried out almost one year before this visit, and some shots were taken, which assisted the researcher to observe different buildings under construction. The main construction material used on this site is limestone produced from the site excavation; this material is used as a filling material, also as finishing material internally, and externally.

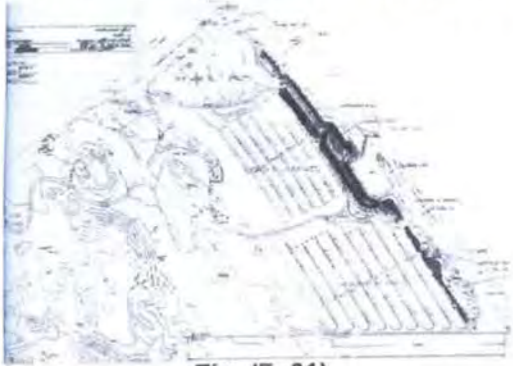


Fig. (7- 31)
Case study (2) layout

Fig. (7- 32)
The limestone being prepared by a local craftsman

Fig. (7-33)
Uneven limestone and construction waste added to concrete (recycling is taking place)

7.4.2.1 Local building materials

The site is rich with two materials, the limestone, and the dead dry 'rocky' corals, which were found during excavation for the foundation phase. These two materials were used excessively as a substitute for bricks or heat insulation as explained and demonstrated in the related figures. Figure (7-32) shows a local craftsman preparing the limestone to be used; the chips are mixed with mortar or concrete, depending on where it will be placed.

The construction waste is also used one more time, in less important areas, it is mixed with concrete to be used as a slab on grade, the point which is worth mentioning, that 'sea water' is used in above-mentioned mixtures, even in plastering, but not in relation with reinforced concrete, i.e. columns, slabs, etc... the project manager mentioned that we did not face any problems in this regard.

As mentioned earlier, the project is under construction for almost eight years, so if he had faced any problems, they should have been clear by now. Figure (7-34) is showing the mixture of limestone when used as a filling material; figure (7-35) is illustrating an arcade constructed from the same building material where it is used externally, the inner arch rendering is a mixture of powder from crushing the limestone and white cement.

Fig. (7-34 & 35)
Local materials used on site

Fig. (7-36)
Building roof with finished heat insulation from the dry rocky corals produced from site excavations

7.4.2.2 Heat insulation

Roof heat insulation is a local material in this case study, which are dry dead corals produced from the excavation works. This material is porous and is placed over the waterproofing material with relatively wide joints allowing a filling mortar to be poured in between. The roofs are inclined to allow water to slide between the joints on the roof. By observation on the two site visits conducted to this project, it has been noticed that this method is efficient with respect to heat insulation.

Fig. (7-37)
A general view for the guest rooms under construction over viewing the in-land manmade lake

Fig. (7-38)
External finishing for a public facility within the project

Fig. (7-39)
Guest room interior

7.4.2.3 Guest room interior

Figure (7-39) is illustrating the guest room interior, which is built in, even the dresser, the luggage rack which are not clear in this image are also built in. The beds are pre-cast slabs finished with a mixture with the powder-produced form crushing limestone and white cement. Also the sofa is finished in the same manner, as for the dresser and the television stand they are covered with locally produced marble. Obviously, mattress and cushions will be placed on the beds and sofas, the issue of the built in furniture will be discussed at the end of the case, in order to discuss the pros and cons for tbis approach.

Fig. (7- 40)
The main lobby

Fig. (7-41 & 42)
The main lobby interior and the façade overlooking the marina where an in-land manmade lake was dredged with its impact on the environment

7.4.2.4 The main lobby

Figures (7-40 & 41) are showing the main lobby, where the construction system is based on conventional reinforced concrete system combined with using limestone. Concrete columns are covered with limestone for interior design purpose, and at certain cases false columns are made from limestone to serve the architectural purpose, as with the façade overlooking the marina (figure 7-42).

The main lobby is not air-conditioned, but mostly naturally ventilated with a limited closed area to be artificially air-conditioned. According to the site observation, it was noticed that this area had a mild and a comfortable weather than the outside weather, especially that the visit was carried out on one of Hurghada hot summer days. Obviously, the researcher observation has taken into consideration that the main lobby is still under construction and façades are not closed yet, but still it is expected that the naturally ventilated system implemented will provide a comfortable feeling.

7.4.2.5. Comment and framework validation

According to the designer for the above-illustrated project, EIA is not done by professionals, where he severely criticized the quality of EIA studies in Egypt generally. However, personally he has an environmental consciousness towards what he is currently doing, it should be noted that in this case, the designer is himself the developer, which would figure out some raised points below.

In contradiction with environmental awareness, the designer mentioned that he should provide more rooms so the development would be interesting for the tour operators, ignoring the carrying capacity issue; this case study comprises around 600 rooms.

Further more, he argues that EIA study should be economically based, and those who conduct it should be realistic. With respect to the environmental aspect, he noted that it should in the form of a checklist and the developer just fill in the blanks. Further he added that environmental policy does not exist.

Although he noticed that green architecture principals are basics for him, however, pointing to the orientation issue, it was termed as luxury that could not be afforded.

With respect to carrying capacity, unfortunately, the project manager confirmed what the designer has mentioned, by pointing that it is only room rate that is guiding carrying capacity within Hurghada. The environmental belief was the basis for the design and construction approach on site from inception and by no means EIA recommendations would help, however, this belief is not based on a scientific study.

Although, this case study is not a common design approach from the project manager point of view, but it is only a belief from the designer that led to the environmental approach, where the designer is in this case the developer also. During the unstructured interview, the project manager highlighted a crucial point that design in our case is following the construction! Since the idea is provided from the designer, then implemented on site, transformed into drawings. He was not pleased with such an approach, since there is no specification or bill of quantities that is guiding him on site.

Furthermore, due to the repeated modifications, and sometimes the confusing building elements, the subcontractor or the craftsman frequently quits the job; he further added that the adopted system would prove to be more expensive on the long run. When the researcher introduced the proposed framework, exploring what it is the target for this flowchart, the project manager noted that it would have been ideal to implement this approach to the project rather than the adopted system, where coordination does not exist. Although, he mentioned that the culture for those addressed by this framework is of extreme importance, to clearly identify who will implement this system on site.

This case study is demonstrating an environmental consciousness but not environmental awareness, emphasizing again the need for the awareness programs. It might be the case that this project is successful from an environmental perspective but it would have been more economically viable if an EMS was adopted. The designer/developer has a high environmental consciousness but it is contradicting with some basic elements in this respect, as with the carrying capacity issue.

With respect to building and then transforming this into drawings, the project manager pointed that he is suffering from this approach due to the reasons raised above. Needless to say that interrelation between design and construction is vital, but not to be handled the other way round. The framework is addressing this point due to the belief this issue necessity, and this is conducted by adopting a cyclic approach.

Unfortunately, the issue of the built in furniture should be further investigated, since one basic element of the sustainable design principals is designing for dismantling not for demolition, though, it could be argued as economically viable on a sooner pay back basis.

7.4.2.6. Framework implementation

Stage-1 Client brief identified by Architect based on sustainable principles

This case study is different from case study (2), where the developer is the designer in this case, no precise client brief is settled upon, it is a flexible brief. According to what is detected from the project manager that the developer/designer would change concepts based on site modifications. However, from the interview carried out with the designer, he mentioned that it is by default that design should be based on sustainability.

Stage-1D Site analysis feedback

The site analysis has an impact on the design, as well as, the construction phase. The layout setup is based on using the site topography with minimum interference. On the construction side, according to soil investigation, local materials are excessively used as shown on the case study images.

Stage-1E-2 Identify carrying capacity based on the targeted tourism/the site sensitivity not only guideline

Unfortunately, carrying capacity for the developer and the project manger was based only on room rate within Hurghada. This is contradicting with the framework concept, moreover, this opposes the design philosophy raised during the conducted interview.

Stage-1E-4 Environmental Profile

The environmental profile was only effective when the developer required an in-land lake as a marina. This was only vital due to EEAA recent strict regulations implementations after law #4 became effective.

Stage-2 Schematic Design

Stage-2D-1 Green holistic approach

The designer mentioned that this approach should be the way of thinking for any designer, however, there is no consistency in this mentioned approach on site. Hence, the awareness and training programs mentioned on the framework LHS are crucial at this case, where the designer has the intention to provide sustainable product but there was no adequate programs introduced to raise awareness.

Stage-3 Preliminary Design & Alternatives

Stage-3D-1 Designer sustainable approach, research, reduce, reuse, and Recycle

Stage-3D-3 Sustainable Design Considerations

Eco-responsible design
Energy planning
Natural ventilation
Simple & not complex techniques
Material selection
Local materials with low environmental load
Waste management

The above aspects are incurred within the product provided, where the construction methods adopted are considered to be eco-responsible, even it is meant to be economical viable. This what environment aspects should be aware of, since developers are mostly under the false impression that any environmental measures taken into consideration mean extra cost, though it might be at certain case vice versa.

The lobby is dependent on natural ventilation, air condition is used in a limited area, a dual effect is accomplished, and environmental aspects complement economical aspects.

Obviously the materials used on this case study are locally extracted with low environmental load, and do not perform any threat on the ecosystem, since it is the excavation product. Waste is collected and used one more time as walls filling material as shown on the case study images, with a minimum load on dump sites.

Stage-3E Final EIA

As with case study (1), an EIA study was carried out for the marina work, implementation for the EIA in this regard was strict, although the designer criticized the quality of EIAs provided in general.

Stage-4 Final Design & construction Doc.

Since this case study was unlike any conventional procedure, where at certain cases design followed what is constructed on site! Therefore, there was no final design stage or construction documents provided, the project manager was not comfortable on handling the project in this manner due to unforeseen costs, being unable to estimate the project costs or time schedule, and so forth.

Stage-5 Tendering

No main contractor is assigned, sub contractors, and at some cases, local craftsman are hired that can properly handle the local materials produced, either those used for building or those used for heat insulation shown on the case study images.

Stage-6 Construction

Stage-6D-2 Waste minimization and recycling

Stage-6E-1 Monitoring

Stage-6E-2 Impacts mitigation

Stage-6E-3 Corrective actions

On the construction phase waste minimization is implemented, since the byproducts and the lower grade materials are reused as mentioned earlier as a filling material. Monitoring, impacts mitigation and corrective actions are adopted with respect to the in-land lake and marina works.

Feedback

Although the system adopted on this case study is awkward at certain points-design follow construction, however, the relation between the site and design is cyclic. The framework addressed this issue, but with a logical methodology.

7.4.3 Case study (3)

Case study (3) construction phase was initiated on (2000) within the larger context of an integrated development; the developer provided an EIA study. The researcher was able to look into this EIA and hence tried to monitor as possible the recommendation if they are implemented or not, also during the visit more than an unstructured interview was carried out with different key persons on site.

The point that should be highlighted with respect to EIA recommendations or even the lines of communication efficiency that when asking a straight question regarding EIA for a key person on a major site department, the researcher needed to explain the term EIA, since the personal has no information in this regard. Although, the environmental measures implemented on site are considerable, as has been initially observed and as demonstrated below, after conducting the interviews, it is argued that these measures are implemented on economically basis in the first place.

This case was chosen as an example for a development with an EIA study, in order to make a comparative analysis between a development with an EIA study carried out and others with no study conducted. The chosen approach is carried out to find out if there is any impact if EIAs are implemented, or no distinction within the current practices.

In order to validate the research framework, unstructured interviews were conducted on site with different personals within the holding company; in this case the developer is the contractor for all reinforced concrete, other trades are tendered for sub-contractors.

7.4.3.1 EIA recommendations in relation to construction phase

The following are some of the few recommendations within the EIA study related to the area of interest to this research; prior to construction, certain zones, which should remain in their desert environment, should be completely fenced off to prevent circulation and unwanted use. During the construction phases, recommendation to fence off sites to prevent pollutants from reaching the seashore should be implemented.

The master developer will review the construction contracts to ascertain they contain the stipulations mentioned below:

- All construction waste and waste from contractor's camps and offices will be disposed to designated sites only.
- All camps and offices are to be provided with approved sanitary
- Contractor's and their sub-contractor's personnel must comply to and use of the sea and the coral reef areas.

- Temporary roads will be watered whilst in use to reduce the dust produced.
- Limitation on the noise generated by construction plant and equipment will be set.

It should be noted before any comment are on the above-mentioned recommendations that the EIA study has highlighted the social and the environmental impact of this development on the Egyptian economy. Briefly, it was noted that the area development has recognized an attempts to avoid many of the elements that may have a negative impact on the site and the region. Such proposals as the reuse of wastewater for the greening of the central plateau are sound and will have a long-term positive impact.

Furthermore, a project of that size will generate new jobs for construction industry labours, and will contribute to the economy of the area and the tourism industry in Egypt.

7.4.3.1.1 Monitoring

Some of the images below are supporting the monitoring notes, where fencing was only implemented between the development as a whole and the labour campsite; neither fencing is implemented on the seashore, nor on the mentioned zones that should remain in their desert environment.

- Waste is not disposed to the designated sites.
- Campsite is provided with sewage holding tank.
- The short visit did not allow the researcher to investigate if contractor's and their sub-contractor's personnel are complying to and use of the sea and the coral reef areas. Although from the researcher's observation, the visited sites seemed to be well preserved.
- The temporary roads are not watered to reduce the dust produced.
- The batch plant is located near to the labours campsite, which is almost 6 kilo meters far from the development, thus the limitation for the noise generated by construction plant and equipment might be implemented in this sense.

Fig. (7-43)
Case study (3) master plan

Fig. (7-44)
Main building

Fig. (7-45) Walls constructed according to specs,
Fig. (7-46) Potable water pipes from copper

Fig. (7-47) local materials used as building materials,
built by local craftsman

Fig. (7-48) local materials used as building materials

7.4.3.2 Used building material on-site

The used building materials are ranging between following strict specs, as with the masonry works inside the main building (figure 7-45), and the copper piping system used (figure 7-46), which was pointed out to be implemented according to the operator's requirement, and using local materials. It should be highlighted that from a recycling perspective copper is more efficient material, but this was not the basis for implementing such approach, further, it was not tackled on the project EIA.

Figures (7-47 & 48) are indicating the use of limestone found on site; the local material was used in different areas of the development. Again this was not mentioned on the section related to construction within the EIA, thus, it is believed that approach was considered from an economical perspective and not form an environmental point of view.

Fig. (7-49 & 50)
On-site brick factory

Fig. (7-51) Concrete batch plant
Fig. (7-52) Steel bars workshop & waste shuttering wood collection

7.4.3.3 On-site building materials production

Bricks are produced on site (figures 7-49 & 50) by the developer, where the contractors tender is only for workmanship in this regard. Bricks are produced in different sizes and types. Obviously, this approach has a positive economical/environmental impact, it should be mentioned that the bricks factory is not requiring hi-tech, although it is more expensive then the red-fire bricks, as mentioned by different contractors, which is currently more environmentally polluting.

A main concrete batch plant (figure 7-51) is installed far from the development area, where in this case the developer is producing the concrete for himself, since he is the concrete contractor. Steel bars workshop is located next to building under construction, no major transportation activities are required after the steel bars are prepared. Also, figure (7-52) on the LHS is showing the shuttering waste colleted to taken to other area that will be shown below for reuse or to be sold.

Fig. (7-53)
Construction waste segregated (steel bars & wood)

Fig. (7-54)
Construction waste mixed with cement sacs

Fig. (7-55 & 56)
Site construction waste to be sold
Or reused in mouldings on site

7.4.3.4 Construction waste

The above figures are generally indicating high awareness for the reuse of construction waste, with some mal-actions as with figure (7-54), where cement sacs are not properly handled with the expected waste due to miss handling. Figure (7-55) is showing the area where wood is collected for reuse or to be sold. Figure (7-56) is a striking example for the reuse of wood waste, where all façade or columns moulding are constructed from the smallest wooden waste parts.

Fig. (7-57)
Fencing separating labour's campsite from the development

Fig. (7-58 & 59)
Labour's camp, externally and internally

7.4.3.5 Labour's camp

The labour's camp is located about 6 Kilometres far from the development, figure (7-57) is showing the fence segregating the camp and the development, where it is one of the EIA recommendations. Figure (7-58) is illustrating the garbage collection system, where a barrel is located in front of each accommodation for disposal.

Only, an interviewed contractor who provided for each accommodation-comprising four labours-a fridge and a gas stove, in order not to burn wood for cooking figure (7-59). As a matter of fact, this has a dual effect, environmental and also at the same level of importance, providing a comfortable accommodation for the inhabitants.

Fig. (7-59)
Construction waste on site before being dumped

Fig. (7-60)
Landscaping waste not properly disposed

Fig. (7-61)
Construction waste not properly dumped in designated dump sites

7.4.3.6 Construction waste

Construction waste from buildings is not handled properly as recommended on the EIA, precisely that seashore is near, as shown on the LHS background for the image (figure 7-60). Furthermore, the landscaping waste is not disposed properly although it is not within the development area, but what is tackled here is the method in general. Finally, the disposal is not as mentioned on the EIA study but simply it is just left out of the site.

7.4.3.6 Comment and framework validation

EIA was conducted for case study (3), and hence it was expected that certain measures within the research proposed framework would be adopted. The conducted interviews on site are in favor of the framework validity, since the measures implemented were mostly not due to environmental consciousness but because for pure economical reasons.

Although, the EIA recommendations at certain cases are not implemented and at other cases, environmental measures are adopted, which were not raised on the EIA study, indicating that there is no consistency with respect to the environmental approach, but only economic governs. Furthermore, the above-opinion is confirmed when a key site personnel answered that there is no environmental policy on site, also that he did not cross by an EIA studies.

Hence, it could be argued that if the proposed framework were to be applied to this case study, it would have enhanced the measures, which already exist. The issue that need to be raised here, that the lines of communications are not efficient, moreover, a lack of awareness is sensed, not with respect to environmental aspects but in relation to economical aspects.

The bricks factory, and joinery workshop located on site minimized energy consumption (embodied energy), and allowed the reuse of wooden waste in moldings, providing recycling and reuse as pointed on the framework, however, with respect to bricks no recycling or reuse measures were observed.

Design consideration for natural ventilation was not observed on this case study as with case study (2). The framework would have been effective in considering environmental aspects either on the design or the construction process. It was not clear if the use of local materials was due to ad hoc decision or was based on a designer study.

Awareness programs would have been crucial to enhance what is currently on site, the proposed framework has taken this issue into consideration through the project life cycle.

It is assumed that an integrated development as such would require more effective environmental management systems, moreover, the conducted EIA should elaborate the construction stage, since more load is made for the offshore works, a less emphasis as described above was made on onshore construction works, the framework is attempting to tackle the interrelation between the design phase and the construction phase within an environmental context.

7.4.3.7 Framework implementation

Stage-1 Client brief identified by Architect based on sustainable principles

Stage-1E-2 Identify carrying capacity based on the targeted tourism/the site sensitivity not only guideline

This project lies within an integrated development, the site is 10,000, 000 sq. meters and is almost a peninsula with attractive coral zones. The carrying capacity was considered with respect to the constructed projects and those under-construction.

Stage-1E-4 Environmental Profile

The environmental profile for the project should be included within the conducted EIA, but according to the carried out interviews on site, environmental measures are considered with no clear policy adopted.

Stage-2 Schematic Design

Stage-2D-1 Green holistic approach

With respect to the green approach, no knowledge available, although observation on site does not indicate that consideration for this issue, buildings are traditionally designed.

Stage-3 Preliminary Design & Alternatives

Stage-3D-1 Designer sustainable approach, research, reduce, reuse, and Recycle

Stage-3D-2 Design for dismantle not for demolition

Stage-3D-3 Sustainable Design Considerations

Life cycle design
Eco-responsible design -Design for flexibility
Energy planning
Natural & assisted natural ventilation

Simple & not complex techniques
Easily understood building controls
Material selection
Local materials with low environmental load
Waste management
Integrate eco-approach with electro-mechanical design team

Stage-3E Final EIA

As mentioned on the case study, environmental measures are adopted though as been indicated on economical grounds. Local materials are used for fencing and landscaping, and as decorative elements at certain locations. The desalination plant was constructed at an early stage, where the construction activities used its output instead of importing potable water to the site. The researcher monitored the EIA recommendations, even though these recommendations are minor with respect to the construction activity, moreover redundant, as with several EIAs.

Stage-4 Final Design & construction Doc.

The construction documents are demanding for strict specs, though site observations and interviews indicated no notion to environmental aspects, only emphasis is made on the construction process, and project economics.

Stage-5 Tendering

The developer in this case is the concrete contractor, any other trades are tendered, and hence no screening is adopted with respect to EMSs implementation on site.

Stage-6 Construction

Stage-6D-2 Waste minimization and recycling

Stage-6E-1 Monitoring

Stage-6E-2 Impacts mitigation

Stage-6E-3 Corrective actions

As mentioned on the framework, awareness and training programs are vital before construction process starts. Moreover, communications; the interviewed personnel have no knowledge that an EIA study was carried out for the project; despite recommendations and instructions raised on this study should be followed.

Waste minimization and recycling has a great share on this site, even if it is for economical reasons, making this framework even more viable.

The monitoring, impacts mitigation, and corrective action are more adopted for the marina works, although, an EIA was carried out for the project. Stakeholders are not aware that mal-actions are devastating for the ecosystem either on shore or off shore.

Stage-8 Demolition

Stage-8D Review disposal options, segregate, reuse, recycle & dispose properly

Although the demolition are far yet to be reached, but the improper waste dumping on this case study indicated that no proper planning is made for this stage. Emphasis is made on this issue on the proposed framework since the framework is adopting a 'cradle to cradle approach'.

7.4.4 Case study (4)

Case study (4) design phase started almost (1996) where the construction phase commenced on the mid of (1997), the developer provided an EIA study. Also, this case study was available to the researcher to look into this EIA and hence, an attempt was made to monitor when possible the EIA recommendation on site, also during the visit unstructured interview was carried out with the contractor on site; moreover the developer was interviewed at an earlier stage during the conducted interviews.

With respect to the EIA study, the developer believed in the EIA as a concept, but he thought that the provided EIAs quality are questionable, and it is only provided for project's permit.

The environmental measures implemented on site are not considerable, as has been observed and as demonstrated below, where it is argued that if any measures are implemented, it is only on economically basis. The keystone used as an alternative for retaining walls is an environmental friendly material, however, it was not mentioned within the provided EIA, although it might be more related to the lake construction and more updated EIA was provided at later stage, which was not available for the researcher.

It should be highlighted that this case study was chosen as another example for a development with an EIA study, in order to further study the difference between a developments conducting EIA studies, and others with no studies carried out.

In the process of the research proposed framework validation, unstructured interview was carried out on site with the contractor where in this case the developer tendered the whole job for main contractor and kept his role as a developer.

7.4.4.1 EIA recommendations in relation to construction phase

The following is the mitigation plan provided within the EIA related to case study (4) in addition to some of the few recommendations in relation to this research.

The mitigation plan
Pre-construction

The developer will ensure the following prior to initiating the development:

- Contract trained individuals to carry out resource inventory in areas on or adjacent to site.
- Initiate a resource monitoring study to establish a baseline of information.
- Prepare, with assistance of team of experts, criteria and standards necessary to maintain the integrity and resource base of development site and nearby.

During construction

The developer should ensure the following during construction of the site:

- Monitor and control all construction activities and ensure that all workers are abiding by regulations
- Make sure that construction waste and wind-blown materials are removed from the site to a designated area.
- Fence-off construction site to prevent pollutants from reaching the sea.
- Ensure that the construction site is provided by sanitary facilities.
- Ensure that contractors abide by limitations set for noise generated during construction.

Post-construction

The post-construction recommendations were provided, but the construction is not concluded yet, to comment on this section, the following section is an attempt to monitor the above-mention points.

7.4.4.1.1 Monitoring

According to the conducted interview with the contractor, he noted that up to his knowledge, an EIA study was carried out for the project, but he was not informed with the contents. Furthermore, the developer mentioned that EIA is too late for Hurghada city, due to the damage done. He further added that EIA would be only worth if it would save him money, where figures is the bottom line in this business.

Hence, how would the developer have contracted trained individuals to carry out resource inventory in areas on or adjacent to site. However, this does not apply to the lake construction, as previously mentioned.

The images bellow does not confirm that construction waste and wind-blown materials are removed from the site to a designated area. Although that the contractor mentioned that he is aware with this issue and he insists that the construction waste is only dumped to proper dumpsites by certain contractors, since unfortunately not all contractors apply the same approach.

The construction site was not fenced-off during the site visit in order to prevent pollutants from reaching the sea. The construction site was not provided by proper sanitary facilities. No measures were observed or noted by the contractor that any instructions were provided to abide by limitations set for noise generated during construction.

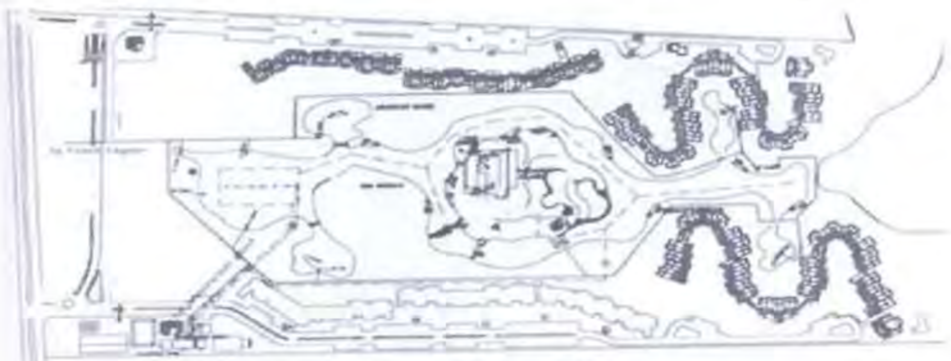


Fig. (7-63)
Case study (4) layout

Fig. (7-64)
Aerial view for the site during the construction phase

7.4.4.2 Case study layout and adjacent developments

The above-aerial view for case study (4) and its adjacent developments indicates two contradicting approaches, which are worth mentioning within the context of current practices. With respect to case study (4), natural shoreline is respected with its setback area. On the top LHS the shorelines for the adjacent developments are not respected, sand filling was carried out on the closer development to create a lake open to the sea, and unfortunately for the other development sand filling was adopted to gain more land jeopardizing the coral reefs.

The orientation aspect is highlighted on this layout justifying the notion mentioned by an architect that it is a luxury that you cannot afford. However, this is the case where natural ventilation and assisted natural ventilation should occur. But the designer in this case tried to provide a view by creating an artificial lagoon, which needs further investigation from experts in this area in order not to damage the local environment.

Fig. (7- 65)
Potable water for construction imported to site

Fig. (7- 66)
Bricks for building handling on site

Fig. (7-67)
Construction materials mixed with site excavation

Fig. (7-68)
Keystone used in construction

Fig. (7-69)
Keystone used around the lagoon

The view over looking the artificial lake
Fig. (7-70)

7.4.4.3 Building materials

Figures (7-65 & 66) are showing the fire bricks used on site, as has been mentioned earlier that red-fire bricks are cheaper then cement bricks. However, the impact they have on the environment and energy consumption is higher. Thus the measures highlighted within the EIA study are not adopted.

Further, the improper method in handling bricks on site would not affect the developer, economically, but it will affect the contractor economically sine the job was already tendered. Also it will have an impact on the environment with the created waste, either that will be dumped, or resulting in extra production.

With respect to potable water handling, the water is imported to the site; some developments take the approach of starting the project with a desalination plant in order to provide water for the construction stage, to cut running costs at this stage. However, some would argue that this would depreciate the plant earlier than planned, an argument that is worth investigating baring in mind the economics of buying water during the construction phase.

Figure (7-67) is highlighting that the EIA recommendations are not adopted or monitored on site, where new materials imported to the site are mixed with the site excavations that might be reused, further construction waste is disposed next to the imported material.

Based on the researcher site observation and mentioning to the contractor that keystones are used as a building material on-site, he pointed that if environmental measures to be pointed on this site, so he mentioned that the keystone is an environmental sound material that is used instead of retaining walls.

He further explored that the used Keystone is mixed with fibers in order to prevent bacteria and fungus from growing. A plastic mesh for soil reinforcement is added according to specs and only fiberglass bolts is used when needed for fixation; geo-textile sheets are placed behind the keystone.

The point that should be raised, and based on the interview with the contractor, it seems that the keystone is used based on economical/time preference more than as an environmental friendly alternative. Where the contractor answered on commencing the interview that there is no environmental policy adopted on-site, and all that he can mention in this regard that he change the method for melting hitumen from burning tires to burning wooden waste. The developer although being aware with the importance of the environment, mentioned on an early interview that the only benchmark is the tour operator requirement to grantee the development pay back and not the environment.

Fig. (7-71)
Improper construction waste handling

Fig. (7-72)
Waste steel bars segregated from other construction waste

7.4.4.4. Construction waste

Construction waste handling is not matching with the EIA recommendations as shown on figures (7-71), however, for economical reason steel bars waste are segregated for reuse or to be sold. Further, the same approach was observed during the site visit in handling wooden waste. It should be emphasized that a tour around this site and adjacent sites has indicated that construction waste is a major problem and would be a severe problem in the very near future if the current practices kept on going due to the method of dumping waste, where mostly waste is not dumped in the designated dump sites. Although, the contractor for this site has mentioned that he has a personal interest to make sure as possible that his construction waste is dumped properly even if it is extra cost.

Fig. (7-73)
Building various orientation

7.4.4.5 Comment and framework validation

The EIA recommended measures for case study (4) seems not to be adopted from the carried out site visit and the conducted interviews. It is suggested that if any environmental measures are implemented are not due to environmental consciousness but for economical factors. If the Keystone issue is taken as an example, it is was not clear on the contractor agenda, unless the researcher raised the issue.

Moreover, the contractor confirmed that there is no environmental policy on site, also that he personally knows that an EIA was conducted for the project but no information was passed to him, emphasizing how the efficiency for the communications lines is crucial, as placed on the research proposed framework, assuming that the EIA study is properly done.

It could be argued that the proposed framework could have been adopted to this case study, taking into consideration the economical aspects raised by the developer, also, the tour operator's requirements that would be very soon environmentally bias.

Embodied energy should be tackled properly. As a matter of fact, comparative investigation is important to be provided to or even done by the contractor himself when using materials that are more environmentally damaging.

Taking the approach that orientation is a luxury that could not be always afforded, design considerations for natural ventilation should be adopted, an approach that was not observed on the site visit. The framework did consider this aspect, which should be highlighted on the basis of running costs reduction. The use of local materials was not implemented on this case study, where it should not be the sole designer responsibility if an interaction has occurred between the design and the construction phase, and this should be the role of the EIA coordinator, or even the designer in being open minded, if the developer did not assign an EIA coordinator as the framework is suggesting.

Furthermore as with the above three case studies, awareness and training programs are crucial for both the designer and the contractor, and should not be dedicated for a certain stage, it should be implemented from inception up to the construction waste handling, in other words through the whole project life cycle.

7.4.4.6 Framework implementation

Stage-1 Client brief identified by Architect based on sustainable principles

Stage-1D Site analysis feedback

Stage-1E-2 Identify carrying capacity based on the targeted tourism/the site sensitivity not only guideline

Stage-1E-4 Environmental Profile

From the site observation site analysis were not a vital element within the provided design; orientation did not consider microclimate, only sea or in-land lake.

As the developer mentioned on the conducted interview, room rate or the tour operator dictate carry capacity figures. A short-term view but it is not the developer sole responsibility, it is a matter of state policies, the framework tackled this issue that would raise issues of interest for the policy-maker as well.

Stage-3 Preliminary Design & Alternatives

Stage-3E Final EIA

The researcher EIA recommendations monitoring indicated that it is almost a project permit on shore; the case might be different off shore. Though materials as keystone were used and the contractor mentioned that they are highly environmental concerned on this issue. On the other hand, the contractor mentioned that no any information regarding EIA was passed him, though he is aware that an EIA was carried out for the project.

Stage-5 Tendering

This case study followed a conventional system, where the project is tendered for two main contractors on a 50% basis, for the sake of competition only. No screening is conducted with regard to any environmental aspects.

Stage-6 Construction

Stage-6D-1 Updated construction catalogues with different materials, methods & equipments alternatives

Stage-6D-2 Waste minimization and recycling

Stage-6E-1 Monitoring

Stage-6E-2 Impacts mitigation

Stage-6E-3 Corrective actions

The different construction method is adopted for the in-land lake construction; the waste minimization is only relying on the contractor conscious. No environmental policy is implemented on site according to the interview with the contractor, and site observations. The monitoring, mitigation, and corrective actions are only implemented on the lake construction; no internal or external environmental auditing is carried out with respect to construction process.

7.5. Framework

Basically, the above four case studies were selected on the basis of examining if the proposed framework would fit with different patterns or it would not be suitable for diverse combinations. The four case studies have no environmental policy adopted on site, and the EIA recommendation did not reach the stakeholders on site, and although some environmental measures are adopted, it is the belief that it is either for economical aspects or it might be the case that if this measure is not adopted, the Egyptian environmental law would be breached, to great extent, an issue that could not be afforded by developer these days.

The researcher conducted interviews, carried out site visits, and was able to look into couple of EIAs, regarding two case studies. As there was an attempt to monitor the EIA recommendations, in parallel, there was an attempt to monitor the validity of the proposed framework, from the above-mentioned comments, it is suggested that this framework would fit into enhancing the efficiency of the above-described patterns; the following flow chart is illustrating the proposed framework.

7.6. Conclusion

Preece (2000) questioned what is a valid argument; he noted that a sound argument has two main general features. First, each piece of evidence should be correct in itself.

Second, the evidence or reasons should be related to each other and to the conclusion in a valid logical manner; that is, the argument should have a valid form.

The proposed framework elements on discretely are sound based on the data collected within the literature review, in the attempt to relate the elements to each other in a logical manner, the above procedure was adopted.

The literature review raised questions and those questions needed to be answered; from this the initial framework was constructed to be tested through piloting and refinement. For more in depth study, the case studies were carried out to test the framework validity.

The framework followed a *'cradle to cradle'* approach based on already existing common design stages, where environmental and sustainable design bits and pieces were placed together in a manner that would assist the designer in his environmental-design approach.

According to the case studies the framework in its final form is suitable for diverse patterns of holiday coastal resorts. Moreover, it is not tailored for designers only but it is suitable to be used by different stakeholders members, would he/she be a designer, developer, policy maker, project manager or a contractor, etc. Obviously, each member would need a focus on his area of interest in order to follow up the work sequence and progress within the environmental context.

Assuming that an EIA was carried out properly and at a high quality, the lines of communication needed to be efficient, since the above case studies have proved that environmental consciousness could possibly match with economical aspects. However, it is the role of the stakeholders to work closely on the different alternatives that would accomplish such integrated aim.

Furthermore, awareness and training programs are of extreme importance to enhance the current practices, either such practices are functioning within an environmental context or totally alienated from this perspective, simply stakeholders are not fully aware of the benefits that could be attained in implementing the recommended environmental measures. Due to the fieldwork feed back, and based on the new tourism trends and requirements, the proposed framework considered this issue through the project life cycle, from inception to demolition.

CHAPTER EIGHT

CONCLUSIONS, RECOMMENDATIONS, AND FURTHER RESEARCH

Conclusions and implications

8.1 Conclusions

The proposed framework is the research aim, which is a derivative from the defined problem, and the research hypothesis. This hypothesis is based upon the belief that from inception to commissioning, the architect has a role to mitigate the tourist projects negative impact on the environment. Through the conducted fieldwork, the proposed hypothesis is proved to be valid as demonstrated in research objectives results and analysis.

The framework is intending to assist the tourism industry stakeholders, namely; designers, developers, contractors, project managers, and also policy makers. The proposed model is contributing to the performance enhancement of the impacts prediction and mitigation within the tourism industry, either during the design stage, or during the construction stage.

Through this research, three objectives were studied; *objective one* assessed the current practices within the tourism industry in relation to the study, *objective two* focused on the factors affecting the decision-making process. *Objective three* looked into the subject of local-alternative environmental friendly materials, the objectives' output in addition to the literature review provided basis for the framework.

The incredible rate of change in the solutions available and in the development of new thinking means that this framework would be out of date shortly. Hence, detailed technical information or materials and production techniques are avoided; it is left for the stakeholder to enrich the area of interest through building his own database. The need to build consideration of environmental impact into the design process will create vast problems and challenges, but it will also be an incentive for innovation and creativity.

In this respect, opportunities would be available for designers to exhibit the value of their problem-solving skills and the extent of their contribution to impacts mitigation; the framework is meant to be interactive and dynamic.

8.2 Theoretical implications

A framework interrelating the conventional design stages with an environmentally aware approach is constructed. The framework aim is to ameliorate the common design process; proposing a methodological sustainable design approach in order to provide environmental friendly coastal holidays resorts.

The framework structure is based on cyclic flow chart with three main lines flowing from top to bottom. The main spine is representing the *Main Design stages*, the left side is representing the *Environmental Procedure Support (E)*, and the right side is representing the *Design Procedure Support (D)*. From the marginal right and left are data support related to each procedure.

The *Main Design stages* presenting the main spine, are based upon studying the conventional design stages, and adapted to fit the research aim.

The *Environmental Procedure Support (E)* is based upon the research two phases; the literature review related to this area with the fieldwork data input.

The *Design Procedure Support (D)* is based on the literature studied and the output of the research three objectives, with an emphasis made during the framework structuring on the interrelation between the design and the construction stages.

The structure considered the process from inception to demolition. As a matter of fact, it is based on a *'cradle to cradle'* approach, where the demolition feedback is crucial for the designer. Since some contracts are already being tendered on a construction and demolition-C & D-basis, hence, designers have to be innovative in finding ways when a building is demolished, or even better, 'dismantled'.

However, it should be emphasized that the provided framework is not an *invention*; it is rather an *innovation*. Where *invention* is an *idea*, while an *innovation* is a *process* according to Stussman, editor-in-chief of Engineering News Record, and the framework construction is based on the *process* of amalgamating environmental procedures with design procedures. Environmental and design *ideas*, as well as, both procedures already exist and running. The conducted fieldwork indicated that ideas are running in isolated islands, the framework intention is to overcome this gap.

The intention is to raise awareness among all those involved in the design process precisely and stakeholders generally of the relationship between design decisions and environmental issues, also to demonstrate the significance of the designer's contribution to minimizing environmental problems. It is intended first and foremost to help designers ask the right questions, rather than to deliver unambiguous answers.

8.3 Practical implications

8.3.1 Tourism issues

This research contributes to tourism industry a framework to provide stakeholders insight into the environmental approach interrelation with design and its impact on their businesses. This framework can provide a better understanding for developing plans and strategies not just for responding to environmental pressures, but also for active and profitable participation in an important and fast-growing marketplace.

The input of tourism into the world economy is obvious, moreover it has been forecasted that within the 21st century international tourism will be the most important sector in world trade, needless to mention the impact tourism has on the Egyptian economy-in hope that the September 11 incidents would not severely affect the industry.

The environment is a major resource for the tourism industry; the abuse of this resource can lead to its destruction. The world tourism success in the future will be dependent on the environment and the interpretation for the environmental protection mottos into actions, in other words, implementing sustainability principles.

Clearly, the key to sustainability is that the product offered is maintained in such a way that it satisfies consumer expectancies and therefore demand levels are maintained on long-term basis, and this would not happen spontaneously. Hence, it should be emphasized that sustainability in Egypt must not become a catchphrase due to its impression; the objective should be changing the current 'tourism management approach'.

EIA has been introduced as a tool that would guide to the rejection of the developments environmentally improper actions, and to the mitigation of its impacts to the acceptability threshold. Currently many EIAs might be based on outdated fieldwork, hence newly tourism market studies should be conducted where as to give the environment its due place in the decision making process by clearly evaluating the environmental consequences of a proposed activity.

It has been found from the stakeholders' point of view that the relation between tourism and economy is strong, although it is clear that an extremely wide gap between policymakers and developers' view occurs with respect to policies and plans of action.

The data extracted from the fieldwork indicated that although, awareness might exist, but the measures to mitigate the predicted impacts are not adequate. Mostly, stakeholders are functioning in isolated islands; miss-coordination is the common theme.

Auditing is not properly implemented, thus how would the concerned body be certain that the EIA output is put into action, the answer that it is only through follow-up. Although this follow up should rely on the partnership approach and not on a "police" approach. Auditing is a technique that provides the feedback on the effectiveness of the adopted methods; there is a need to more effective integration for monitoring and auditing into the EIA process. Obviously, sustainable buildings grant benefits to all parties; hence the holistic approach mentioned on the framework is needed towards the balances within the ecosystem.

8.3.2 Design issues

One objective of the framework is to help designers to take account of environment considerations which can be commercially successful, functional and highly aesthetically attractive. Certain measures within the research proposed framework were implemented on case study (1), although no EIA was conducted. These measures were not implemented due to environmental consciousness but for pure economical reasons, confirming that environmental and economical aspects can complement each other.

Sustainable buildings must be lifted out of the abstract ethical sphere and into the world of action; in the 21st century there will be an increasing need for some designers who are specialist in ecological design. The designer must be aware of the extent of the earth's resources used; each material in the built environment incurs spatial alterations to the ecosystem and a depletion of that resource.

Holistic architects and designers must have a through knowledge of what comprises an environmentally healthy building in the biological and ecological sense. Furthermore, the designer should not limit his vision to the design phase, figuring out the consequences of his design on the construction phase. The framework provides designers with a *'way of thinking'* about buildings as an important step towards sustainability.

The designer for case study (2) severely criticized the quality of EIA studies in Egypt, and although he is environmentally conscious, he mentioned that more rooms should be provided so developments would be interesting for the tour operators, ignoring the carrying capacity issue. The framework tackled this issue as a basic element from the project inception, based on the tourism type and the area sensitivity.

There is almost a consensus in favor of the research hypothesis; however, the interaction between the design team members needs to be highly considered, the engineering role needs to be emphasized within the context of impacts mitigation. It is not the architect sole responsibility to secure measures that would provide an environmental friendly product; the EIA coordinator assigned on the framework would play a part of this role.

Clearly materials have an impact directly and indirectly on the construction, as well as, the tourism industry, where the resources would be depleted on one hand, on the other, guests would be directly affected, if materials were hazardous. Hence, it is vital for suppliers and manufactures to grant environmental friendly products, the equation is simple, loosing tourism market share, meaning loosing hard currency.

Some materials will be depleted within the foreseeable future if the present scale of extraction continues. The Egyptian Map for Available Resources and Related Industries mentioned on the framework might be a guide for the designer in his material selection decision-making.

Consequently, the economical factor shall be the keystone in providing alternatives; the designer should make available what would be economically beneficial on the long term in materials selection by searching for new products and implementing innovative ideas. This approach is based on sustainability principals, directly designers in considering resource depletion mitigate the impacts that might take place due to their actions.

Case study (2) demonstrated environmental consciousness but not environmental awareness, emphasizing again the need for the awareness programs as the framework proposed. It might be the case that this project is successful from an environmental perspective but it would have been more economically viable if an EMS was adopted.

8.3.3 Construction issues

Traditional construction methods in fragile ecosystems would produce neither sustainable developments, nor sustainable tourism. Within this research, the intention is finding out the means for development. Tourism based on the environment is the most compatible option for development. A holiday resort should provide an attractive healthy environmental milieu in an exotic setting with minimum impact possible on the ecosystem, a concept that would be eminently marketable.

The framework has addressed the environmental policy issue, which does not unfortunately exist on construction sites according to the conducted fieldwork. Further the framework has clearly pointed to on which phase predicted impacts should be dealt with which is a confusing subject on construction sites.

The framework is providing a consistent pattern of thinking, in addition to the horizontal and vertical lines of communications, which were vital for case study (3). On this case study environmental measures implementation were mostly not consistently adopted. Economics govern, EIA follow up is not existing, even a key personnel did not know if an EIA was conducted for the project, where the researcher informally was monitoring the EIA recommendations. On case study (4), the contractor confirmed that there is no environmental policy on site, though he personally knew that an EIA was conducted for the project but no information was passed to him, emphasizing the need for communication efficiency as highlighted within the framework.

8.4 Recommendations

In order to minimize the environmental impact of buildings a great many topics need to be addressed. These range from the way in which a building affects the external, or global and neighborhood environment. To date, there has been little useful information from manufactures, where they tend to promote one aspect of their product.

Designers within the industry are not equipped to respond to new environmental demands; many designers adopt the approach that their area of responsibility is limited to function and appearance. Also those responsible for the construction phase must seek to reduce the impact of their operations on the environment.

Ecosystems are not isolated systems but have a spatial interlocking property, the design and the construction process must interrelate, the following are recommended actions that are proposed by the study that would enhance the process from design through to construction;

1) Policies should incur measures to mitigate the predicted impacts; the pattern of the current policies implemented could be responsible for the environmental damage by the Hurghada coast.

2) The relation between tourism and economy is strong as has been indicated, although the state economical policies are short termed, which could lead to environmental destruction, demolishing one of Egypt's assets and a crucial source for the country's GNP, a more far sighted policies are required.

3) The whole process within the tourism industry is lacking to the implementation for the real essence of sustainability; a better implementation for sustainability principals would dictate a different pattern for handling this issue.

4) The follow-up for the policies action plans need to be more effective through internal and external auditing systems, or how would the concerned body be certain that the EIA output is implemented. The interaction between the design team members needs to be highly considered; also the role of the EIA coordinator must be properly defined.

5) The terms EIA or sustainable development, are not appropriately understood; their essence would be conveyed to those involved on two lines in parallel. Now, throughout training and awareness programs, and for the future to come through our education system.

6) The implementation for innovative ideas in material selection, through conducting research in this area, or at least using the carried out research-as for The Egyptian Map for Available Resources and Related Industries-on real grounds. However, The economical factor shall be the keystone in this respect, where the designer should provide what would be economically viable on the long term.

7) Designers must take into consideration natural ventilation, and assisted natural ventilation methods. Furthermore, efficient energy conservation methodologies, either when the building is finished, or when the building is yet under construction, i.e. recommending construction methods that would minimize the materials embodied energy, as manufacturing building materials on-site.

8) The EIA quality as a tool is still questioned; the study should be conducted through professionals and experts in the area. Further, if it is properly carried out, effective lines of communication should be implemented making sure that the output has reached the design team members, as well as those involved on site.

9) Construction waste recycling and waste segregation should be properly managed through waste management plans, where the benefits are translated into

economical terms. Hence, those benefits will mandate taking those crucial issues into consideration by developers, as well as, contractors.

10) On construction sites there is a need for the implementation of environmental policy, and not just as 'stereotype' statements for marketing purposes, but policies accompanied with action plans, auditing systems (see appendix-I) must be carried out to make sure that plan of action is running smoothly. An EMS imbedded within the whole process would mean that most of the above-required aspects are in action, an ISO certificate might not be necessary; this might be accomplished internally within the organization or the project.

11) Public participation is a crucial element within the EIA process, this issue is neither realized nor adopted, it nearly does not exist; a need for raising the public awareness is required in order for the public to practice their rights appropriately.

8.5 Limitations and further research

This study has tackled the area of environment within the context of sustainability; this is a diverse area with various constituents that could not be addressed in this research due to various limitations. Due care should be adopted in looking into the results analysis because of the limited number of the studied sample.

Other limitation is the lack of environmental data within the field of construction, as well as, the field of tourism, precisely in the Arabic literature. Also, a lack of data is detected within the area of environmental approved materials in Egypt.

However, this research opens the way for further research that could be carried out in the following three areas: *tourism, design, or construction*, discretely or jointly. The research proposed framework could be tested on a larger number, where more empirical and numerical data could be worked out.

Despite the increase in the environmental awareness over the last few years there is still a lack of hard information on environmental effects, particularly comparative information on the hidden environmental costs of materials impacts. An interpretation system that would give an economical meaning for the mitigation measures recommended by the EIA, such as CBA, would supply the designers with better vision in providing alternatives.

Further, due to pressure on the earth resources, and materials depletion, a structure for a building dismantle manual could be studied in further research, based on the sustainable principle, 'design for dismantle not demolition'. The need for designers adopting holistic approach will increase in the near future according to markets and public directions.

Establishing an EIA that is tailored to the tourism industry with specific emphasis on coastal zones might be a break through, since the studied EIAs procedures are approaching projects in general, and the researcher should adapt this procedure to the project in question. The nature of coastal zones is different than those of industrial zone; a need to overcome this gap through further research is required.

Finally, the proposed framework could be transformed into interactive user-friendly software that could be updated and upgraded by the involved stakeholder to assist in the decision-making process, through further research development, the software could be a step towards providing an expert system to the tourism industry within the context of the environment.

APPENDICES

List of appendices

APPENDIX A

Stages Content

Detailed Framework
Stage-1
<u>Client brief identified by Architect based on sustainable principles</u>

<u>Guide sustainable development:</u>

1) Do not exceed Carrying capacity;
2) Maintain biodiversity;
3) Minimize depletion of non-renewable resources;
4) Promote development that maintains natural wealth;
5) Encourage equitable distribution of costs, benefits and management responsibilities;
6) Allow effective participation of local communities and in the decision-making process; MacGregor (1993)

Stage-1D
<u>Site Analysis Feedback</u>

1) *<u>Site considerations</u>*
   How the site and its buildings will interrelate with the microclimate variation,
2) *<u>Wind</u>*
   The design should reflect the wind direction and how it is channeled over site such that the building catches the wind to ventilate the internal space.
3) *<u>Water</u>*
   Large expanses of water on, or close to, the site will result in microclimate variations. The water naturally conditions the air passing over it by absorbing heat or by adding evaporative heat into cooler air.
4) *<u>Sun</u>*
   The sun offers a valuable source of heat and light. To achieve optimum results the orientation must be carefully selected. Leicestershire County Council (1992);
5) *<u>Topography and soil reports</u>*

Stage-1E-1
<u>Assign EIA coordinator</u>

1) Several consultants would be involved, the EIA coordinator will need to ensure that all parties are basing their assessments on the same, most up-to-date version of the proposed project.

2) It is particularly important to ensure that all impacts of the mitigation measures outlined in separate analysis are fully agreed upon and assessed.

3) When mitigation measures are proposed and adopted they become part of the most recent version of the project proposal and the environmental impacts of this version need to be reassessed. Thompson (1995)

Stage-1E-2
<u>Identify carrying capacity based on the targeted tourism/the site sensitivity not only guideline</u>

Types of carrying capacity

1) Physical capacity; is the absolute limit on tourist numbers that a resource can cope with.

2) Environmental capacity; is the maximum number of tourists that an area can accommodate without initiating a decline in the general perceived attraction of the area.
3) Ecological capacity; is the maximum number of tourists that an area can absorb before ecological decline takes place. (Witt et al, 1995).

The effects of carrying capacity; every destination has a limitation to the total number of visitors, which defines its Carrying capacity that could be broken down into five elements; two are quantifiable and three qualitative.

- *Damage*. The number of visitors hosted without causing measurable damage to the environment.
- *Delay*. The number of visitors hindered without causing intolerable delays in the use and enjoyment of attractions, with people having to queue or wait in traffic.
- *Overcrowding*. The number of visitors congested without giving a feeling of overcrowding, so that people are not, pushed and squeezed.
- *Image*. The number of visitors in and around a destination without changing its image.
- *Reaction*. The number of visitors maintained before there is a strong reaction, on the part of the local population, to the excessive pressures created, and a feeling of cultural invasion is provoked.

The optimum carrying capacity of a given tourism destination is judged, when there is no more room for anybody else'.

Stage-1E-3
Environmental Agenda

1) The first stages of a potential project are critical in establishing an environmental agenda and a good brief is fundamental to success of a project. The form, orientation and internal planning of the building have a critical influence on its energy requirement. The building should aim to provide as far as possible a naturally serviced environment.

2) Effective communication between the different parties can therefore save time and money and ensure the successful realization of a project's aims and objectives. (CIRIA, 1994).

3) A crucial element within the framework of design is feedback. Feedback can be derived from continuous monitoring of the design development and construction activity.

Environmental policy ingredients

Woolston introduced the essential ingredients of an environmental policy in the following sequence:

- Published statement.
- Clear objectives.

- A board member should be appointed with environmental responsibility.
- It is clear that policy has to be set at the top, and owned at the bottom. As the middle management will be in charge of implementing environmental policy, it is crucial that they are included in the policy making.
- A clear communication plan is very important. The Staff needs to be aware of the organization's policy and fully trained to handle their new responsibility.

Finally, the policy should include the environmental, health and safety checks, which are ongoing in most companies anyway.

Environmental policy requirements

Sppeding et al (1993) point that Setting out an environmental policy and being adopted by organizations, certain requirements should be met, including the following:

- It must be appropriate to the nature, scale, and environmental impacts of the organization's activities, products, and services.
- It must include a commitment to continual improvement and prevention of pollution.
- It must include a commitment to comply with relevant environmental legislation and regulations and with other (voluntary) requirements to which the organizations subscribes.
- It must provide a framework for setting and reviewing environmental objectives and targets.
- It must be documented, implemented, and maintained (Woodside et al, 1998).

General requirements for EMS documentation

Generally, Woodside et al (1998) mentioned that the standard requires the organization to establish and maintain information that describes the core elements of the EMS and their interaction, and to provide direction to related documentation. The information can be in paper or electronic form. Indeed, the environmental policy would be considered a core element, other elements that are not considered to be "core" must also be listed or otherwise referenced.

Stage-1E-4
Environmental Profile
Describing baseline environment

1) The aim of baseline description is to identify the current state of the environment, against which the PPPs expected impacts could be appraised.

2) The base line description is generally linked to the environmental indicators, and focuses on the key environmental components identified during the scoping process.

Stage-2
Schematic Design

Stage-2D-1
Green holistic approach

1) Brenda and Vale mentioned that a green approach to the built environment involves a holistic approach to the design of buildings; that all the resources that go into a building need to be considered if a sustainable architecture is to be produced.

2) William Reed defines green buildings as structures, *"designed constructed operated and demolished in an environmentally enhanced manner"*.

3) Dietsh demonstrated that truly "green" architecture is a holistic approach to design that engages a complex relationship between a building and its materials, systems, occupants, and surroundings (Mokhtar, 1998).

Stage-2D-2
Integrate economist, ecologist and sociologist views & culture aspects

Challenges in achieving sustainable tourism development might be through the integration of the viewpoints of at least three disciplines, (Serageldin1993):

a) Those of the *economists* whose methods seek to maximize human welfare within the constraints of existing capital stock and technologies.
b) That of the *ecologists* who stress preserving the integrity of ecological subsystems viewed as critical for the overall stability of the global ecosystem.
c) That of the *sociologists* who emphasize that the key actors are human beings whose pattern of social organization is crucial for devising viable solutions to achieving sustainable development.

The viewpoints of the three disciplines have to be integrated under the guidance of tourist expertise to forecast future demand, inducing values integrating tourism development projects into a sustainable framework that would warrant sustainable tourism growth.

Stage-2E-1
Initial EIA

Recommendations for managing the process of identifying Environmental Aspects

Woodside et al (1998) demonstrates the following points in order minimize the confusion within the application of the EIA process.

Do...

- Develop a process that is straightforward and repeatable.
- Make this process into a procedure.
- Ensure the process covers inputs and outputs of activities, products, and services.
- Consider beneficial as well as adverse environmental impacts.
- View this as "first step", not a "final product". There is always an opportunity to enhance the list of environmental aspects at a later time.

Don't....

- Make the process into a life-cycle assessment of each product, component, or raw material input

- Get bogged down debating the meaning of the definitions of environmental aspects and environmental impacts.
- Substantially change the process unless it is clearly not working.
- Make the process so complicated that it can't be performed in a reasonable amount of time.

The process of EIA

Although the steps are outlined in linear fashion, EIA should be cyclical activity, with feedback and interaction between various steps. The order of the steps may also vary in the process (Glasson et al, 1996):

- Project screening narrows the application of EIA,
- Scoping seeks to identify at an early stage the key significant issues,
- Considerations of alternatives,
- Description of the project/development,
- Description of the environmental baseline,
- Identification of key impacts, the prediction of impacts,
- Mitigation involves measures to avoid, reduce, remedy, or compensate for any significant adverse impacts,
- EIS presentation, review,
- Decision-making, post-decision monitoring; auditing.

Technically, Wathern (1988) suggests that EIA can be thought of as a data management process, as a 'science', it relates to the management of information. Where, it has three components:

a) Firstly, the appropriate information necessary for a particular decision to be taken must be identified and possibly, collected.
b) Secondly, changes in the environmental parameters resulting from implementation must be determined and compared with the situation likely to occur without the proposal.
c) Finally, actual change must be recorded and analyzed.

Stage-2E-2
Impacts prediction

1) The prediction of impacts raises various conceptual and technical problems, according to Glasson et al (1996). Establishing an environmental baseline is a problem on its own.

2) There may also be difficulties in clearly establishing the dimensions and development stages of the project under consideration on several cases, where the economical factor is a key element in this issue.

3) Innovative methods are being developed to predict impacts, ranging from simple checklists and matrices to complex mathematical models; these models rely on the quality of data input.

Stage-2E-3
Mitigation

Ecologist involved in the EIA of coastal developments should provide detailed prescriptions for the proposed measures, indicate how they would actually be put in place, and purpose how they might be modified if unforeseen post-project ecological impacts manifest themselves. Such information would be used by the design team.

Stage-3
Preliminary Design & Alternatives

Alternatives

The role of EIA is to ensure that environmental criteria are also considered at these early stages. Alternatives are *"the heart of the environmental impact assessment"*, according to the US council on Environmental Quality (CEQ 1978).

- Types of alternatives: The "no action" option refers to environmental conditions if the project did not go ahead.
- Presentation and comparison of alternatives: Overlay maps compare the impacts of various locations in a non-quantitative manner. Checklists or less complex matrices can also be applied to various alternatives and compared; this may be the most effective way of visually presenting the impacts of the alternatives.

Stage-3D-1
Designer sustainable approach, Research, Reduce, Reuse, and Recycle

Sustainable design

1) Design must be the bridge between human needs, culture and ecology. Design should enable internal adaptation in the future as circumstances change. "Engineers shall perform services that help to sustain the world's resources and meet long-term human needs while protecting the natural cultural environment". (CIRIA, 1994).

2) Thomas et al (1999) suggests that Building envelopes obviously need to be durable, economical, aesthetically pleasing, weather tight, structurally sound and secure. Psychologically, views out are very important. The envelope would to a large extent, determine how the internal environment is affected by the external one.

3) However, in Papanek (1995) opinion, *the procurer,* by investigating, identifying and clearly instructing the design team with regard to the real needs, requirements and priorities of the users. *The design team,* designers must think through issues leading to over-design and inefficiencies, pay attention to detail and give forethought to maintenance, commissioning and manageability.

4) Dhir et al (1998) emphasizes that the design team objective will have to deal with the following aspects:

    - Designing for environment.
    - Designing for disassembly (e.g. construction of joining systems).
    - Designing for recycling.

From the above it is crucial to highlight the skills and the capabilities that a design team member must develop as Papanek (1995) has illustrated.

The designer's repertoire

- The ability to research, organize and innovate.
- The capacity to develop appropriate answers to new or newly emerging problems.
- The skill to test these answers, through experimentation.
- The training to communicate such developments through drawings, models and mock-ups and feasibility studies.
- The talent to combine form giving with rigorous technical considerations and with a sense of humane and social factors and aesthetic enhancement.
- The wisdom to anticipate the environmental, ecological, economic, and political consequences of design intervention.
- The ability to work with people from many different cultures, and different disciplines.

Moreover, amongst the designers' skills, is their ability to be more sensitive to their environment from the aspect of waste minimization. Also adapting the concepts of *reduce, reuse, recycle,* to their sustainable approach, and this might be implemented through clever design leading to:

- More slender sections
- Thinner slabs
- Less need for false work
- Reduce amount of temporary work

Stage-3D-2
Design for dismantle not for demolition

Stage-3D-3
Sustainable Design Considerations
-Life cycle design
-Eco-responsible design -Design for flexibility
-Energy planning
-Natural & assisted natural ventilation
-Simple & not complex techniques
- Easily understood building controls
-Material selection
- Local materials with low environmental load
-Waste management
-Integrate eco-approach with electro-mechanical design team

The Environmental Preference Method

Environmental preference method (EPM), which has been developed by Woon/Energie in 1991, compares materials and products currently on the market and ranks them according to their environmental impact. The EPM is not static, Anink et al (1996) pointed that the basic strategy for choice of sustainable building materials to consist of the following steps

Step 1: prevention of unnecessary use and efficient use of materials

At the early design phase, significant improvements can be achieved, for instance by investigating the possibilities for reuse of existing buildings. Secondly, designers can design a building to be as efficient as possible, by minimizing the resources needed. In the final design-specification phase an optimization of the sizes of components may be helpful to avoid demolition waste during construction. Last the expected lifetime of a component should be adjusted to its technical lifetime.

Step 2: use of renewable and recycled sources

By making use of renewable and recycled sources, life cycle of a building can be closed. Recycled materials will enter a second life, without taking resources from the nature. Clients, designers can allow for future recycling by:

- Not using composite materials that cannot be separated at the end of the life cycle.
- Not gluing and sealing components together.
- Designing buildings for dismantling, not for demolishing.

They emphasized that the first recycling option is direct reuse of components or complete buildings. A second consideration is the recycled product quality. The so-called down cycling into low-grade application will not close the life cycle, but only expand lifetime.

Step 3: selections of the materials with the least environmental impact

The environmental impact of materials is caused during the complete lifetime. Amongst the typical environmental issues are; raw materials, embodied energy, emissions, waste, recycling, repair and lifetime. It is important to select those building products, which have the lowest environmental impact.

Stage-3E

Final EIA

EIA report preparation

Wood (1996) points out that Within the EIA report; a consistent vocabulary should be employed describing the impacts significant on EIA reports. The basis on which value judgments are made should be clearly explained since while there may be agreement about the magnitude of impacts, different participants in the EIA process are unlikely to agree about their significance.

The non-technical summary is frequently used to disseminate the findings of the EIA report to the general public at low cost.

Wood (1996) states that in UK there is no prescribed form of an environmental statement (ES). Except that it must contain, a description of the environment and the project; the data necessary to identify and assess the main effects; a description of the likely significant effects, direct and indirect; on the environment of the development, and a description of mitigation measures and a non-technical summary. However, the USA form for the ES would be as following:

- Cover sheet

- Summary (not normally exceeding 15 pages in length)
- Table of contents
- Statement of purpose and need
- Alternatives, including the proposed action
- Affected environment
- Environmental consequences, including mitigation measures
- List of prepares
- List of agencies and organization consulted
- Appendices
- Index

Stage-4
Final Design & construction Doc

Stage-4E-1
Verify compliance
Environmental auditing definitions

The definition is highlighted by Renger (1992) European Eco-Audit defines 'environmental audit' as: 'a management tool comprising a systematic, documented, periodic and objective evaluation of the performance of the organization, management system and equipment designed to protect the environment with the aim of:

I. Facilitating management control on environmental practices
II. Assessing compliance with company policies, including observance of the existing regulatory requirements.

Sasseville et al (1997), notes that although there are numerous definitions of environmental audit, certainly one of the most authoritative definitions in the United States comes from the U.S. Environmental Protection Agency (EPA) in their 1986 Environmental Policy Statement:

> *"Environmental auditing is a systematic, documented, periodic, and objective review by regulated entities of facility operations and practices related to meeting environmental requirements." (Federal Register, 131, July 9, 1986).*

Sppeding et al (1993) explored the above-mentioned statement by their notion that "systematic" has, in this context, two aspects: the methodology to be adopted and the scope of the audit. As regards to methodology, it is interesting that the US Environmental Protection Agency, (EPA), ICC and the European Community emphasized the importance of:

(i) Management understanding that leads to support and commitment.
(ii) Proper definition and aims of the audit.
(iii) Independence and objectivity of the audit team; and
(iv) Quality control.

It should be noted that all the schemes require that audits be carried out at regular intervals. Where the eco-audit scheme of an organization is expected to have:

1. An environmental protection system;
2. An environmental system;
3. An environmental management system;
4. An environmental program; and
5. It is expected to undertake environmental reviews and of course, environmental audits and issue environmental statements.

The "environmental protection system" is at the *heart* of the scheme. It includes in writing: environmental objectives, an environmental program and an environmental management system. It is to be developed on the basis of the initial environmental review, and is defined as "a coordinated set of measures of various kinds aimed at protecting the environment".

Audits objectives

Environmental auditing has three broad aims according to Legerwood et al (1992), which concerns the existing operation of a firm;

(i) Compliance with regulatory codes;
(ii) Assistance in acquisition and disposal valuations; and
(iii) Corporate development towards green missions.

In this respect Renger (1992), demonstrates the objectives for audits as following:

- To increase the organization's knowledge of its own sites and activities.
- To monitor and improve environmental performance.
- To assist better management.
- To ensure compliance with legislation.
- To assess compliance with corporate policy.
- To identify and control a specific problem.
- To educate and motivate the workforce: corporate environmental policies by their nature are strong on principle and weak on detail.
- To demonstrate commitment of management to environmental performance.
- To reduce costs: undertaking an environmental audit could be a potentially expensive task. However, the short-term financial costs could often be outweighed by improvements in environmental performance.
- To identify and minimize future potential liabilities.

Audits functions

During the evaluation procedures Sasseville et al (1997), points that the environmental audits could verify compliance with environmental requirements, evaluate the effectiveness of components of the organization's EMSs, asses risks from regulated and unregulated materials and practices, and Serve as quality assurance check.

The different types of audits in its easiest form, within the ISO 14001 context, to think of three types. *First,* the most common historically, the environmental compliance audits. *Second* is the EMS audit. *Third* is a specialized set of EMS audits that together comprise the ISO 14001 certification audit.

Stage-4E-2
Procedures Audit

Stage-5
Tendering

Stage-5D
Favor manufactures demonstrating environmental safeguard

Stage-5E
Screening for contractors not implementing EMS &ISO 14000 BUT With Reference to Size & Type Of The Project
ISO 14000 certification

In order to seek certification a few more basics need to be comprehended, amongst these basics are the following:

- The differences between certification, registration, and auditing.
  The terms, *certification* and *registration* are used interchangeably to denote the process of third-party verification that an organization's

- Identification of the areas to begin with.

  The organization should begin with those areas, where the most initial benefit is expected.

- Management's Commitment to an Environmental Policy

  ISO 14001 requires that management demonstrates a real commitment to its EMS and that commitment would be defined in detailed environmental policy.

- The fulfillment of the ISO requirement

  Three steps are necessary according to ISO 14004, the guidance document designed to help organizations implement ISO 14000.These are:

  (i) Ensuring top management commitment and leadership.
  (ii) Developing an environmental policy.
  (iii) Performing an initial environmental review.

- Information collection

  Having decided what would be reviewed, and depending on the nature of the data that would be collected, there are several approaches to collecting information, amongst these are:

  1) Focused questionnaires, which produce unambiguous responses.
  2) Reviewing existing organizations' records, procedures, and so on.
  3) Perform site inspections.
  4) Review audit results.

5) Interview organization's personnel or outside parties.
6) Develop checklists.
7) Review internal practices that have in the past resulted in environmental improvement.

Review procedures and practices of other similar companies that have improved their environmental performance.

Stage-6
Construction

Stage-6D-1
Updated construction catalogues with different materials, methods & equipments alternatives
Sustainable construction

Sustainable construction is generally used to describe a process that starts well before construction, in planning and design, and continues after the construction team has left the site. Waytt (1994) has deemed sustainable construction to include managing the serviceability of a building during its lifetime and eventual deconstruction and recycling of resources to reduce the waste stream usually associated with demolition.

Stage-6D-2
Waste minimization & Recycling
Waste minimization

Ferguson et al (1995) defines *"Waste is any material where the holder has an intention to discard the material as no longer part of the normal commercial cycle or chain of utility".*

The true cost of waste

> *Purchase price and transportation costs of materials that are being waste +Cost of storage, transport and disposal of waste +Loss of income from not salvaging waste materials.*

Further Anink et al (1996) adds that if waste enters the environment after the demolition of a building, either through landfill or in another way, then the environmental pollution created will depend on particular combination of the material's ability to cause harm to its degradability. Waste products including paint and construction materials should be disposed of at appropriate waste disposal sites.

Economic benefits of waste minimization

Ferguson et al (1995) indicated that the disposal of construction waste is becoming a major cost in construction projects. To be competitive, ways of minimizing construction waste need to be found.

- Prevent waste by proper maintenance.
- Design with whole-life cost in mind to minimize waste.
- Use techniques, which avoid creating waste.
- Reuse waste on site for other purposes or find profitable uses off site.

- Dispose of inert waste on site.

Care should be considered when producing waste, due to the direct and indirect benefits that might be gained if the amount of construction waste going to landfill can be reduced, the following could be accomplished:

- Environmental amount from quarrying can be cut.
- Energy consumption on transport can be conserved.
- Profits on construction can be increased through reduced disposal costs.

Moreover, the financial benefits might include:

- Reduced costs for the transport and disposal of waste materials
- Reduced costs of using new materials
- Increased returns from selling waste materials for reuse.

Dealing with waste

It is self evident that the best way to deal with waste is not to create it in the first place. There are five basic approaches to controlling waste at the source:

1. Change raw materials used in production.
2. Change production technology and equipment
3. Improve production operations and procedures
4. Recycle waste within the plant.
5. Redesign or reformulate end products.

(CIOB, paper no.49 Brigth and Lown).

By looking at the waste management priorities illustrated below, concentrating on each stage, and by implementing these points, we have helped to minimize the use of raw materials and reduced waste production.

- Minimize raw materials used
- Reduce wastes
- Recycle wastes
- Recover energy from waste
- Send minimum amount of waste to landfill.

In practical terms, and by exploring some few examples, Concrete could be recycled for reuse as aggregate in new concrete or as unbound aggregate in roads or fill. The excavation of topsoil might be reused for landscaping, also Timber would be reused for chipboard, and finally Metals recycled by smelting. Coventry and Woolveridge, 1995 argue that before demolition begins, disposal options for the materials that will be generated ought to be reviewed.

Waste separation

Anink et al (1996) emphasizes that the separation of building waste, opens up opportunities for further use.

- Primary reuse–where the material is used again following negligible or no further treatment–is preferable, and occurs more often in demolition or refurbishment than in construction of new houses.

- Secondary reuse (recycling) where the materials are reprocessed to new materials in a reprocessing plant demands additional transport and energy consumption and results in the release of harmful substances. Most building waste used to be dumped. The separation of waste on site is generally preferable because it is best to tackle problems at their source.

Client's and designer's checklists towards waste minimization

As the client and the designer represent two major contributors to the construction industry, Ferguson et al (1995) suggests checklists that could enhance the philosophy of waste minimization.

Client's checklist

- Waste prevention and minimization should be part of the brief-
- Use adjacent land for landscaping which can be landscaped using spoil
- Beware contaminated land- if land is contaminated by previous process.
- Use specialist demolition contractor to carry out safely and with maximum reuse, recycling or sale of the materials.
- Avoid over-specification.
- Determine the details of the proposals for reuse and/or disposal and check the details with waste regulation authority where there is any doubt any part of the arrangements.

Designer's checklist

- Not excavating spoil materials, concrete, or other materials, which can be left in place.
- Attempting to recycle as part of the design, for example by providing sites and opportunities for crushing concrete, etc.
- Balancing cut and fills.
- Using material, which would be unsuitable for construction in areas where material strength is not required.
- Using contractors or subcontractors who can and will reuse materials on site or else where.
- Specifying materials to the performance required.

Stage-6E-1
Monitoring

Monitoring is an important element of EIA, The success of mitigation measures can be established only if the area in question is subject to monitoring program impacts;. (Therivel and Morris, 1995).

Therivel and Partidario (1996) demonstrate a range of techniques that can be used to predict and represent the impacts of PPPs ;

- Checklists which show whether the PPP has an impact or not, sometimes with further details on, for instance, impact type (positive, negative) and magnitude;
- Compatibility or consistency assessment, which test whether different sub-components of the PPP are internally consistent;
- Overlay maps or GIS showing for instance, sites affected by the PPP.

Stage-6E-2
Impacts Mitigation

Wood (1996) emphasized that;

> *If the consideration of alternatives lies at the heart of the environmental impact statement then the mitigation of impacts is the principal aim of the EIA process.*

Examples of methods to avoid impacts on site would include:

- The control of solid and liquid wastes by recycling on site or by removing them from the site for environmentally sensitive treatment else where;
- Avoid disturbance to communities from construction lorry and night construction; and
- Establishment of buffer zones.

Examples of methods to reduce adverse effects during the design phase might include:

- The sensitive design of structures, using simple profiles, local materials, and muted colors, to reduce the visual impact of a development, and landscaping to hide and/or blend it into the local environment;
- Use of construction site hostels, and coaches for journeys to work, to reduce the impact on the local housing market, and on the roads, of a project with major construction stage employment;
- Use of silting basins or traps, planting of temporary cover crops, and scheduling of activities during the dry months to reduce erosion and sedimentation.
- A local community astride a route to a new tourism facility could be relieved from much of the adverse traffic effects through the construction of a bypass.

Construction and the environment

Moavenzadeh (1994) points that It might be the case, that some construction firms-based on unawareness or other reasons-would consider solving the problem is through implementing simple environmental requirements at a building site, such as dust suppression, noise control, and the disposal of debris. In this respect, Moavenzadeh suggested four different types of needs for construction companies as a result of expanding environmental requirements.

Mackenzie et al 1991, emphasizes that assessing the true environment impact of a product or construction can be done only if consideration is given to its effect throughout all the stages of its life "cradle-to-grave approach". Focusing on its impact during use, or on of its characteristics, such as recyclability or energy efficiency, gives partial, possibly misleading picture of its overall performance.

On site green techniques (OGT)

Several areas and procedures on site can be tackled technically "green", the following procedures present some of these procedures;

Demolition
Coventry and Woolveridge (1995), points that before demolition begins, a review of the disposal options for the materials that will be generated should be considered.

Dredging
Dredging may affect the aquatic ecology; an appropriate dredging technique must be used to minimize the disturbance of sediment resulting in silting of the watercourse and potential mobilization of contaminants

Earthworks
Coventry and Woolveridge (1995) emphasized following good practice in managing stockpiles, and planning the disposal of surplus materials arising from earthworks before starting works, aiming to reuse spoil rather than disposing of it to landfill.

Excavation
They further added the reuse for topsoil by storing it in piles less than 2 m high to prevent damage to the soil structure. Also using excavated materials to form noise bunds and for landscaping.

Piling (including temporary works)
Piling is an early activity; the risk of spillage should be minimized in using oils and chemicals. Noise and vibration will annoy neighbors; noise levels created by piling vary with the method used. Wastes from bored piling may form a particular problem, as the waste is often wet and it should be disposed properly.

Grouting
Enclose grouting operations. Pump out displacement water before works start Use settlement tanks to remove sediments. Use flocculants to separate grout fines.

Housekeeping
Ueda and Yamamto (1996) illustrated on-site green techniques by separating it into eight categories according to standard segregation rules of the building constructors society.

1. Wood
2. Metal
3. Combustible
4. Incombustible
5. Can
6. Corrugated paper
7. Concrete
8. Garbage

Managing materials (Ordering and receiving)

CIRIA publication (1999) emphasized ordering the right quantity and quality, when materials are needed. Checking arrangements for delivery, unloading to the correct location, handling and storage.

Concrete batching

Position plant away from neighbors; erecting barriers to deflect noise, using water sprays in aggregate storage bays, considering self -contained plant to allow for water reuse. On site the following could be implemented

(i) A concrete construction method, which does not require moulds.
(ii) A plastic mould method reducing the volume of trees cut down.

Use of paints and solvents

CIRIA publication-1994 raised the issue of paints and solvents where the potential hazards and environmental concerns relate to the materials used. The potential contamination of the internal environment from such processes as off- gassing. The potential hazard to the workforce from solvent fumes when applying paints, resins and related materials; sealant and glazing compound formulations using asbestos fiber as filler or lead as drying agent should be avoided, and the emphasis for the use of lead-free paint and primers.

Stage-6E-3
Corrective actions

Nonconformance and corrective and prevention action

ISO 14001 requires that the organization establish and maintain procedures for defining responsibility and authority for handling and investigating non conformances, for taking action to mitigate any environmental impacts, and for initiating and completing corrective and preventive action. Finally, the standard requires the organization to make changes to procedures, as necessary, as a result of corrective and preventive action.

Stage-6E-4
EMS AUDIT

Stage-7
Occupational Phase

Stage-8
Demolition

Stage-8D
Review disposal options, segregate, reuse, recycle & dispose properly

Feedback

APPENDIX B

السادة :

تحية طيبة وبعد ،

يقـوم الـباحث بجمع أراء السادة المساهمين في صناعة التشييد كجزء مكمل لرسالة الدكتوراه التي تهدف إلى أفضل السبل التصميمية التي تراعي الحفاظ على المصادر الطبيعية .

لذا نشكركم على حسن مشاركتكم في هذا البحث ... المهندس / مدحت عثمـان

الاسم : ____________

الوظيفة : ____________

برجاء وضع إشارة ☐ في المربع المناسب

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١. ما هي مقومات مصر السياحية من وجهة نظرك ؟ ☆

أثـار ☐ شـواطئ ☐ مناخ ☐ غيـره ☐

٢. هل تأثير المشروعات السياحية الشاطئيه على البيئة ؟

إيجابي ☐ سلبي ☐ غير مؤثـر ☐

مباشر ☐ غير مباشر ☐

قصير المدى ☐ بعيد المدى ☐

٣. هل هناك علاقة بين السياحة و الاقتصاد ؟ نعم ☐ لا ☐

- في حالة نعم – هل تلك العلاقة مبينة على سياسية اقتصادية ؟

بعيدة المدى ☐ قصيرة المدى ☐

٤. السياحة المستدامة أو بمعنى أخر السياحة التي تستمر على مدار السنين بصورة إيجابية هل هي نتيجة : ☆

- إنشاء المشروعات السياحية بطريقة سليمة بيئيا ☐
- وضع السياسة البيئية وتنفيذها ☐
- غيـره ☐

٥. هل هناك علاقة بين السياحة المستدامة والتنمية المستدامة ؟☆ نعم ☐ لا ☐

٦. هل مقومات التنمية المستدامة من وجهة نظرك هي : ☆

- وعي جميع الأطراف لتنفيذ المشروع بصورة متوافقة بيئيا ☐
- عدم الضرر بالبيئة المحيطة والمحافظة عليها ☐
- المشروع الذي يدر دخل دائم بغض النظر عن تأثيره على البيئة ☐

٧. هل التحديات التي تواجه التنمية المتواصلة (المستدامه) ؟☆

- قصور في السياسة البيئية والمتابعة ☐
- عدم الوعي من البيئي المقاول ☐
- رغبة المالك في التوفير ☐

٨. هل يوجد في الموقع أو الشركة ما يسمى بالسياسية البيئية ؟ نعم ☐ لا ☐

٩. هل يوجد مستندات متابعة لتنفيذ تلك السياسية أثناء التنفيذ .

نعم ☐ لا ☐ لا اعلم ☐

١٠. أ . هل يوجد للمشروع دراسة تقيم الأثر البيني؟

نعم ☐ لا ☐ لا اعلم ☐

ب . في حالة نعم - هل تلك الدراسة ؟

مفيدة ☐ غير مفيدة ☐ ضارة ☐

ج . هل منع الآثار السلبية المتوقعة يعني شيء بالنسبة لك في دراسة تقييم الأثر البيئي ؟

نعم ☐ لا ☐

د . هل تعنى كلمة رصد الآثار السلبية شئ بالنسبة لك في دراسة تقييم الأثر البيئي ؟

نعم ☐ لا ☐

١١. هل ترى وضع البدائل المقترحة لمنع الآثار البيئية أهمية ؟ ☆

نعم ☐ لا ☐ لا اعلم ☐

- في حالة نعم – ماذا تعني تلك البدائل المقترحة ؟

– بدائل طرق إنشاء ☐

– بدائل طرق تنفيــذ ☐

– بدائل أخرى للتصميم ☐

١٢. هل يتم عمل أي تفتيش لمتابعة تنفيذ توصيات دراسة تقييم الأثرالبيئي على الموقع؟☆

نعم ☐ لا ☐ لا اعلم ☐

١٣. كيف يتم التعامل مع الآثار السلبية المتوقعة ؟ ☆

– في خلال مرحلة التنفيذ ☐

– في خلال مرحلة التصميم ☐

– لا أ علم ☐

١٤. هل يتم اتخاذ أي سبل للحفاظ على البيئة أثناء التنفيذ ؟ ☆

نعم ☐ لا ☐ لا اعلم ☐

- في حالة نعم ☆

– من خلال سياسة واضحة للشركة ☐

– اجتهاد شخصي من العاملين ☐

– من خلال دراسة أثر التقييم البيئي ☐

١٥. هل يتم إعادة تدوير نواتج (هوالك) مواد البناء في الموقع؟ ☆

نعم ☐ لا ☐ لا اعلم ☐

١٦. هل وجدتم من وجهة نظركم مراعاة تصميمه للتوجيه الأمثل على الموقع ؟ ☆

نعم ☐ لا ☐ لا اعلم ☐

١٧. هل يؤثر التوجيه الأمثل في الموقع على تقليل الطاقة المستخدمة ؟ ☆

نعم ☐ لا ☐ لا اعلم ☐

١٨. هل وجدتم من وجهة نظركم تأثير إيجابي للتصميم على عملية الإنشاء ؟ ☆

نعم ☐ لا ☐ لا اعلم ☐

١٩. هل لاحظت انه يتم مراعاة اختيار مواد الإنشاء عند التصميم حتى لا تؤثر سلبا" على الموقع ؟

نعم ☐ لا ☐ لا اعلم ☐

٢٠. حدد من وجهة نظرك مدى استهلاك مواد البناء المستخدمة للطاقة بصفة عامة سواء بالموقع أو خارج الموقع :

- الطوب عالي ☐ منخفض ☐ غير مؤثر ☐
- الأسمنت عالي ☐ منخفض ☐ غير مؤثر ☐
- الحـديـد عالي ☐ منخفض ☐ غير مؤثر ☐
- الدهانـات عالي ☐ منخفض ☐ غير مؤثر ☐
- الأخشاب عالي ☐ منخفض ☐ غير مؤثر ☐

٢١. هل يتم فصل العناصر المختلفة في مخلفات الموقع ؟ نعم ☐ لا ☐ لا اعلم ☐

٢٢. هل عملية الفصل تتم بسبب اقتصادي أو أسباب أخرى ؟ ☆ اقتصادي ☐ أسباب أخرى ☐

٢٣. ما هي العوائق أمام عمليات الفصل في المخلفات ؟ ☆

عدم الوعي ☐ لا يوجد عائد مادي ☐ أسباب أخرى ☐

٢٤. ما هو من وجهة نظركم أسس صناعة التشييد المستدامة بمعنى صناعة التشييد المثلى التي تؤدي إلى منشأ يستمر يؤدي بكفاءة لأجيال قادمة .

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٢٥. ما هو من وجهة نظركم أسس صناعة التشييد المستدامة بمعنى صناعة التشييد المثلى التي تؤدي إلى منشأ يستمر يؤدي بكفاءة لأجيال قادمة .

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٢٦. هل كان من الممكن كمدير مشروع أثناء عملية التنفيذ استغلال البيئة بصورة أفضل للتوفير .

نعم ☐ لا ☐ لا اعلم ☐

- في حالة نعم – اشرح ذلك :

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٢٧. هل يوجد سؤال أخر لم يتم سؤاله .

APPENDIX C

السادة :

تحية طيبة وبعد ،

يقــوم الــباحث بجمع أراء السادة المساهمين في صناعة التشييد كجزء مكمل لرسالة الدكتوراه التي تهدف إلى أفضل السبل التصميمية التي تراعي الحفاظ على المصادر الطبيعية .

لذا نشكركم على حسن مشاركتكم في هذا البحث ...   المهندس / مدحت عتمــان

الاسم : ____________________

الوظيفة : ____________________

برجاء وضع إشارة ✓ في المربع المناسب

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١. لماذا يأتي السياح إلى مصر ؟

الآثار ☐ البحـر ☐ الجـو ☐

٢. هل تأثير المشروعات السياحية الشاطئيه على مواقع الإنشاء ؟

جيد ☐ غير جيد ☐ غيـر مؤثـر ☐

٣. هل هناك علاقة بين السياحة والفلوس التي تدخل إلى جيبك ؟ نعم ☐ لا ☐

٤. في حالة نعم – ما هي سياسة الدولة ؟

هل تنظر إلى الأمام ☐ لا تنظر إلى الأمام ☐

٥. كيف تكون مشاريعنا السياحية السبب في تدفق السياح ؟

– ننفذها جيدا حتى تعيش مدة طويلة ☐

– نحافظ على الموقع من المخلفات وخلافه ☐

٦. هل هناك علاقة بين السياحة والمشاريع التي نفذت بصورة جيدة ؟ نعم ☐ لا ☐

٧. كيف تكون مشروعاتنا طويلة الأجل بعد التنفيذ ؟

– طريقة تنفيذ جيدة ☐

– طريقة تصميم جيــدة ☐

– الاثنان معــا ☐

٨. هل المشاريع لا تنجح بسبب ؟

- قصور في السياسة والمتابعة ☐

- عدم الوعي من المقاول ☐

- رغبة المالك في التوفير ☐

٩. للحفاظ على مواد الإنشاء و أساليب العمل ، هل يوجد في الموقع توعيه للحفاظ على الموقع كأرض ومكان

نعم ☐ لا ☐

١٠. هل يوجد مستندات متابعة للتنفيذ تلك التوعية ؟

نعم ☐ لا ☐ لا أعلم ☐

١١. في حالة نعم - هل تلك التوعية ؟

مفيدة ☐ غير مفيدة ☐ ضارة ☐

١٢. هل تعنى منع الآثار السلبية المتوقعة شيء بالنسبة لك؟ نعم ☐ لا ☐

١٣. هل تعنى كلمة رصد الآثار السلبية شئ بالنسبة لك ؟ نعم ☐ لا ☐

١٤. هل تعنى كلمة البدائل المقترحة لمنع الآثار السلبية شئ بالنسبة لك؟ نعم ☐ لا ☐

١٥. هل يتم عمل أي تفتيش لمتابعة أسلوب التنفيذ في الموقع ؟ نعم ☐ لا ☐

١٦. هل يتم اتخاذ أي سبل للحفاظ على بيئة الموقع أثناء التنفيذ ؟ نعم ☐ لا ☐ لا اعلم ☐

١٧. ما هي تلك السبل ؟ توعيـــة ☐ تنفيذيـــة ☐

١٨. هل يتم إعادة تدوير نواتج (هوالك) مواد البناء في الموقع؟ نعم ☐ لا ☐ لا اعلمُ ☐

١٩. هل وجدتم من وجهة نظركم مراعاة تصميمه للتوجيه المثالي على الموقع ؟

نعم ☐ لا ☐ لا اعلم ☐

٢٠. هل تم توجيه الواجهات في الاتجاه البحري ؟

نعم ☐ لا ☐ لا اعلم ☐

٢١. هل التوجيه البحري أفضل ؟

نعم ☐ لا ☐ لا اعلم ☐

- في حالة نعم – لماذا هو أفضل ؟

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٢٢. هل لاحظت انه يتم مراعاة اختيار مواد الإنشاء عند التصميم حتى لا تؤثر سلبا" على الموقع ؟

نعم ☐ لا ☐ لا اعلم ☐

٢٣. هل لاحظت أنه يتم مراعاة مواد الإنشاء عند التصميم حتى لا تؤثر سلبا على الموقع ؟

نعم ☐ لا ☐ لا اعلم ☐

٢٤. هل يتم فصل العناصر المختلفة في مخلفات الموقع ؟

نعم ☐ لا ☐ لا اعلم ☐

٢٥. هل عملية الفصل تتم بسبب :

اقتصادي ☐ أسباب أخرى ☐ لا اعلم ☐

٢٦. ما هي العوائق أمام عمليات الفصل في المخلفات ؟

عدم الوعي ☐ لا يوجد عائد مادي ☐ أسباب أخرى ☐

٢٧. هل طريقة تنفيذ المبنى في هذا المشروع ؟

أفضل ☐ أسوأ ☐ من مشاريع أخرى عملت بها .

- لماذا ..؟

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٣١. هل يوجد أسئلة أخرى لم يتم سؤالها :

APPENDIX D

السادة :

تحية طيبة وبعد ،

يقــوم الــباحث بجمع أراء السادة المساهمين في صناعة التشييد كجزء مكمل لرسالة الدكتوراه التي تهدف إلى أفضل السبل التصميمية التي تراعي الحفاظ على المصادر الطبيعية .

لذا نشكركم على حسن مشاركتكم في هذا البحث ...

المهندس / مدحت عثمــان

الاسم : ____________________

الوظيفة : ____________________

برجاء وضع إشارة ☐✓ في المربع المناسب

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١. هل تأثير المشروعات السياحية الشاطئيه على البيئة ؟ ☆

إيجابي	☐	سلبي	☐	غير مؤثر	☐
مباشر	☐	غير مباشر	☐		
قصير المدى	☐	بعيد المدى	☐		

٢. هل العلاقة بين السياحة والاقتصاد هي علاقة ☆

بعيدة المدى ☐ قصيرة المدى ☐ ولماذا ؟

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٣. من وجهة نظركم السياحة المستدامة أو بمعنى أخر السياحة التي تستمر على مدار السنين بصورة إيجابية- هي نتيجة: ☆

- إنشاء مشروعات سياحية بطريقة سليمة بيئيا ☐
- وضع سياسة بيئية وتنفيذها بأقل أضرار سلبية ☐
- المشروع الذي يدر دخل بغض النظر عن البيئة ☐

٤. هل هناك علاقة بين السياحة المستدامة والتنمية المستدامة ؟

نعم ☐ لا ☐

٥. ما هي مقومات التنمية المستدامة من وجهة نظرك ؟ ☆

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٦. هل التحديات التي تواجه التنمية المتواصلة (المستدامه) ؟ ☆

- قصور في السياسة والمتابعة ☐
- عدم الوعي من المقاول ☐
- رغبة المالك في التوفير ☐ اشرح لماذا ..؟

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٧. هل دراسة تقييم الأثر البيئي بالنسبة للمشروعات الشاطئية ؟ مفيدة ☐ غير مفيدة ☐

- اشرح لماذا ..؟

____

____

٨. هل التفاعل بين أفراد فريق العمل في دراسة تقييم الأثر البيئي يؤثر إيجابيا أم سلبيا على المنتج النهائي وهو مشروع متوافق بيئيا ولماذا ؟

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٩. هل يوجد سياسة بيئية في مجال التشييد ؟ نعم ☐ لا ☐

- هل تطبق هذه السياسة ؟ نعم ☐ لا ☐
- في حالة نعم — كيف تطبق هذه السياسة ؟

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١٠. هل يوجد خطط متابعة للتنفيذ تلك السياسية ؟ نعم ☐ لا ☐

١١. هل يتم عمل متابعة لتنفيذ توصيات دراسة تقييم الأثر البيئي على الموقع ؟

نعم ☐ لا ☐

- كيف تتم تلك المتابعة وبأي إسلوب : ☆

هل يجرى تفتيش على مواقع الإنشاء السياحية بيئيا ؟ ☆

نعم ☐ لا ☐

- وكيف من المفروض أن يكون الأسلوب المتبع للتفتيش ؟

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١٢. كيف يتم التعامل مع الآثار السلبية المتوقعة ؟

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١٣. ما هو دور دراسة تقييم الأثر البيئي في اختيار البديل من وجهة نظركم ؟

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١٤. هل يتم اتخاذ أي سبل للحفاظ على البيئة الطبيعية أثناء التنفيذ ؟ ☆

نعم ☐ لا ☐

١٥. ما هي تلك السبل التي يتم اتخاذها للحفاظ على الموقع بيئيا ؟ ☆

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١٦. هل يتم إعادة تدوير نواتج (هوالك) مواد البناء في الموقع؟ ☆

نعم ☐ لا ☐ لا اعلم ☐

١٧. هل وجدتم من وجهة نظركم مراعاة تصميمه للتوجيه الأمثل في مواقع إنشاء المشروعات السياحية ؟

نعم ☐ لا ☐

- في حالة الإجابة بنعم — كيف كانت تلك المراعاة من وجهة نظركم ☆

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١٨. هل طرق الإنشاء المستخدمة تؤثر إيجابيا" على توفير الطاقة ؟ ☆

نعم ☐ لا ☐

- اشرح ذلك :

---

١٩. مـــن وجهة نظركم ما هو التأثير لعملية التصميم على عملية الإنشاء فعلى سبيل هل راعى المصمم عملية إعادة التدوير أثناء التنفيذ و بعد انتهاء العمر الافتراضي للمبنى ؟

٢٠. من وجهة نظركم ما هو الأسلوب المتبع من خلال المصمم في اختيار مواد البناء بمعنى هل فيه ابتكار أم تقليدي في الاختيار ؟

٢١.ما هو من وجهة نظركم أسس صناعة التشييد المستدامة بمعنى صناعة التشييد المثلى التي تؤدي إلى منشأ يستمر يؤدي بكفاءة لأجيال قادمة

٢٢. هل يوجد أسئلة أخرى لم يتم سؤالها ؟..

APPENDIX E

السادة :

تحية طيبة وبعد ،

يقوم الباحث بجمع أراء السادة المساهمين في صناعة التشييد كجزء مكمل لرسالة الدكتوراه التي تهدف إلى أفضل السبل التصميمية التي تراعي الحفاظ على المصادر الطبيعية .

لذا نشكركم على حسن مشاركتكم في هذا البحث ...

المهندس / مدحت عثمـــان

الاسم : ____________

الوظيفة : ____________

برجاء وضع إشارة ☑ في المربع المناسب

---

١. ما هي مقومات مصر السياحة من وجهة نظرك ؟ ☆

أثـــار ☐ شـــواطئ ☐ مناخ ☐ غيـــره ☐

٢. هل تأثير المشروعات السياحية الشاطئيه على مواقع الإنشاء ؟ ☆

إيجابي ☐ سلبي ☐

مباشر ☐ غير مباشر ☐

قصير المدى ☐ بعيد المدى ☐

٣. هل العلاقة بين السياحة و الاقتصاد في الدولة مبينة على سياسية اقتصادية ؟

بعيدة المدى ☐ قصيرة المدى ☐

٤. مـا تعنيه من وجهة نظرك السياحة المستدامة أو بمعنى أخر السياحة التي تستمر على مدار السنين بصورة إيجابية ؟ ☆

____

____

٥. هل هناك علاقة بين السياحة المستدامة والتنمية المستدامة ؟☆☆ نعم ☐ لا ☐ اشرح ذلك :

____

____

٦. ما هي مقومات التنمية المستدامة من وجهة نظرك ؟ ☆

____

____

٧. هل التحديات التي تواجه التنمية المتواصلة (المستدامه) ؟ ☆

- قصور في السياسة والمتابعة ☐
- عدم الوعي من المقاول ☐
- اقتصاديات المشروع ☐ اشرح لماذا ..؟

____

____

٨. للحفاظ على البيئة ، هل تعتقد أنه يوجد في مواقع العمل في مصر سياسة بينية خاصة للتوعية بالأساليب المثلى للتنفيذ ؟ نعم ☐ لا ☐

٩. هل تعتقد أنه يوجد مستندات متابعة للتنفيذ تلك السياسية ؟

نعم ☐ لا ☐

١٠. لمراعاة الحفاظ على البيئة ، هل تعتقد أنه يوجد للمشروعات بصفة عامة دراسة لتقيم الأثر البيئي؟

نعم ☐ لا ☐

- في حالة نعم - هل تلك الدراسة ؟

مفيدة ☐ غير مفيدة ☐

- اشرح لماذا ..؟

____

____

- هل تعنى منع الآثار السلبية المتوقعة شيء بالنسبة لكم؟ ☆ نعم ☐ لا ☐
- هل تعنى كلمة رصد الآثار السلبية شئ بالنسبة لكم ؟ ☆ نعم ☐ لا ☐

١١. هل تعنى كلمة البدائل المقترحة لمنع الآثار السلبية شئ بالنسبة لكم؟

نعم ☐ لا ☐ لا اعلم ☐

١٢. في حالة نعم – ماذا تعني تلك البدائل المقترحة ؟ ☆

____

____

١٣. هل تعتقد يتم عمل متابعة لتنفيذ توصيات دراسة تقييم الأثر البيئي على الموقع ؟

نعم ☐ لا ☐

- كيف تتم تلك المتابعة وبأي إسلوب : ☆

____

____

١٤. كيف يتم المنع للآثار السلبية المتوقعة ؟ ☆

____

____

١٥. من وجهة نظركم ما هو دور المصمم أثناء عملية التصميم في منع الآثار السلبية المتوقعة أثناء التنفيذ ؟ ☆ ☆

____

____

١٦. ما هو دور دراسة تقييم الأثر البيئي في اتخاذ القرار من وجهة نظركم ؟

____

____

١٧. هل يتم اتخاذ أي سبل للحفاظ على بيئة الموقع أثناء التنفيذ من الناحية البيئية ؟ ☆

نعم ☐ لا ☐

١٨. ما هي تلك السبل التي يتم اتخاذها للحفاظ على الموقع بيئيا ؟ ☆

____

____

١٩. هل يتم إعادة تدوير نواتج (هوالك) مواد البناء في الموقع؟

نعم ☐ لا ☐ لا اعلم ☐

٢٠. هل يتم فصل العناصر المختلفة في مخلفات الموقع ؟

نعم ☐ لا ☐ لا اعلم ☐

٢١. هل عملية الفصل تتم بسبب اقتصادي أو أسباب أخرى ؟

اقتصادي ☐ أسباب أخرى ☐

٢٢. ما هي العوائق أمام عمليات الفصل في المخلفات ؟

____

____

٢٣. هل وجدتم من وجهة نظركم مراعاة تصميمه للتوجيه الأمثل في مواقع العمل ؟

نعم ☐ لا ☐

- في حالة الإجابة بنعم- كيف كانت تلك المراعاة من وجهة نظركم ؟

____

____

٢٤. هل طرق الإنشاء المستخدمة تؤثر إيجابيا" على توفير الطاقة ؟

نعم ☐ لا ☐

- اشرح ذلك :

____

____

٢٥. مــن وجهة نظركم ما هو التأثير لعملية التصميم على عملية الإنشاء فعلى سبيل المثال هل راعى المصمم عملية إعادة التدوير أثناء التنفيذ وحتى بعد العمر الافتراضي للمبنى ؟

____

____

٢٦. مــن وجهة نظركم ما هو الأسلوب المتبع من خلال المصمم في اختيار مواد البناء بمعنى هل فيه ابتكار أم تقليدي في الاختيار ؟

____

____

٢٧. ما هو من وجهة نظركم أسس صناعة التشييد المستدامة بمعنى صناعة التشييد المثلى التي تؤدي إلى منشأ يستمر يؤدي بكفاءة لأجيال قادمة .

____

____

٢٨. هل يوجد سؤال أخر لم يتم سؤاله .

____

____

APPENDIX F

السادة :

تحية طيبة وبعد ،

يقوم الباحث بجمع أراء السادة المساهمين في صناعة التشييد كجزء مكمل لرسالة الدكتوراه التي تهدف إلى أفضل السبل التصميمية التي تراعي الحفاظ على المصادر الطبيعية .

لذا نشكركم على حسن مشاركتكم في هذا البحث ... المهندس / مدحت عتمـــان

الاسم : ______________

الوظيفة : ______________

برجاء وضع إشارة ☑ في المربع المناسب

---

١. ما هي مقومات مصر السياحية من وجهة نظركم ؟ ☆

أثار ☐ شواطئ ☐ مناخ ☐ غيره ☐

٢. هل تأثير المشروعات السياحية الشاطئيه على البيئة ؟ ☆

إيجابي ☐ سلبي ☐ مباشر ☐ غير مباشر ☐ قصير ☐ بعيد المدى ☐

٣. هل العلاقة بين السياحة والاقتصاد ؟ ☆

شديدة التأثير ☐ مؤثرة ☐ غير مؤثرة ☐

٤. من وجهة نظرك السياحة المستدامة أو بمعنى أخر السياحة التي تستمر على مدار السنين بصورة إيجابية ؟ ☆

- إنشاء مشروعات سياحية بطريقة سليمة بيئيا ☐
- وضع سياسة بيئية وتنفيذها بأقل أضرار سلبية ☐
- المشروع الذي يدر دخل بغض النظر عن البيئة ☐

٥. هل هناك علاقة بين السياحة المستدامة والتنمية المستدامة ؟ ☆ ☆

نعم ☐ لا ☐ اشرح ذلك :

____

____

٦. ما هي مقومات التنمية المستدامة من وجهة نظرك ؟ ☆

____

____

٧. هل التحديات التي تواجه التنمية المتواصلة (المستدامه) ؟

- قصور في السياسة والمتابعة ☐
- عدم الوعي من المقاول ☐
- رغبة المالك في التوفير ☐ اشرح لماذا ..؟

____

____

٨. هل دراسة تقيم الأثر البيني للمشروعات ؟ مفيدة ☐ غير مفيدة ☐

اشرح لماذا ..؟

٩. هـل التفاعل بين أفراد فريق العمل في دراسة تقييم الأثر البيئي يؤثر على المنتج النهائي وهو مشروع متوافق بيئيا ولماذا ؟

١٠. مـن وجهـة نظـركم كيـف يمكن الاستفادة من نتائج دراسة تقييم الأثر البيئي عند اتخاذ القرار في المشروع لكل مشارك على حده من أفراد فريق العمل (المالك – المصمم – المنفذ) :

١١. للحفاظ على البيئة ، هل يوجد في مواقع العمل التي تعاملت معها ما يسمى بالسياسة البيئية بالنسبة للمقاولين ؟ نعم ☐ لا ☐

١٢. هل يوجد خطة متابعة للتنفيذ تلك السياسية ؟ نعم ☐ لا ☐

١٣. هل تعنى منع الآثار السلبية المتوقعة شيء بالنسبة لكم؟ ☆ نعم ☐ لا ☐

١٤. هل تعنى كلمة رصد الآثار السلبية شئ بالنسبة لكم ؟ ☆ نعم ☐ لا ☐

١٥. هل تعنى كلمة البدائل المقترحة لمنع الآثار السلبية شئ بالنسبة لكم؟ نعم ☐ لا ☐ ☆

١٦. في حالة نعم – ماذا تعني تلك البدائل المقترحة ؟ ☆

١٧. هل يتم عمل متابعة لتنفيذ توصيات دراسة تقييم الأثر البيئي على الموقع ؟ ☆

نعم ☐ لا ☐ كيف تتم تلك المتابعة وبأي إسلوب :

١٨. كيف يتم التعامل مع الآثار السلبية المتوقعة ؟ ☆

١٩. مـن وجهـة نظركم ما هو دور المصمم أثناء عملية التصميم في منع الآثار السلبية المتوقعة أثناء التنفيذ ؟ ☆ ☆

٢٠. ما هو دور دراسة تقييم الأثر البيئي في اتخاذ القرارات التصميمية من وجهة نظركم ؟

٢١. ما هي التحديات في سبيل تصميم منشأ متوافق بيئيا ؟

٢٢. هل أسس العمارة الخضراء أو المتوافقة بيئيا تؤثر في أسلوبكم التصميمي ؟ ☆☆

نعم ☐ لا ☐ اشرح كيف :

٢٣. هل يتم اتخاذ أي سبل للحفاظ على بيئة الموقع أثناء التنفيذ من الناحية البيئية ؟ ☆

نعم ☐ لا ☐

٢٤. ما هي تلك السبل التي يتم اتخاذها للحفاظ على الموقع بيئيا ؟ ☆

٢٥. هل يتم التوجيه من خلالكم بضرورة إعادة تدوير نواتج (هوالك) مواد البناء في الموقع؟

نعم ☐ لا ☐

٢٦. هل يتم فصل العناصر المختلفة في مخلفات الموقع ؟ ☆☆

نعم ☐ لا ☐ لا اعلم ☐

٢٧. هل عملية الفصل تتم بسبب اقتصادي أو أسباب أخرى ؟ ☆☆☆

اقتصادي ☐ أسباب أخرى ☐

٢٨. ما هي العوائق أمام عمليات الفصل في المخلفات ؟ ☆

٢٩. هل يتم مراعاة التوجيه الأمثل في المشروع أثناء عملية التصميم؟ ☆☆

نعم ☐ لا ☐

٣٠. هل ترى أن طرق الإنشاء تؤثر على توفير الطاقة ؟ ☆☆

تأثير كبير ☐ تاثير جوهري ☐ تاثير جوهري ☐ اشرح ذلك :

٣١. ما هو الأسلوب المتبع من خلالكم في اختيار مواد البناء ؟ ☆

٣٢. ما هو من وجهة نظركم أسس صناعة التشييد المستدامة بمعنى صناعة التشييد المثلى التي تؤدي إلى منشأ يستمر يؤدي بكفاءة لأجيال قادمة . ☆

٣٣. هل يوجد أسئلة أخرى لم يتم سؤالها ؟..

APPENDIX G

Name : -------------------------------------- Frame work
Title : --------------------------------------- Refinement

Stage- 1 : Approved ☐ Disapproved ☐
Comments : --

Stage- 1E-1 : Approved ☐ Disapproved ☐
Comments : --

Stage- 1E-2 : Approved ☐ Disapproved ☐
Comments : --

Stage- 1E-3 : Approved ☐ Disapproved ☐
Comments : --

Stage- 1E-4 : Approved ☐ Disapproved ☐
Comments : --

Stage- 1D : Approved ☐ Disapproved ☐
Comments : --

Stage- 2 : Approved ☐ Disapproved ☐
Comments : --

Stage- 2D-1 : Approved ☐ Disapproved ☐
Comments : --

Stage- 2D-2 : Approved ☐ Disapproved ☐
Comments : --

Stage- 2E-1 : Approved ☐ Disapproved ☐
Comments : --

Stage- 2E-2 : Approved ☐ Disapproved ☐
Comments : --

Stage- 2E-3 : Approved ☐ Disapproved ☐
Comments : --

Stage-3 : Approved ☐ Disapproved ☐
Comments : --

Stage-3 D-1 : Approved ☐ Disapproved ☐
Comments : --

Stage-3 D-2 : Approved ☐ Disapproved ☐
Comments : --

Stage-3 D-3 : Approved ☐ Disapproved ☐
Comments : --

Stage-3E : Approved ☐ Disapproved ☐
Comments : --

Stage- 4 : Approved ☐ Disapproved ☐
Comments : --

Stage- 4 E-1 : Approved ☐ Disapproved ☐
Comments : --

Stage- 4 E-2 : Approved ☐ Disapproved ☐
Comments : --

Stage- 5 : Approved ☐ Disapproved ☐
Comments : --

Stage- 5 D : Approved ☐ Disapproved ☐
Comments : --

Stage- 5 E : Approved ☐ Disapproved ☐
Comments : --

Stage- 6 : Approved ☐ Disapproved ☐
Comments : --

Stage- 6 D-1 : Approved ☐ Disapproved ☐
Comments : --

Stage- 6 D-2 : Approved ☐ Disapproved ☐
Comments : --

Stage- 6 E-1 : Approved ☐ Disapproved ☐
Comments : --

Stage- 6 E-2 : Approved ☐ Disapproved ☐
Comments : --

Stage- 6 E-3 : Approved ☐ Disapproved ☐
Comments : --

Stage- 6 E-4 : Approved ☐ Disapproved ☐
Comments : --

Stage- 7 : Approved ☐ Disapproved ☐
Comments : --

Stage- 8 : Approved ☐ Disapproved ☐
Comments : --

Stage- 8 D : Approved ☐ Disapproved ☐
Comments : --

APPENDIX H

RECORD OF DECISION

Reference number ...

DETAILS OF APPLICANT

1. NAME:

A Title .... First Names ....

B Surname ....

C Company (if applicable) ....

2. CONTACT DETAILS:

A Telephone: Area Code .... Number ....

B Cellphone: Number ....

C Fax: Area Code .... Number ....

D E-mail: Address ....

3. ADDRESS (FOR CORRESPONDENCE):

A P O Box ....

B Street ....

C Suburb ....

D Town/City ....

E Postal Code ....

4. CONSULTANT(S) INVOLVED (IF ANY):

A Planning Consultant (Name) ....

....

B Telephone: Area Code .... Number ....

C Environmental Consultant (Name) ....

....

D Telephone: Area Code .... Number ....

SITE VISIT

5. DETAILS:

A Date:

Day .... Month .... Year ....

B Attending:

Person(s) .... Organisation ....

Person(s) .... Organisation ....

Person(s) .... Organisation ....

Person(s) .... Organisation ....

COMMENTS

....

....

....

....

....

....

....

....

....

DETAILS OF THE ACTIVITY / ACTIVITIES

(indicate which activity/activities by ticking in relevant block(s))

6. TYPE OF ACTIVITY/ACTIVITIES:

A Disturbance of vegetation ....

B Earthworks ....

C Dredging ....

D Dune stabilisation ....

7. EXTENT OF THE ACTIVITY / ACTIVITIES:

A Disturbance of vegetation

Length (parallel to coastline) .... m

Width (right angle to coastline) .... m

Area .... m²

B Earthworks

Depth .... m

Area .... m²

Volume .... m³

C Dredging

Depth .... m

Area .... m²

D Dune stabilisation

Length (parallel to coastline) .... m

Width (right angle to coastline) .... m

Area .... m²

LOCATION OF SITE:

Property/Erf number(s)..

Farm name(s) (if applicable)..

....

Farm number(s) (if applicable)..

Size (area) of property, erf or farm..m²\ha

Magisterial district..

ONSULTATIONS UNDERTAKEN

VIEWS OF INTERESTED AND AFFECTED PARTIES (IF AVAILABLE): *(refer to Appendix if necessary)*

Neighbours..

....

....

....

....

....

Media..

....

....

....

....

....

General Public..

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....

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....

....

Nature Conservation or Environmental Authorities..

....

....

....

....

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....

DETAILS OF DECISION ON APPLICATION

10. KEY FACTORS IN DETERMINING THE DECISION:

....

....

....

....

....

....

....

....

11. STATUS OF DECISION-MAKER WITH RESPECT TO THE DECISION-MAKING AUTHORITY:
(indicate which by ticking in the relevant block)

A Council resolution..

B An official acting under delegated powers..

12. TYPE OF DECISION:
(indicate which by ticking in the relevant block)

A Approved unconditionally..

B Approved conditionally..

C Turned down..

13. CONDITIONS OF APPROVAL (IF APPLICABLE):
(refer to Appendix if necessary)

A Mitigation measures to be taken by the applicant:

....

....

....

....

....

....

B Rehabilitation measures to be taken by the applicant:

....

....

....

....

....

....

....

٣٦٥

Other/additional conditions of approval:

C By National Government Departments (if applicable):

14. CONTROL MEASURES TO BE TAKEN BY THE RELEVANT AUTHORITIES: *(monitoring, site inspections by officials, etc.)*

A By Decision-making Authority:

B By Provincial Nature Conservation Agency (if applicable):

15. VALIDITY OF PERMIT:

		DAY(S)	MONTH(S)	YEAR(S)
A Duration				
B Program	Start			
	Finish			
C Expiry date				

16. SIGNATURE OF DECISION-MAKING PARTY:

Person/official duly authorised to make decision:

NAME (print) SIGNED

AT (place) ON (date) DAY MONTH YEAR

ETAILS OF APPEALS

.SUBMISSION OF APPEALS (IF APPLICABLE):

Appeals submitted to (name of organisation/body): ....

Deadline date for submission of appeals: ....

DAY MONTH YEAR

Appeals submitted before deadline date (tick in relevant block): Yes No

Appeals submitted by (name of appealing party) on (date):

....

NAME OF APPEALING PARTY DAY MONTH YEAR

....

E Person/official duly authorised to receive appeals:

....

NAME (print) SIGNED

....

AT (place) ON (date) DAY MONTH YEAR

....

APPENDIX I

EMS Audit No. : 1/2002	Date : 20 / 03 / 2002	Auditor : S. Zaiady
Audit Type : Planned	Auditee (Dept. /Section/Sub-section) : UMD/Utility Water	

.2 Environmental Policy	Documentation EM-System			Effectiveness of EM- System
Questions	Ref. To EMP EMI-I.P-I.W W.I	Assessing Of Doc.	Imp.	Audit Finding (positive / Negative)
s the Environmental Policy made Known to all employees ?				
Has the environmental policy been communicated to all employees ?				

Remarks :

4.3 Planning	Documentation EM-System			Effectiveness of EM- System
Questions	Ref. To EMP EMI-I.P-I.W W.I	Assessing Of Doc.	Imp.	Audit Finding (positive / Negative)
4.3.1 Environmental Aspects s the identification and evaluation of he environmental aspects based on - activities - products or – service				
Does the identification of the aspects ake into account : emissions - waste water - waste management- contamination of land - use of raw material & resources (energy , water & fuel) - handling of environmental relevant substances.				

Remarks :

EMP = Environmental Management Procedure EMI = Environmental Management Instruction
I.P = Internal Procedure I.I = Internal Instruction W.I = Work Instruction

ANSDK Environmental Management System	Audit Questionnaire	Department : Sub-Section : Environment. Issue date : 20/03/2002
MS Audit No. : 1/2002	Date : 20 / 03 / 2002	Auditor : S. Zaiady
udit Type : Planned	Auditee (Dept. /Section/Sub-section) : UMD/Utility Water	

Planning	Documentation EM-System			Effectiveness of EM- System
Questions	Ref. To EMP EMI-I.P-I.W W.I	Assessing Of		Audit Finding (positive / Negative)
		Doc.	Imp.	
3.1 Environmental Aspects				
e those aspects determined , hich have or can have a significant ipact on the environment ?				
it ensured that the relevant entified aspects are considered in tting the environmental objective d targets ?				

Remarks

3 Planning	Documentation EM-System			Effectiveness of EM- System
Questions	Ref. To EMP EMI-I.P-I.W W.I	Assessing Of		Audit Finding (positive / Negative)
		Doc.	Imp.	
3.2 Legal and other requirements				
re the legal and other quirements vailable and accessible ?				

Remarks :

MP = Environmental Management Procedure
P = Internal Procedure
.I = Work Instruction

EMI = Environmental Management Instruction
I.I = Internal Instruction

NSDK Environmental Management System	Audit Questionnaire	Department : Sub-Section : Environment. Issue date : 20/03/2002
Audit No. : 1/2002	Date : 20 / 03 / 2002	Auditor : S. Zaiady
Type : Planned	Auditee (Dept. /Section/Sub-section) : UMD/Utility Water	

lanning	Documentation EM-System			Effectiveness of EM- System
Questions	Ref. To EMP EMI-I.P-I.W W.I	Assessing Of		Audit Finding (positive / Negative)
		Doc.	Imp.	
Objective and targets				
he following items taken into deration when establishing and wing the objectives ?				
Legal & other requirements				
Significant aspects				
Technological options				
Natural resources				
the objective and targets istent with the environmental cy?				
e the objectives and targets been ntified , and have time limits?				

marks :

MP = Environmental Management Procedure
P = Internal Procedure
I = Work Instruction
EMI = Environmental Management Instruction
I.I = Internal Instruction

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Al Azhar University
Faculty of Engineering
Architectural Engineering Department

جامعة الأزهر
كليـة الهندسـة
قسم هندسـة العمارة

THE IMPACT OF TOURIST DEVELOPMENTS ON THE ENVIRONMENT DURING CONSTRUCTION AND AFTER OPERATION

تأثير المشاريع السياحية على البيئة أثناء الإنشاء وبعد التشغيل

By

MEDHAT MAHMOUD ETMAN

المقدم من

مدحت محمود محمد عتمان

A dissertation submitted in partial fulfillment
of the requirement for the degree of
Doctor of Philosophy
(Architecture)
2002

رسـالة العالميـة
" دكتوراه الفلسفة "

Doctoral Committee

لجنـة الإشراف

Professor Ezz El-Din Fahmy
Faculty of Engineering
Al-Azhar University, Cairo, Egypt

الأستاذ الدكتور/ عز الدين فهمي
الأستاذ بقسم العمارة
كلية الهندسة - جامعة الأزهر - مصر

Associate Professor Ahmed Sherif
Construction Engineering Department,
College of Architecture,
The American University in Cairo, Egypt

الأستاذ الدكتور / أحمد شريف
أستاذ مساعد بقسم هندسة التشييد
كليـة الهندسة
الجامعة الأمريكية بالقاهرة - مصر

Professor Andrew Wheatley
Department of Civil and Building Engineering
Loughbrough University, Loughbrough, Uk

الأستاذ الدكتور / أندرو ويتلي
قسم الهندسة - جامعة لافبرا
لافبرا - المملكة المتحدة

المقدمـــة

البيئة في الواقع تشمل الوضع أو المؤثرات التي يحيا من خلالها أي كائن حي .

البيئة طفت على السطح كموضوع ذا أهمية في الستينات ، العلماء أبدو الاهتمام بالتدهور الحادث في الاتزان البيئي والموضوعات البيئية هي الآن في بورة الضوء بالنسبة للعالم المتطور في الفهم الايكلوجي في خلال السنوات القليلة الماضية الذي أوضح أن احتياجات الإنسان في البيئة المحيطة تتحقق فقط عند توفير احتياجات الكائنات الأخرى. لفظ "التنمية " يثير استفسارات جادة ، حيث يتم التعامل مع هذا المعنى على أنه أداة لتدمير الطبيعة اكثر منها مكسب للإنسان . ولكن هذا لا يمثل الحقيقة كاملة ، حيث أنه يوجد نوعيات متعددة للتنمية ــ المشكلة ليست في مدى تأثيرنا على البيئة بقدر ما هو علاقتنا مع البيئة أيكلوجيا. التنمية المتناغمة مع البيئة من الممكن أن تكون جزء مكمل لها والحياة على كوكب ملئ ببلايين البشر يتطلب الوصول الى نظام مشترك للمثل والأساسيات حتى يتم التنبؤ بالعواقب المترتبة على أي نشاط ، الآن وفى المستقبل .

في خلال النظام العالمي الجديد ، البيئة تستخدم كأداة ضمن أدوات أخرى لكي تسمح ــ أو لا تسمح ــ لتصدير المنتجات من بلد الى آخر . البيئة هي ميزة او منتج غير تقليدي يتم اتخاذه في الحسبان في إستراتيجيات الدول الواقعة على الخريطة السياحية ، سوء استغلال هذه الميزة قد يؤدى الى تدميرها و تأثير السياحة في الغالب يتم اعتباره بصورة محسوسة سواء اقتصاديا او اجتماعيا ، تأثير السياحة واضح على بيئة السواحل وكذلك على الموارد المادية للإنسان .

في هذا الوطن البيئة لفظ يتم استخدامه من خلال وسائل الأعلام وايضا من خلال سياسات الدولة ، ولكن هو لفظ مستحدث . قانون ٤ ولوائحه التنفيذية للبيئة ، تم إصداره سنة ١٩٩٤ ، دراسة تقيم الأثر البيئي (EIA) أصبح فرض على المشروعات بدأ من ١٨ فبراير ١٩٩٥ م وذلك نتيجة للأثر التي تسببه السياحة على الناتج الإجمالي القومي .

مفهوم التنمية المستدامة اصبح في صميم الاهتمام الحالي بالبيئة والتنمية ، المنتجات الشاطئية يتم إنشائها وتنميتها لكي تستقبل السياح المتدفقين على الوطن .

التصميم هو عنصر هام لتوفير منتجات شاطئية مستدامة و هذا البحث يخاطب العلاقة بين التنمية والبيئة .

١,١,١تحديد المشكلة

الإدراك السليم لحقيقة اللفظ المسمى " **البيئة** " ضمن كل من له علاقة بهذا الموضوع – موضوع تساؤل – وبالتالي المشكلة التي تم تحديدها في هذا البحث هي عدم الوعي لكثير من المعماريين لمدى تأثير العملية التصميمية على البيئة .

٢,١,١تعريف المشكلة .

المنتجع الساحلي له تأثير قصير المدى وبعيد المدى ، الأول هو المرتبط بعملية الإنشاء ذاتها ، الأخير مرتبط بتأثير العملية التصميمية خلال دورة الحياة الخاصة بالعملية التنموية .

الاستغلال السيئ سواء للبيئة المحيطة او البيئة بصفة أوسع يؤدى الى تأثير عكسي على الاقتصاد .

على سبيل المثال الشعب المرجانية التي تمثل واحدة من عناصر الجذب الرئيسية للسياحة الساحلية التي تضيف للاقتصاد المصري في خطر، الخطر ليس ناجم فقط لما يتم تحت الماء بل أيضا لما يتم على الشاطئ . تدمير الشعب يعني القضاء على آلاف الأحياء البحرية وفناء لعنصر رئيسي من عناصر الدخل وتوظيف ملايين من الأفراد بالتالي في أي مرحلة من مراحل دورة حياة المشروع يجب محاكاة تلك التأثيرات .

البحث يركز على موضوع المنتجات الشاطئية – وبالتالي تم تعريف المشكلة كالتالي :-

التأثير السلبي للمنتجات السياحية على البيئة التي لا يتم منعها سواء في مرحلة التصميم أو مرحلة الإنشاء .

٣,١,١مجال الدراسة .

الدراسة تركز على الجزء الخاص بنظام الإدارة البيئي وليس البيئة في مجملها ، الدراسة منحصرة في مجال المنتجعات الساحلية بالبحر الأحمر- مصر ، حيث الأرض البكر تم تنميتها وتحويلها الى مراكز سياحية وتركز الدراسة على تأثير العملية التصميمية على البيئة في مرحلة الإنشاء وبعد التشغيل .

من الجدير بالذكر ، أن الدراسة لا تتعرض لتأثير الخدمات المساعدة من محطات تحلية او خلافه ، أو أي أعمال تحت الماء (off shore) على البيئة مثل المارينا أو تأثير البحيرات التي من صنع الإنسان .

٤,١.١ الفرضية .

الفرضية التي يتم اختبارها في مجال هذا البحث هي :

" المعماري له دور لمنع الآثار السلبية للمشاريع السياحية على البيئة "

٥,١,١البحث النظري .

البحث النظري ينقسم الى ثلاث أجزاء هم : -

(١) الاستدامة من خلال صناعة السياحة .

(٢) دراسة تقييم الأثر البيئي – EIA .

(٣) الاستدامة خلال المرحلة التصميمية حتى مرحلة الإنشاء .

٦,١,١الغرض .

الغرض يأتي على المستوى الإستراتيجي للبحث و يعتبر ما قد يستطيع الباحث القيام به إذا كان لا يوجد هناك أي محددات معوقة .

الغرض من البحث هو تطوير إطار عمل لكل المتعاملين والشـــركاء فـــي العملية المؤدية الى منتجع ساحلي يؤدى الى منتج متوافق بيئيـــا . إطـــار العمـــل هذا من المفترض أن يكون مبنى على أساس نظام ــ مفتوح ، يقبل (Feed back) والتحديث ، بل أيضـــا التوافق مع محدادت كل مشروع .

١,١,١٧الاهداف

فالوز وليو (١٩٩٧) أشاروا بان الأهداف هي مقولات ضمـــن المقولـــة الإستراتيجية للغرض وهى مقولات على المستوى التكتيكـــي ــ الأهـــداف تـــأخذ الغرض من البحث بالإضافة الى المحدادت وتترجم هذا كله الى مقولـــة متماســـكة وقابلة للتفعيل تلك الدراسة لها ثلاث أهداف :

الهدف الأول :

تقييم الوضع الراهن من خلال الاستبيان

الهدف الثاني :

يدرس العوامل المؤثرة على عملية اتخاذ القرار من خلال عمل لقـــاءات (Interviews)

الهدف الثالث :

يقوم بالبحث في الخامات المحلية البديلة والتي تكون متوافقة بيئيا .

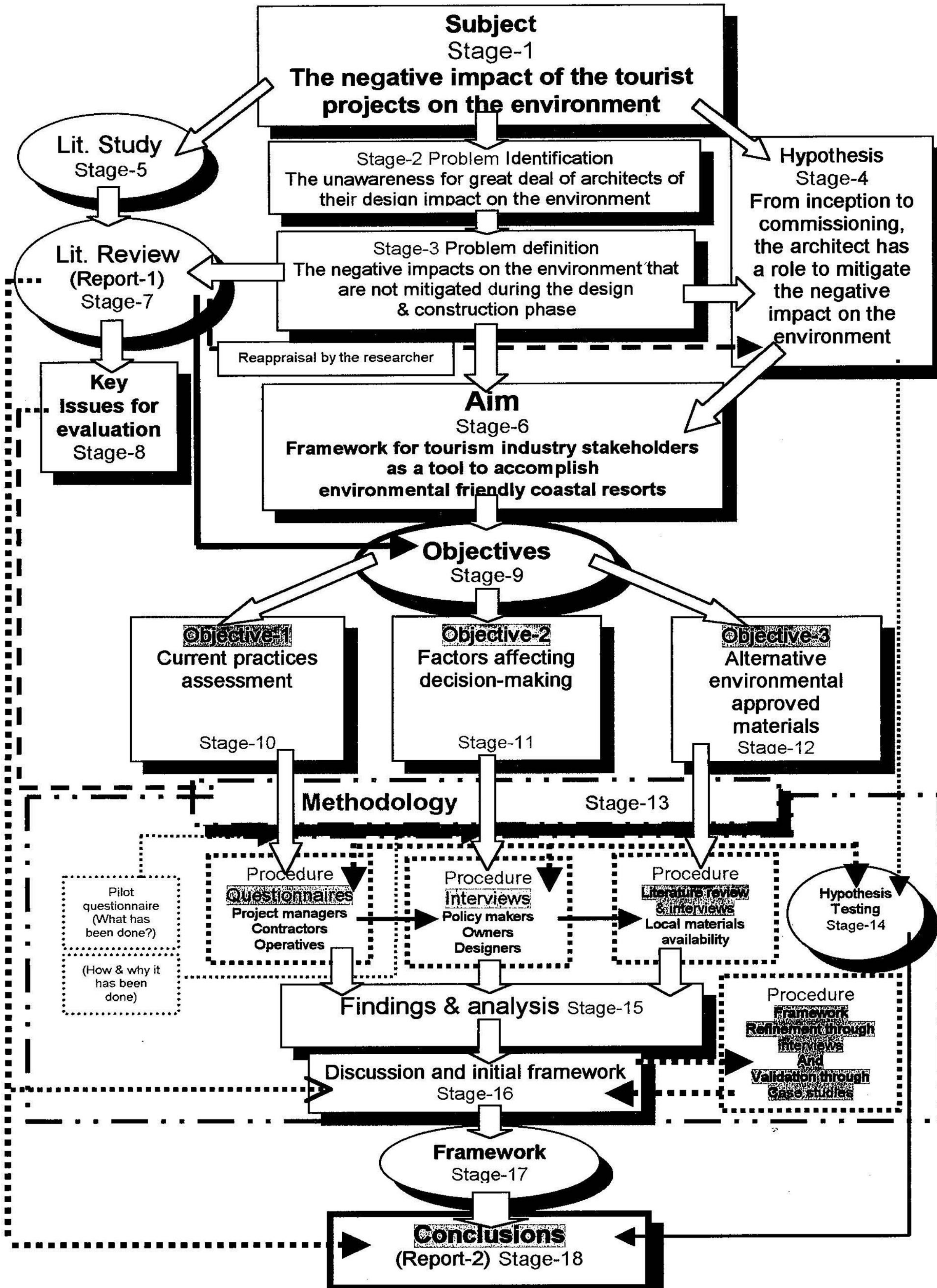

Fig (1-1)- Research Map

١,١,٨المنهجية .

منهجية البحث تتضمن ١٨ مرحلة (انظر شكل ١)

مرحلة ــ ١ : اختيار الموضوع .

مرحلة ــ ٢ : تحديد المشكلة

مرحلة ــ ٣ : تعريف المشكلة

مرحلة ــ ٤ : فرضية البحث

مرحلة ــ ٥ : الدراسة النظرية

مرحلة ــ ٦ : الغرض من البحث

مرحلة ــ ٧ : البث النظري (تسليم التقرير الأول)

مرحلة ــ ٨ : موضوعات أساسية للتصميم

مرحلة ــ ٩ : مرحلة الأهداف

مرحلة ــ ١٠: الهدف الأول

مرحلة ــ ١١: الهدف الثاني

مرحلة ــ ١٢: الهدف الثالث

مرحلة ــ ١٣: منهجية الجزء العملي

مرحلة ــ ١٤: اختبار الفرضية خلال الاستبيان واللقاءات

مرحلة ــ ١٥: النتائج والتحليلات

مرحلة ــ ١٦: المناقشات و إطار العمل المبدئي

مرحلة ــ ١٧: إطار العمل النهائي

مرحلة ــ ١٨: الخلاصة (تسليم التقرير الثاني)

٩,١.١ الدليل الى البحث

١,٩ .١.١ الفصل الأول : المقدمة

هذا الفصل يحتوى على المقدمة الى موضوع البحث ، المشكلة ، الفرضية ، الغرض ، الأهداف و إطار العمل المستهدف .

٢,٩ .١.١ الفصل الثاني : الاستدامة خلال صناعة السياحة

هذا الفصل يستعرض فهم لظاهرة السياحة وتأثيراتها مع الإشارة الى ديناميكية السوق .

متغيرات السوق مع شرح الأنواع المختلفة للسياحة . هذا الفصل أيضا يؤكد على المفهوم أن البيئة هي عنصر أساسى في صناعة السياحة ، سؤ استغلال هذا العنصر قد يؤدى الى تدميره الشامل . بالإضافة الى ذلك ، المفهوم الشامل الى التنمية المتواصلة والخطوط العريضة للسياحة المستدامة قد تم الإشارة إليها .

تم التأكيد على الاهتمام الواضح لحكومة جمهورية مصر العربية بالبيئة في خلال السنوات الماضية حيث اصبح هناك أمر صريح لأي مشروع أن يقدم دراسة تقيم الأثر البيئي .

٣,٩ .١,١ الفصل الثالث : دراسة تقيم الأثر البيئي ونظم الإدارة البيئية

هذا الفصل يناقش أساليب دراسة تقيم الأثر البيئي ، مكونات تلك السياسية تم توضيحها ، الغرض من دراسة تقيم الأثر البيئي تقرير برونتلاند ــ تم استعراض العناصر الأساسية ؛ المنع ، المراقبة و البدائل في خلال هذا الفصل . مختلف نظم الإدارة البيئية و نظم المراجعة قد تم استعراضها كأدوات هامة في عملية اتخاذ القرار وذلك كي يتم الوصول الى تنمية مستدامه ضمن صناعة السياحة .

١,١. ٩,٤الفصل الرابع : الاستدامة فى العملية التصميمة حتى الإنشاء

هذا الفصل يناقش الأصول والتكنيك الخاص بالتنمية المستدامة . أساسـيات العمارة الخضراء تم دراستها حتى يتم الوصـول الـى عمليـة تصميميـه مستدامة ، إلغاء الاعتبارات والتعديلات التي تواجه العملية التصميميه تـم التنويه بها أيضا أسلوب المفاضلة البيئي EPM تم دراسته كأحد الطـرق الهامة في مجال اختيار المواد . تم تقديم أمثلة مختلفة لمباني بيئيه في العالم ، ذلك لاستخلاص الدروس من وجهـة نظـر عمليـة . طـرق الإنشـاء المستدامه تم التعرض لها فى هذا البحث مع التركـيز علـى نظـام إدارة المخلفات في مجال الإنشاء .

١,١. ٩,٥الفصل الخامس : منهجية البحث .

يستعرض هذا الفصل منهجية البحث ، الأساليب التي قام هذا البحث عليـها . تم اخذ الاهتمام والاعتبار لنوعية البحث لكي يتلاءم معه انسب الأسـاليب المتعارف عليها في المنهجية البحثية . البحث ينقسم الى جزئين متشـابكين الجزء النظري والجزء العملي .

١,١. ٩,٦الفصل السادس : الجزء العملي .

هذا الفصل يستعرض الاستبيان واللقاءات التي تم عقدها مع المتعاملين مـع المنتجعات الساحلية كذلك النتائج والتحليلات والمناقشة للأهـداف الثلاثـة حيث كانت النتائج المستخلصة والجزء النظري هما الأساس للإطار العمـل المبدئي .

١,١. ٧,٩الفصل السابع: إطار العمل – الغرض (Aim).

هذا الفصل تم توظيفه لتقديم إطار العمل النهائي مـــع الاســـتعراض لكـــل مرحلة . أيضا تم الإشارة الى المرحلـــة الاسترشـــادية **(Piloting)** و التنقيح و الفاعلية للإطار المقترح من خلال الحالات التي يتم دراستها .

١,٢. ٨,٩ الفصل الثامن : الخلاصـــة والتوصيـــات :

هذا الفصل هو خلاصة البحث بالإضافة الى مجموعة من التوصيات تـــم بناؤها على الجزء النظري والجزء العملي . أيضا تم التنويـــة لمحـــددات البحث ومجال البحث المستقبلي المقترح .

- **الإضافة العلميـــة للبحث :**

النموذج المقترح في هذا البحث يقدم ربما للمرة الأولـــى لصناعـــة السياحة في مصر والمستثمرين والمتعـــاملين فيـــها إطـــار عمـــل ديناميكي تفاعلي يساعد على توفير منتجعات ساحلية متوافقة بيئية .

- **الخـــلاصـــة**

  - **التأثير النظري :**

    تجويد مراحل العملية التصميمية المتعارف عليها

- **التأثير العملي :**

  - تطوير النظرة البيئية لدى المتعاملين في صناعة السياحة لفهم العلاقـــة بين العملية التصميمية وتأثيرها على الاستثمارات .

التوصيـــات :

- السياسات يجب أن تكون بعيدة النظر
- المتابعة للسياسات التي تم وضعها
- التدريب والتوعيــة
- التطوير في عملية اختيار مواد البناء
- تطوير سبل توفير الطاقــة
- دراسة تقييم الأثر البيئي التي يجب أن تكون من خلال خبـــراء في المجال
- تطبيق طرق إدارة المخلفات
- المشاركة الشعبية في دراسة تقييم الأثر البيئي

أبحاث مستقبليـــة :

- نظام يخلط بين الجانب الاقتصادي العائد من التوافق البيئي
- إعداد دليل لكيفية تفكيك المباني وإعادة تدوير المواد نتيجة لتقلص الخامات في العالم
- دراسة تقييم أثر بيئي متوافق مع صناعة السياحة
- في النهاية تطوير الإطار المقترح إلى برنامج تفاعلي على الحاسب الآلي