UNIVERSITY OF GHANA

DEPARTMENT OF ECONOMICS

Topic

THE COST AND BENEFIT ANALYSIS ON THE ACCRA ECO PARK PROJECT AT ACHIMOTA, ACCRA, GHANA

A DISSERTATION SUBMITTED TO THE DEPARTMENT OF ECONOMICS, UNIVERSITY OF GHANA IN PARTIAL FULFILLMENT FOR THE AWARD OF THE BACHELOR OF ARTS DEGREE IN ECONOMICS

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DECLARATION

We hereby declare that this piece of work on the Cost and Benefit Analysis on the Accra Eco-park project in the Greater Accra Region of Ghana is our own research output with the exemption of works whose references have duly been acknowledged.

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DEDICATION

We dedicate this work to the Most High God for taking good care of us in these four years of gaining university education. We also dedicate this work to our families who supported us in diverse ways. We are thankful to all.

ACKNOWLEDGEMENT

We acknowledge the contributions of Mr. David Kpelle, Commercial Development Manager of the Forestry Commission, Wildlife Division. We also thank the entire staffs of the Forestry Commission who have supported us by giving us the needed data from which this work has been made possible. We also acknowledge the help of our supervisor Dr. William Bekoe who has given us the needed guidelines and assistance for the successful completion of this project work. We are grateful.

ABSTRACT

This paper is concerned with the cost and benefit analysis of the Accra Eco park project that is being overseen by the Forestry Commission of Ghana. The paper focuses on the economic, institutional, commercial, socio cultural and financial appraisal of the project. The direct and indirect, tangible and intangible benefits and costs of the project are identified, and are duly evaluated using the benefits cost ratio and the net present value to determine the feasibility of the project, it was found to be a project that is worth implementing with benefits accruing over the years. The study makes a number of recommendations including sensitization and replication of the project in other cities.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

AMA	Accra Metropolitan Assembly
BCR	Benefit Cost Ratio
BoG	Bank of Ghana
CIFOR	Centre for International Forestry Research
CSIR	Centre for Scientific and Industrial Research
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organisation of the United Nations
FC	Forestry Commission
FOSA	Forest Outlook Studies in Africa
GEPA	Ghana Environmental Protection Agency
GIMPA	Ghana Institute of Management and Public Administration
GIPC	Ghana Investments Promotion Council
GPRS II	Growth and Poverty Reduction Strategy II
GRA	Ghana Revenue Authority
MDG	Millennium Development Goal
MiDA	Millennium Development Authority
MoFA	Ministry of Food and Agriculture
NB	Nota Bene
NEPAD	New Partnership for African Development
NPV	Net Present Value
NREG	Natural Resources and Environmental Governance
POC	Project Oversight Committee

LIST OF FIGURES AND TABLES

CHAPTER ONE

INTRODUCTION

1.0 Background Study

The United Nations Food and Agriculture Organisation (FAO) define forests as 'Land with a tree canopy cover of more than 10 percent and an area of more than half a hectare' (FAO, 2006).

At the beginning of the twentieth century, the forests of Ghana covered about 34 percent of the total land area. This implies Ghana had about 8.6 million hectares of its total land area covered by tropical high forests (this included forest lands inside reserves that were protected and other forests outside the protected reserves). Forest reservations were started as far back as 1927 by the British government and ensured the reservation of 11 percent of the country's total land area. In all, 282 forest reserves and 15 wildlife protected areas, occupying more than 38 000 square kilometers were established and gazetted in Ghana. There was an additional 4 000 square kilometers of forest outside this gazetted area. The main aim of the reservation program was to ensure the protection of substantial areas of forest, but the process of forest land reservation ignored the traditional tenure system, which led to a negative attitude to reserves among the population, especially in forest fringe communities. This situation was exacerbated by a failure to inform forest communities of their usufruct rights and by the focusing of forest management on forest protection by the central government.

According to Leach and Fairhead (2010) not only is the basis for the estimates of deforestation in Ghana unclear, the rate is characterized by rapid changes so that the precise figures for the deforestation rates and for the actual size of forest cover are difficult to determine. Owusu (1998) and Abeberese, (2002) estimated that deforestation was particularly rapid during 1950-1987, resulting in approximately a 75 percent loss of the original forest area. After 1987, the

estimation for deforestation in the entire country was 65,000 hectares per annum, while that of the high forest zones was 22,000 hectares per annum (Abeberese, 2002). The average deforestation rate in Ghana was recently estimated as 135,395 hectares per annum resulting in the depletion of the country's forest cover from 7.5 million hectares in 1990 to 4.9 million hectares in 2010 (FAO, 2010b)

The repercussion of the country's rapid loss of the nation's forest cover has already been manifesting. Ghana is already experiencing an increase in extreme weather conditions, in the form of flooding, unusually long droughts, reduced crop yield and falling water levels particularly in the Volta river delta, which provides approximately 80 percent of the nation's electricity supply (MoFA, 2007).

According to Cameron (2011), the annual mean temperatures in the country have already gone up by a degree over the past 3 decades. GEPA (2007) projects that the annual temperature would increase within a range of 0.6 degrees to 3.9 degrees Celsius between 2020 and 2080 , causing rainfall to decrease between 2.8 percent and 18.6 percent in the same period.

Forest resources are particularly instrumental to social and economic activities in Ghana and most countries in the tropics. They are important elements in both poverty reduction and sustainable development strategies specifically for the mostly impoverished Sub-Saharan countries (Tutu, 2009). More than two-thirds of the Sub-Saharan populace representing 600 million people rely directly or indirectly on forests for their livelihoods as well as food security (CIFOR, 2005). On the average, 6 percent of the gross domestic product of Sub-Saharan countries is accounted for by forests (NEPAD, 2003).Traditionally timber ranked third behind Gold and Cocoa in terms of export revenues that Ghana received. In 1996, timber alone contributed 6 percent of Ghana's gross domestic product and 11 percent of its export earnings. Usually the forest's contribution to our development comes in the form of the value of food

produced, timber logs used in various forms of productions as well as the value of recreational and leisure activities. In addition, it is estimated that close to 80 percent of the energy used in Africa comes from the forests in the form of wood biomass. Forests also perform the role of controlling water flow and recharging water bodies which makes forests vital in agricultural production as well as the generation of power. Finally, it serves as a means of the maintenance of biodiversity. Forests accommodate numerous forms of wildlife species which in turn plays the key role of supplying the protein and fuel needs of the people in the country.

Kaimowitze and Angelsen (1997) report that the underlying causes of deforestation differs substantially for different countries. The major causes of deforestation in Ghana are very numerous. The FOSA country report put it this way ‘‘forest depletion and degradation is the effect of the complex interactions between social, cultural, political and commercial factors’’. The following are some of the major causes of deforestation in our country:

Firstly, high profitability in the timber industry is the single most dominant force behind deforestation. The cutting down of trees for commercial purposes in Ghana became a popular job opportunity for most people because of its lucrativeness. Timber ranks third in terms of exports earnings in Ghana, accruing US $300 million Safo (2002) making the trade very hard to resist especially to the government as well as the lumbers. .

Weak institutional structures is one contributing factor to deforestation in the country. The Forestry Commission and its parent body the Ministry of Lands and Natural Resources have failed woefully as far as the control and management of the country’s natural resources are concerned, resulting in encroachment on the country’s forest reserves on a grand scale. This is mainly due to the fact that, the Forestry Commission is unable to effectively monitor and patrol Ghana’s forests.

Rapid population growth is another major factor behind deforestation and depletion of Ghana's forests. According to Index Mundi the population growth rate in Ghana for 2013 was 2.1 percent, this may sound good by regional standards but it is well above desired levels of growth. The rapid growth in population has increased the pressure on land for the production of food and settlements. It has led to the rampant clearing of our forests to produce more food and create settlement facilities. Unfortunately the increased pressure on land for food production purposes leads to poor farming practices like uncontrolled bush burning and shifting cultivation which further depletes our forest cover. Agyemang and Amissa(1987) attributed 70 percent of deforestation to shifting cultivation. It is very evident that rapid population growth breeds poverty and Ghana's case is no different. The desire to reduce poverty has led to the over exploitation of natural resources for exports. Such procedures used is mining and quarrying. Unfortunately, most of the mineral rich areas are covered with forests, thereby causing depletion of our forest cover.

Insufficient investment by both the private and public sector in forestry in Ghana has cost us a lot of hectares of forest cover. Over the years, the private sector has particularly performed woefully as far as investment in forestry is concerned. Forestry investment could come in the form of creation of eco-parks, investing in reforestation projects, investing in forest fringe communities to ensure sustainable forest management. It is for the reason of controlling deforestation, curbing its effects on the country and enjoying the full benefits of afforestation that the government together with the private sector are investing in forestry by prosecuting the Achimota Eco park project. The USD 323 million project, already ongoing would be a public private partnership, with the private sector contributing 45 percent of the entire project cost.

1.1 Problem Statement

The Achimota forest has been in existence before independence. It was gazzetted as a forest reserve in the 1930's to primarily serve as a woodlot of Neem trees (*Azadirachta indica*) to

provide fuel wood for the Achimota School and also serve as the green belt to buffer the school against the noise from the development in the city of Accra. The area was also reserved to serve as a recreational site, a site for educational and science research for students, conservation of biodiversity as well as play the ecological role of air purification. Currently the area remains the only green belt in Accra housing the Accra zoo as well as the planned site for the Accra Eco park project. It is approximately a fifteen minute drive away from the Kotoka International Airport (Forestry Commission, Proposal for the Accra Eco-park Project).

Originally, the area under reservation for Achimota forest was 494.95 hectares however the current size of the forest has shrank to just 360 hectares. This implies that about 134.95 hectares representing 27 percent of its original land size has been lost, according to the ministry of lands and natural resource. This is mainly due to the fact that no real effort has been made to invest and develop the area. Particularly the Abelemkpe/ Dwowulu area which used to be part of the forest has been lost to urban development, building encroachments, dumping site of refuse by residents and other unauthorized developments. Also the establishment of the Ghana Institute of Management and Public Administration (GIMPA) and the Accra-Tema Motorway extension as well as other privately made encroachments have eaten into parts of the forest, but that is not the only danger posed to the forest. . In fact, the forest is under constant pressure from private developers, state agencies and squatters (predominantly artisans and petty traders plying their trade around the park). Construction works on roads, water pipes and electricity cables in the area seek to use the forest as its desired route. When the Accra Zoo had to make way for the building of the presidential palace, the Achimota Forest Reserve was where most of the animals at the Zoo were taken to. The forest is currently managed as an arboretum and wildlife rescue centre, however patronage of the makeshift zoo is very low. The reserve which was to provide a serene environment in the city for research and tourism has its part being turned into prayer camps. The park is heavily patronised by various church groups, with an

average annual visitation of 200,000 and gate proceeds of GH¢ 60,000 per annum.. Which is well below the reserves potential comparing it to other urban green spaces such as the Nairobi National Park (Kenya) which attracts 96,000 visitors a year and makes as much as US$ 8 million. Hence the need for the Eco park project to protect our environment, boost tourism and raise more revenues in the process. Forestry Commission, Proposal for the Accra Eco-park Project (2009)

1.2 Research Question

These are questions that the study seeks to shed more light on after it has been completed. Every piece of the project would be directed towards answering the research questions. At the end of the study the following questions would have been answered.

- What are the cost and benefits associated with the project?
- Does the project help to the achieve Ghana's MDG's and GPRS II commitments on environmental protection?
- Is the project feasible to undertake?

1.3 Objectives of the study

- Identify, estimate and evaluate the costs and benefits of the proposed Eco Park project to the residents of Achimota, the city of Accra and the Ghanaian economy at large.
- To appraise the commitment levels of the public and private sector towards environmental protection and the tourism sector as a whole.
- To analyse the viability of the project as an alternative way of protecting the environment, boosting tourism, raising revenues and reducing poverty in the country

1.4 Significance of Study

The purpose of the study is to point out the extent of apathy we as Ghanaians have towards environmental protection and eco-tourism and also to support the Forestry Commission's

proposition to invest in and develop the abandoned Achimota Forest into the Accra Eco-Park**.** Transformation of an ordinary park to an Eco-park with international standard is without doubt a huge project which the government intends to pursue. This study will bring to light the cost and benefits of the projects to know if it's worthwhile channelling the nation's scarce resource into such a project. This study will serve as a reference work for organizations to review when embarking on similar projects; that is, it will help policy makers and stake holders to make informed choices. It will also serve as a resource for students and individuals to know more about the park as well as create awareness on forest conservation.

1.5 Organisation of the study

Chapter one of this study consist of the background and problem statement which brings us to the main reason or objective for choosing that particular project. The second chapter enlightens us on the appraisal stage where every aspect of the project is subjected to systematic and comprehensive evaluation which help project decision makers make a rational choice. Chapter three deals with the benefits and costs that accrue to the project, which the forth chapter compares and evaluates, to ascertain the project's viability to see if it's worth undertaken. The fifth chapter concludes the cost benefit analysis done on the projects with recommendations and suggestions as well as challenges faced throughout the projects execution.

CHAPTER TWO

PROJECT APPRAISAL

2.0 Introduction

Projects appraisal is an investigation and presentation of a reasonable design of a project to help decision makers make a rational decision on a project(s). Project appraisal is a necessity in undertaking any project(s). It is said to be the technique employed by welfare economists to evaluate the efficiency of alternate project or policies. Thus it assesses the feasibility of every aspect of the project. If a project is well formulated and thoroughly appraised, a good follow-through on the subsequent stages of the project cycle will see to its goals being achieved. Appraisal involves a careful checking of the basic data, assumptions and methodology used in project preparation, an in-depth review of the work plan, cost estimates and proposed financing, an assessment of the project's organizational and management aspects and finally the validity of the financial, economic and social benefits expected from the project. On the basis of such an assessment, a judgment is reached as to whether the project is technically sound, financially justified and viable from the viewpoint of the economy as a whole. The main component assessed during project appraisal includes; technical, economical, financial, commercial, institutional, and socio-cultural as well as risk appraisals.

2.1 Technical Appraisal

Technical appraisal focuses on the identification and analysis of the alternative ways of executing the project in terms of choice of scale, timing, technology, location and organization. Technical Appraisal determines whether the requirements of a successful project has been covered and good choices have been made with regards to location, raw material requirements and other factors such as availability of required professionals, technicians and workers.

The Accra Eco-park project will be implemented within the Achimota Forest Reserve. According to the forestry commission, the name "Accra Eco-park" was deliberately chosen for purposes of name-recognition and easy identification especially for potential international/non-Ghanaian visitors and useful for branding and marketing purposes.

The Achimota forest reserve covers an area of 360 hectares, with a total perimeter of 11.9 kilometers. With respect to its geographical coordinates, it lies within a longitude of 0^{o} 11' West and 0^{o} 14' West, and a latitude of 5^{o} 36' North and 5^{o} 36' South. The location of the Eco Park has many advantages comparing its proximity to the Kotoka International Airport i.e. 15 minute drive from the airport.

The Park consist of diversified plants species which are considered to be fairly rare internationally but rare in Ghana and of high conservation priority (Hawthorne and Abu-Juam 1995). The modern Eco Park which is to be established would be zoned into eight (8) distinct areas, clearly demarcated by organic fencing or as appropriate of which each zone will have its own unique attributes and attractions as indicated below;

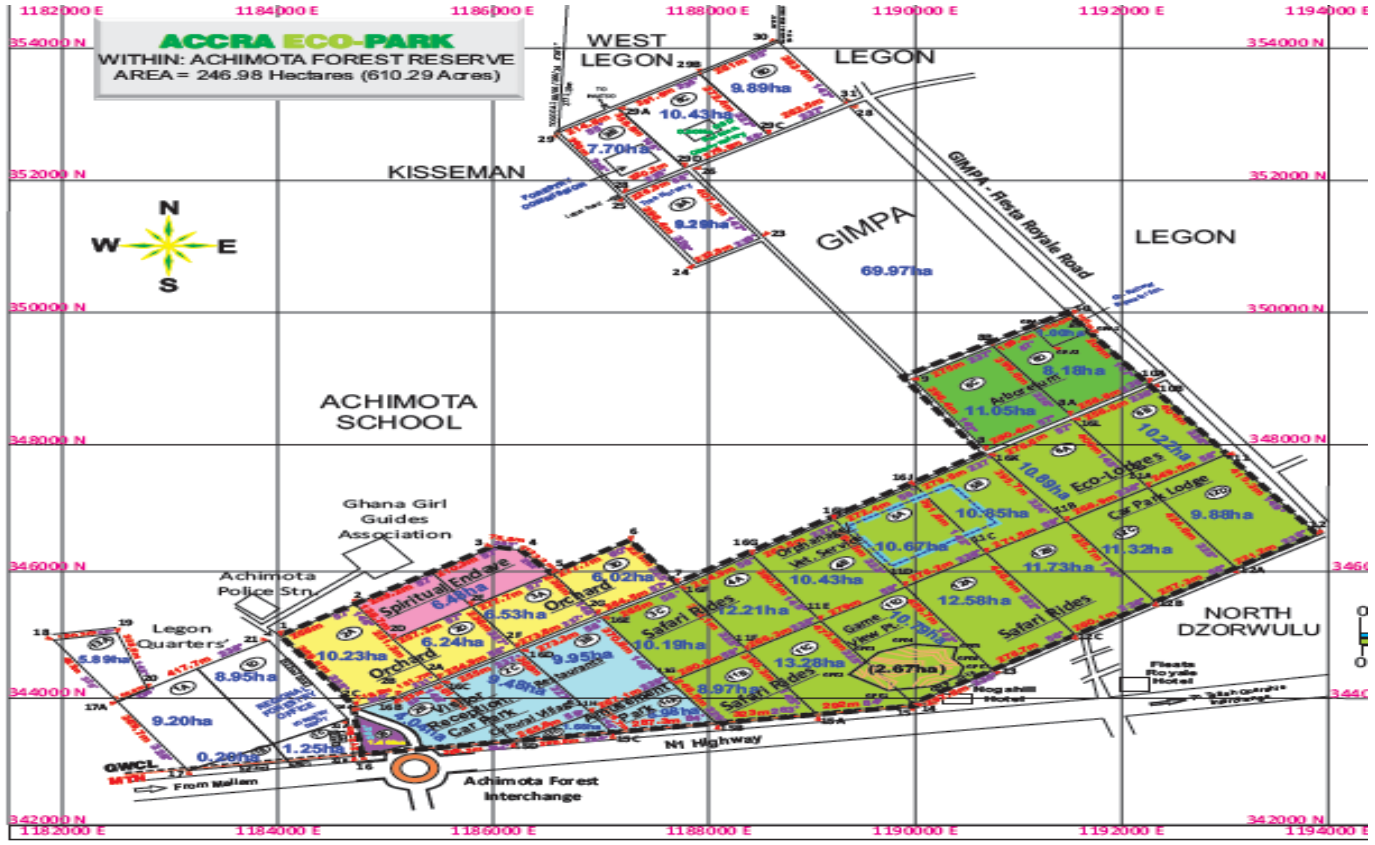
Table2.1.0.1: List of features and interventions planned for the Accra Eco-park

Zone	Area (Ha)	Features/Interventions	By whom
Drive Safari	108.70	driveway, cart ride, eco-lodges, fencing, landscaping, veterinary facilities, introduction of wildlife, watering points, salt lick, viewing platforms	Forestry Commission/ Private sector
Walk Safari	48.97	Scenic gravel pit, restaurant, animal enclosures and blinds, bird sanctuary, suspended walkway, water features, viewing platforms, animal orphanage, landscaping	Forestry Commission/ Private sector
Amusement Park	10.00	water-based activities, rides, seesaw etc, food court, amphitheatre, electronic games, "Accra Eye", roller coaster	Private sector
Cultural Village	9.95	craft village, replica traditional buildings, traditional restaurant/food court	Private sector
Spiritual Enclave	8.24	landscaping, pavilions, hostel, grotto	Forestry Commission/ Private sector
Orchard	28.88	landscaping, planting of trees, story boards, walk trails, benches, camp sites, stingless bees sanctuary	FC/CSIR/GIF
Arboretum	29.25	green block, enrichment planting, research site	BotanyDept/ FoRIG/GIF/FC
Visitor Reception Facility	8.32	main entrance, reception, turnstiles, offices, mini nature museum, parking area, cafeteria	Forestry Commission/ Private Sector

Source: Forestry Commission

The table above gives a list of the major interventions expected to be made on the park. These interventions are expected to further enhance the value of the park making it more attractive to local visitors and more especially the foreign ones. Some of these interventions, would however lead to the loss of some parts of the vegetation cover. These may include the Amusement Park, Cultural Village, Spiritual Enclave and the Visitor Reception Facility

Figure 1 A site map of the Achimota Forest Reserve showing the areas of intervention to be made



Source: Forestry Commission

A pond of size 30x30 meters would be created to meet the water requirements of the animals to be introduced into the park. This area represents only 0.08% of the area designated as Drive Safari. Geologists and hydrologists would be contracted to design and develop this feature which would serve a very important need and also enhance the park greatly. Game viewing platforms/hides would be erected at different points around the pond for visitors to experience free-ranging park animal flock drink.

The entire 11.9 kilometres perimeter of the Achimota Forest Reserve would be completely fenced to secure the boundaries of the park and also to prevent the escape of wildlife into the highly built-up neighbourhood. A solid fence wall would be a preferred option for the exterior fencing as compared to electric- wire or chain-link fencing, considering the rampant vandalizing of the existing chain-link fencing by miscreants and the high incidence of power trips which could render electric fencing ineffective or expensive to operate. However internal demarcation for the various designated zones would take the form of organic fencing i.e. wire fencing integrated with live fencing for aesthetic appeal and environmental compatibility.

The longest track which runs from the main entrance to the park is the only motorable road in the park and would mainly provide access to all the designated zones. This road is currently not under any serious threat of erosion, but would require resurfacing especially for a few sections that have developed water-logged conditions or splits in levels. A speed limit of 10 kilometres per hour would be fixed for this main route with speed checks at some points. Additional tracks will be created in the proposed Drive Safari zone, which would be essential for easing movement. The same would apply for walking trails and paths in zones such as the orchard and the Walk Safari. Curved paths would be incorporated in the road and trail design to break the monotony and enhance discovery and surprise during hiking.

2.2 Financial Appraisal

Financial appraisal focuses mainly on the sources of finance for the development of the park and how these funds would be disbursed to cover all the expected expenditure of the project. The proposed Eco park project is estimated have a minimum budget of $30 million. The main source of finance would come from the Forestry Commission's coffers through its own internally generated funds (especially allocations from the proceeds of other projects under the Forestry Commission's watch) and central government's releases to the commission. The rest of the project would be financed by

- Private sector equity
- Debt and capital market sources
- Concession fees
- Grants from development partners and sponsorship from local corporate institutions interested in conservation and environmental awareness.

Source: Forestry Commission

Table 2.2.1 Details of the Proposed Financing Arrangements showing each partners allocation and sector of investment

Project Development Activity	Proportion of Budget	Source of Finance	Remarks
Park Design and Basic Infrastructural Development	45%	FC(Internally Generated) - 23% Donor(NREG)- 20% Other (MiDA) – 2%	Commitment of MiDA based on EIA prescription in respect of road construction
Detailed design and development of park infrastructure	55%	Private Sector Investment- 55%	High level of buy-in expected due to high business potential of park location

Source: Forestry Commission

Under the projects implementation the table above shows how the proposed budget would be shared among the various partners and the development activity their funds would be mostly directed into. It could be seen that the private sector would be more concerned with the design and development of the park's infrastructure, whilst the Forestry Commission and the other partners would be more concerned with basic infrastructure, the projects management and administration.

Table 2.2.2 Analysis of Funding Sources by proportion based on each partners contributions

Cost Responsibility	Proportion (%)
Private Sector	66.87
Forestry Commission	13.90
Development Partners	16.66
Grant/ MiDA	2.62

Source: Forestry Commission

The table above shows that the largest individual contributor to the projects funding is the Private Sector. These include corporate bodies and other for-profit making organisations who wish to capitalise on the projects Build Operate and Transfer contractual terms.

All maintenance costs will also be borne by the private partners during the period based on the terms of the contract plan for the Park. There is also the need to look at how the money invested into the plant will be recouped. The money invested is expected to be recovered mainly from visitors who patronise the place. It is for this reason that ticket toll booth is established at almost every part of the eight (8) distinct areas of the Park. This system is introduced in order to make a good account of patronage at the Park.

2.3 Institutional Appraisal

This is concerned with the laws, government policies, management, norms, and practices relating to Achimota Eco park project. It is conducted to ensure that the right environment exists for the project to be implemented. Institutional evaluation considers the existing framework, assess to check the viability of the project is also to be conducted. It will be prudent to adjust the existing environment for it to contain the new project in instances where there is such need. There are situations where the implementation of the new project will require the re-evaluation of issues like law, management and structures. The following are the various institutions that would oversee the implementation of the project.

- **The Forestry Commission**: The Accra-Eco park project would be entirely under the supervision of the Forestry Commission. The Forestry Commission is an organized institution which consists of board of directors and management units. The mandate of the Forestry Commission is to protect, develop and manage the park on a sustainable basis to ensure that the nation derives optimum benefits, both direct and indirect, from the resource. The Forestry Commission which is constituted of three divisions i.e. Forestry Service Division, Wildlife Division and Timber Industry Development Division, has developed considerable capacity for implementing projects of this kind over the years, working in collaboration with development partners, indigenes and various experts. Particularly the Wildlife Division of the Commission has specialist knowledge and experience in the development and management of parks and would be very key in the various stages of the park's development. Various ecotourism projects have been successfully executed in parks like Mole, Kakum, Ankasa, Shai Hills and lately Kyabobo. A Project Oversight Committee (POC) under the Forestry Commission will be responsible for all strategic decisions on the project. This project will be executed with the active participation of various stakeholders including relevant

government agencies, private business concerns, community members, academic and research institutions and international development partners. The stakeholder groups identified include state and quasi-state agencies, private sector business institutions, NGOs, academic and research institutions, development partners and neighbouring communities.

- **The Environmental Protection Agency (EPA)** will assess the development of the project and programs which are likely to have negative effects on the environment. As a guide, the Environmental Procedures of Ghana, 1955, has provided a checklist of undertakings that require Environmental Impact Assessment and these include, among other things, the provision of Amusement and Recreational Services.
- **The Ministry of Lands and Natural Resources:** The Forestry Commission falls under this ministry. This ministry would be the projects main advocate to the government and parliament through parliamentary select committees. The ministry would enter into a memorandum of understanding with the Ministry of Education in conjunction with the Achimota School for its management to hand over idle lands belonging to the school as part of the Eco-park for the mutual benefit of both sides.

- **Green Advocacy Ghana (Green Ad):** This is an environmental Not-For-Profit Organization. Green Ad aims at upholding and enhancing the integrity of Ghana's environment, among others through partnership in research and data collation on the state of the environment; advocacy for sound environmental policies and practices (e.g. dissemination of environmental information through newsletter publications).They would therefore be of help by assisting the commission on the projects publicity.
- **The Accra Metropolitan Assembly (AMA)**: This is the main planning authority and the statutory body with the mandate for environmental protection and waste

management in the city of Accra. Under normal circumstances therefore, the development and management of the park would be the responsibility of the Assembly. Given the peculiar and specialised nature of wildlife management however, the AMA is incapable of handling the task proficiently. This notwithstanding The Accra Metropolitan Assembly's (AMA) support is strongly needed in the implementation of the project. This would be in the area of waste management at the park during and after the projects implementation.

2.4 Socio-Cultural Appraisal

Socio-cultural Appraisal focuses on the impact of the project on the lives of the people who live around the area where the park is to be established. It also looks at the impact in terms of problems like waste water disposal, air emissions, noise and spills as well as the benefits that may accrue to the surrounding societies.

The purpose for the establishment of the park back in the 1930's was to create a green buffer for the Achimota School. The Achimota forest reserve occurs in a densely-populated area surrounded by a heavily built-up area mainly for institutional, residential and commercial purposes. The area surrounding the park is fast emerging as a middle-class settlement given the existing as well as on-going development. The park will have to cope with severe encroachment pressures from would-be property developers and "squatters" who are mainly artisans such as mechanics and petty traders plying their business around the park. The pressure would most likely escalate in the coming years as a result of the fast-increasing value of the area due to intensive on-going commercial developments such as shops, hotels and office buildings etc. It is as a result of these encroachments that the Eco Park is being established to prevent the fast increasing pressures on the area as the place will be fenced and put under the supervision of the Forestry Commission.

Sanitation is a key challenge in densely populated areas and the park is not spared its share of the nuisance, with the illegal dumping of refuse generated from nearby homes and squatters around the periphery of the forest. This has serious implications for the wildlife resources in the reserve, exposing them to various forms of pollution and its attendant health risks. Thus the developing of the park will prevent the residence from dumping refuse which will protect the wildlife of the Park. Also it will provide the Park with a fresh purified natural air as the stench from the refused will be no more.

The Park will bring prestige to the society as well as inter cultural unity as people will migrate to the place to trade, visit the place or just to reside near the park. More research will take place at the establishment of the Park as there is a place set aside for that purpose. This will boast up intellectual performance of nearby schools as well as increase the nation's research capacity on environment. It will also change the mind-set of the society concerning wildlife and forest conservation.

Employment opportunities will be created for the citizens in the community. 1200 jobs will be generated at the developmental stage of the project and 500 permanent jobs generated when the Eco-park is fully operational. This can help minimize certain social vices that arise from unemployment such as school drop-outs and armed robbery. The municipality can also benefit from developmental projects that will be undertaken as a result of the corporate social responsibility of the project enterprise.

2.5 Environmental Appraisal

The environment is one aspect which is very important in analysing the outcome of a project. Environmental appraisal captures the impacts of the project on the use of renewable and non-renewable resources. These impacts are in the form of reducing or worsening pollution, climate change, and environmental degradation .

2.5.1 Habitat Modification

Under the project it would be necessary to remove and also introduce some plant species in different areas of the park, as part of interventions towards habitat modification to enhance the parks value. The predominance of the Neem tree (Azadiratcha *indica*) and Cassia (Cassia *siamea*) which are both exotic species would be put in check. Some few patches of the above species would be removed in a mosaic pattern to create space for waterholes and salt licks for wildlife in the Drive Safari area.

Some under growth would be thinned or cleared to encourage growth of desirable species as well as improve game visibility and the movement of visitors. Species such as *Trema guineensis* and *Ficus crastenostona* known to be good sources of food for birds and which also can thrive well in the habitat type would also be introduced to re-vegetate the gravel pit area. Bamboo which is fast growing, hardy and provides lots of shade would also be planted along walkways. Under the project, plant species to be introduced would be mostly indigenous, however expert advice and direction would be sought concerning the introduction of exotic species for reasons of ornamentals, shade, erosion control et cetera to avoid any explosion of undesirable species.

Meticulous identification and handling of individual species would be employed during all habitat modification actions to avert destruction of any species of special biological significance. The following factors would be taken into consideration in deciding on the introduction of wildlife species.

Hard release: This is the introduction of animals into an area without shelter or food. As such species can suitably fend for themselves. It would be experimented for the Drive safari zone.

Soft release: This is where animals are provided with shelter, food or other resources and an education (i.e. how to cope with the new environment). This would be experimented in the Walk safari area.

Overall the following would also be taken into account concerning the introduction of species

- Suitable period for introduction
- Food availability
- Necessary habitat requirements
- Eradication of possible threats
- Control of possible predators/ competition
- Management of pollution
- Management of noise levels
- Carrying capacity

Source: Forestry Commission

The habitat condition would be made more favourable to browsers such as the Bush buck, Maxwell's duiker, Red-flanked duiker and the Royal antelope. Given the available space of the park, the animal population would be carefully managed within the carrying capacity. Some exotic fauna that may possibly be introduced into the park include Zebra, Giraffes and Ostriches. It should however be noted that no member of the wild cat family and any other carnivore would be included in the list of species present on the park.

2.5.2 Identification of Ecological sites

Based on their biophysical attributes, the ecologically sensitive areas of the Eco-park would be identified and managed as special sites to be preserved against potential negative visitor impacts. This would include spots where Gold and Blue star species are located as well as the forested area close to the Nogahill end of the reserve.

2.5.3 Environmental Impact Assessment

In compliance with the Environmental Protection Agency (EPA) Act of 1994 (Act 490), which stipulates that as a prerequisite for the developmental approval, an Environmental Impact Analysis (EIA) be made for all developments, projects and programmes which are likely to have adverse effects on the environment. The Accra Eco-park would be no exception. As a guide, the Environmental Procedures of Ghana, 1955 has provided a checklist of undertakings that require Environmental Impact Assessment and these include among other things, the provision of Amusement and Recreational services.

The Environmental Impact Assessment of the included areas show the following positive and negative impacts.

Table 2.5.1 Summary of possible positive Impacts the project is expected to produce

Positive Impacts
Re-establishing arboreta into a real botanical-tree garden
Habitat modification to introduce varieties of trees, shrubs and grasses
Enhancement of the faunal component of the Achimota Forest reserve through translocation of selected wildlife species
Fencing to help check encroachment and poaching
Project will contribute to addressing youth unemployment
Important alternative for individual family recreation
Major attraction to the urban population, tourists and other visitors
Research facility for students
Environmental education facility

Source: Forestry Commission.

The above table shows positive marks the project would have on the environment. These improvements are sure to add value to the projects commercial value as well as its bio-diversity.

Table 2.5.2 Summary of the possible negative impacts that the project may produce and its proposed mitigations

Negative Impacts	Mitigations
• Dust and noise pollution • Removal of some trees like Neem and Cassia as well as the clearance of some undergrowth to improve tree growth or establish lawns • Generation of garbage and litter due to visitation • Aggravation of the already difficult vehicular traffic situation on all sides of the park	Mitigation measures as well as other contingency plans for the above mentioned impacts would be factored into the design and development of the park. This would be handled by experts in the field and recommendations would be in accordance with international best practices.

Source: Forestry Commission

Although the project is intended to a positive impact on the environment, it however does come along with some negative impacts. Nonetheless the project is expected to have a net positive effect environmentally. The table above gives a summary of some of the negative effects of the project on the environment.

2.6 Risk Appraisal

Risk appraisal is concerned with accessing all the things that could possibly go wrong with the project. In other words it looks at the risks associated with the development of the park and how such risks would be mitigated or brought under control should it occur. The following are some of the risks that are associated with the development of the park.

Table 2.6.1 Summary of possible Risks that could befall the projects execution

Risk/Threats	Exposure	Mitigation
Political		
Lack of government commitment	Medium	Constant lobbying through the Ministry of Lands and Natural Resources and Parliamentary sub-committees.
Political Instability	Medium	-
Instability of corporate leadership	High	Petition Government
Environmental		
Loss of rare plant and animal species	Low	Adhere to strict habitat modification plan
Loss of sensitive niches through habitat modification	Low	-
Disease transmission among introduced species	Medium	Veterinary care unit to take care
Social		
Increasing population density/ Internal migration (from within Accra and its immediate environs)	High	Sustained decongestion actions around the park
Anti- social/ deviant activities	High	Awareness and livelihood empowerment programmes
Unplanned developments/ Slums	High	Enforcement of regulations
Resistance from squatters who may be displaced	High	Sensitization, sensitivity and provision of alternatives
Adulteration of local culture and traditions	Medium	Sensitization and promotion of cultural programmes

Technological		
ICT system failure	Low	Back up/ redundancy
Economic		
Competition from tourism/ recreational facility operators	High	Business strategy
Economic Inflation	Medium	Financial management
Project funding constraints	Medium	Proactive action by Forestry Commission management
Legal		
Litigation e.g. concessionaires, concerned groups et cetera	Low	Alternative dispute resolutions measures
Breach of Memorandum of Understanding/ agreements	Medium	Enforcement of terms and conditions

Source: Forestry Commission

The table above gives a summary of all the possible factors that could beset the execution of the project looking at various jurisdictions so as to be circumspect as well as their mitigations.

2.7 Economic Appraisal

The economic appraisal is a methodical way of determining the anticipated costs and benefits of the project and valuing them at shadow prices to help show the impact of the Achimota Eco park project on the economy, which would go a long way to help stakeholders in their decision making. These include

- **Revenue Generation**: The Eco park project on its establishment is envisaged to increase tourism revenue which would be very vital in assisting government to promote the development of other projects.

- **Employment Creation**: The project upon its implementation and completion is expected to create a lot of job opportunities for different classes of people mainly from the surrounding communities and the country as a whole. This is would be instrumental in reducing the high levels of unemployment in Ghana especially among the youth.

Table 2.7.1 Summary of Jobs Envisaged for the Eco-park

Developmental Phase		*Operational Phase*	
Professional	**Non-professional**	**Professional**	**Non-professional**
Site Engineers	Masons	Park Manager	Security personnel
Architects	Plumbers	Facility Managers	Guides
Draughtsmen	Tilers	Game wardens	Drivers
Quantity surveyors	Electricians	Maintenance Engineer.	Craftsmen
Hydrologists	Gardeners	Curators	Gate staff
Geologists	General labourers	IT Specialists	Waiters
Ecologists		PR Officer	Receptionists
		Marketing officer	Cleaners
		Eco-lodge Manager	Gardeners
			Cooks
			Food vendors

Source: Forestry Commission

In all, a minimum of 1200 direct jobs are projected to be generated during the developmental phase of the project while some over 500 permanent job placements would be made when the Accra Eco-park swings into full operation.

The table above divides the project into two phases under each of which two clases of employments would be created. These are the professionals and the non-professionals.

The professionals can be termed as the more skilled or formally educated labour whilst the non-professionals are the less-skilled ones and mostly less educated.

- **Improved Living Standards**: Employment means that the standard of living of people in and around the area and beyond will improve and this is necessary for economic growth of the country. This implies that the beneficiaries of the employment creation can now afford better social services other things being equal
- **Environmental Protection**: Protection of the country's forest reserve is also necessary hence the establishment of the park will prevent issues of encroachment arising from other possible competing land uses. Currently issues with sanitation are a challenge for densely populated areas, the park as at now has its fair share of sanitation problems as people have used it as a site for dumping refuse. Rubbish breeds disease causing insects and organisms such as mosquitoes and housefly and bacteria from rotten and decayed food that pose health risks for people living in and around the area. A sick population means productivity will be low and this will not auger well for the country. Establishing the Eco Park is a sure way of preventing this practice and protecting the environment and human life as well from these health risks.

2.8 Commercial Appraisal

This deals with how the arrangement for the distribution and marketing of the output produced and arrangement for the supply of inputs needed for the construction and operation of the project. Commercial appraisal looks at the project from the private lens where profit maximization is key objective.

The Achimota forest is situated in a highly strategic location in the city of Accra, both in terms of accessibility and potential for eco-tourism. It lies adjacent to the south end of the Achimota School and the southwest of the University of Ghana, running parallel to the Accra- Tema motor way extension. Most importantly, the park is just a fifteen minutes drive away from the Kotoka international airport.

Comparing the proposed Eco-park to three already existing major eco-tourism sites in Ghana it is believed that the project when completed would supersede the already existing parks in terms of patronage and revenue generation.

Table 2.8.1 Summary of the annual visitations for the top 3 national parks in Ghana (2007- 2009)

	Annual Visitation		
PARK	**2007**	**2008**	**2009**
KAKUM National Park	88 900	96 772	126 065
MOLE National Park	13 734	15 508	14 760
SHAI HILLS	7 861	5 501	9 241

Source: Forestry Commission

Considering the inadequate and sometimes the total absence of any decent tourism facilities at these sites and the fact that the park in its current stage records 200000 visitors from religious groups alone annually, it is certain that visitation to the park would easily outstrip all the three already established parks upon its completion.

Summary of the commercial potentials of the park

- Central location of the park: Mainly its proximity to the Kotoka International Airport, The Accra Mall, Achimota School &Golf Course ,University of Ghana and high-end residential suburbs of Accra such as East Legon, Airport residential and the Westlands where most of the targeted 'customers' would come from.
- It is serviced by good roads making it easily accessible to all parts of the city
- Broader variety of eco-tourism products would be available as a result of heavy capital injection into the project

- The huge population of the Greater Accra region believed to be more than four million meaning a high level of patronage other things being equal.

The actual operations of the Accra Eco Park would commence upon completion of the developmental phase of the project and its subsequent inauguration. Park operations will be based on a comprehensive business strategy that shall be formulated and agreed by key stakeholders based on a fair balance between the conservation and business interests in the park.

CHAPTER THREE
IDENTIFICATION OF COST AND BENEFITS

3.0 Introduction

Cost benefit analysis is a method of analysing the investment viability of projects. This is based on assessing the benefits and costs of undertaking the project. It therefore ensures effective resource allocation; by ensuring that the benefits accrued from the project outweighs the costs incurred. Thus it is an evaluation tool by which policy makers evaluate the viability of alternative projects (public or private), to ensure that the group or community concerned benefit as a whole compared to the cost involved to ensure the optimal welfare of the society. It is imperative for one to consider in Cost-Benefit Analysis, all *costs* and *benefits* emanating from a project. This chapter therefore attempts to identify and estimate all possible costs and benefits associated with the establishment of the proposed Eco Park. Benefits and costs can be identified as tangible, and intangible. These can be sub categorized into direct and indirect.

3.1 Benefits

Benefits refer to all possible advantages or pros that result from the execution of a project or policy. They reflect improvements in the interest and well-being of members of the society. There are numerous benefits that can be associated with the establishment of the Eco Park. They are hereby classified into; Direct Tangible benefits, Direct Intangible benefits, Indirect Tangible benefits, and Indirect Intangible benefits.

3.1.1 Real Direct Tangible Benefits

Real direct tangible benefits attempt to measure fund inflows which are closely related to the setting up of the project and its implementation. They reflect direct increases in the community's welfare as a result of the project implementation. These benefits are said to be tangible because they can be determined under the market system, that is, they can be valued at a given market price.

- The direct benefits are expected to manifest in the form of revenue from entry fees, concession charges (rent) and taxes on the wages and salaries paid to the workers employed directly under the project.

  - ✓ **Entry fees**

    We estimated that a total number of 500 000 visitors (both locals and foreigners) would be registered in the first year and would be increasing at a 5% annual rate subsequently, assuming an average gate fee of GH₵ 10 for both local and foreign visitors. It implies that the annual proceeds from the visitations would equal GH₵ 5 million.

  - ✓ **Rent & Concession charges**

    There would be a total of 100 stall units on the entire park (Forestry Commission). Using the prevailing market rate of rent in the Accra Metropolis (GH₵ 500 per month), it implies that the total proceeds from rent on the entire premise would be GH₵ 50 000 per month and GH₵ 600 000 annually.

  - ✓ **Employment Creation**

    The project is expected to be a source of employment creation through its developmental stages right to its operational stage. This would be mainly among those employed by the Forestry Commission to work directly on the project at its various stages. The wages and salaries they would receive is used as a proxy for the value of employment. Employment in this sense is considered to be a Real Direct Tangible Benefit because it is provided as a result of direct involvement in the execution of the project as compared to the employment created to other groups such as Petty traders, Hotel operators et cetera which would be considered as an Indirect Tangible Benefit.

    The benefits to the workers at both the construction and developmental stages are represented by the wages and salaries they received at each stage and is

given in *Appendix 1* as GH₵ 19 800 000 at the end of the 5 year construction stage and GH₵ 2 400 000 annually at the operational stage.

- ✓ **Tax revenue from workers**

  There would be a total 1200 workers (200 professionals and 1000 non - professionals) at the developmental stage and 500 workers (100 professionals and 400 non-professionals) at the operational stage (Forestry Commission). At the developmental stage the non-professionals receive GH₵ 10 per day (i.e. 3 cedis above the current minimum), three times a week for the entire 60 month duration of the project. This would yield an annual wage *GH₵1560* for the non-professionals. The professionals would however take GH₵ 1000 each for the entire duration. The table below gives a description of how the two classes of workers would be taxed.

Table 3.1.1 Summary of Tax Revenue from the workforce at the Construction Stage

Worker	Annual Salary	Tax Rates	Sum
Non- professional	GH₵ 1560 (GH₵ 10* 156days per annum)	0% Since they fall short of the first GH₵ 1584 per annum (GRA tax structure)	FREE
Professional	GH₵ 12 000 (GH₵ 1000* 12 months)	first GH₵ 1584 - 0% N ₵729 - 5% = GH₵ 39.6 N₵1104-10%=GH₵104 R 8520-17.5%= GH₵1491	GH₵ 1635 per 200 workers per annum for 5 years
TOTAL			GH₵ 1 635 000

Source: Authors Own Compilation

The N and R in the table represent *next* and *Remainder* respectively.

The table above shows how the both class of workers would be taxed at the construction stage. It could be noticed that since the non-professionals fall short of the minimum taxable pay of GH₵ 1584 they are exempted from any income tax at this stage. The

professionals would however be eligible for the tax. At the end of the 5 year construction stage a total of GH₵ 1 635 000 would have been collected from the workforce employed.

At the operational stage, the non-professionals would be receiving GH₵ 250 each per month whilst that of the professionals would remain unchanged at GH₵ 1000 based on our own estimations. The table below shows that both class of workers would be eligible for tax at this stage as none of them fall short of the minimum.

Table 3.1.2 Summary of Tax Revenue from the workforce at the Operational stage

Worker	Annual Salary	Tax Rate	SUM
Non-professionals	GH₵ 3000 (GHC 250 per month)	First GH₵1584 free N ₵792-5%=GH₵ 39.6 R GH₵687= GH₵ 68.7	GHC108 per annum per worker(400 workers) GH₵ 43,320
Professionals	GH₵ 12000(GHC 1000 per month)	first GH₵ 1584- 0% ₵729- 5% = GH₵ 39.6 ₵1104-10%=GH₵ 104 R ₵8520-17.5%= GH₵ 1 491	GH₵ 1635 per annum per worker(100 workers) GH₵ 163 460
TOTAL			GH₵ 206 780

Source: Authors Own Compilation

From the tables above the letters N and R represents *Next* and *Reminder* respectively.

NB: The tax structure used is based on that of PKF Ghana's 'Ghana Tax Guide 2015' as provided by the Ghana Revenue Authority (GRA). A full view of the Income tax structure for the year 2015 is provided in *Appendix 2*.

Also the tax revenue on the wages and salaries of the workers employed at each stage of the project is considered a *Real Direct Tangible Benefit* because its flow is directly related to the execution of the project as compared to the tax revenues that would flow from the incomes of other economic beneficiaries like Hotels, petty traders et cetera which are not directly related to the project.

- The establishment of the park will curb issues of encroachment pressure arising from other possible competing land uses after the previously idle land has been put to use.

  In the year 1930 when the area was first put under conservation, it was originally 494.95 hectares in area, however only 360 hectares remain as at the end 2014 (Forestry Commission). This implies that over the 84 year period, 134.95 hectares of the park's original size has been lost. This gives us an average yearly loss of 1.6 hectares. Comparing it with the prevailing market prices of GH₵ 8500 per acre , it implies that a 1.6 hectares (4 acres) annual loss would give a market value of *GH₵ 34 000* annually.

- The health and safety of the people and environment in and around the park will be improved because measures will be put in place to prevent the already existing canker of dumping refuse on the site.

  Assuming that as a result of the dumping site, 15 people get sick monthly from ailments like malaria, typhoid fever, cholera, diarrhoea et cetera. Then a total number of 180 residents would visit the hospital by the end of the year. Assuming a flat treatment cost of GH₵ 50 each, it would give us a total of *GH₵ 9000* per annum, which would be accrued as a benefit to the society due to the evacuation of the dumping site to make way for the park's construction.

Table 3.1.3 Summary of all the Tangible Benefits that may be accrued directly at both the construction and operational stages of the Accra Eco-Park project

Item	Summations GH₵
Rent & Concession Charges	600 000
Tax Revenue	Construction stage = 327 000 per annum for 5yrs Operational stage = 206 780 per annum
Entry Fees	5 000 000
Reduction in Encroachment	34 000
Reduction in Ailments	9 000
Employment Creation	Construction stage= GH₵ 3 960 000 per annum for 5 years Operational stage = GH₵ 2 400 000 per annum

Source: Authors own compilation

The above gives us an overview of how much of the Real Direct Tangible Benefits that would be accrued as a result of the projects execution.

3.1.2 Real Direct Intangible Benefits

These refer to those benefits of the project which are closely related to the implementation of the project but cannot be quantified in monetary terms by the existing market system. They constitute a direct increase in the community's welfare, but cannot be valued at a given market price.

- The development of the Achimota Park would enhance and enrich the park's ecological status as a result of the introduction of some selected plant and animal species. Here we would represent the park's enhancement by how much visitors would be willing to pay to have access to the revamped park. Currently (5 years before the project's

completion), visitors (mostly churches and prayer groups) pay GH₵ 0.5 each to get inside. By our estimates we expect the average entrance fee after completion to be GH₵10 for both locals and foreigners. Comparing these two fares would give us how much value consumers place on the project. However the GH₵ 10 would have to be discounted into current day values. Using the average yearly inflation in *Appendix 3* the GH₵10 would be GH₵ 0.52629 today (GH₵10 * 1.805^ -5).

This means as additional GH₵0.02629 of value on average to each visitor has been brought about by the value added to the initial project. Multiplying by the expected annual visits of 500 000 we would get a total enhancement value of *GH₵ 13,145.57* per annum.

- Nature conservation awareness and education for students and the general public would be enhanced as people come to appreciate the non-consumptive values of wildlife and recreation.
- Another crucial benefit is that it is going to aid in the control of pollution such as air pollution (through the absorption of the excessive carbon dioxide produced in the Accra metropolis), noise absorption (absorption of noise in the area by the vegetation cover) and global warming due the planting of more trees. The Achimota area where the park is located is heavily inhabited and motorized. The main form of pollution that exists in the area is that of air pollution. The burning of waste substances and other human activities that emit carbon dioxide as well as fumes from the numerous vehicles all reduce the quality of air in the area.

  What the forest does is that, the trees would absorb the excess carbons in the atmosphere and replace them with cleaner oxygen which is fit for human absorption.

  We would therefore represent the value of the reduction in pollution with the costs of treating the ailments associated with the pollution itself.

Assuming that a total of fifty (50) simple cold complaints are received monthly as a result of the pollution it implies that there would be 600 ailments annually. Using the unit price of (Chloramphenicol Ophthalmic Solution) which costs GH₵ 2 according to Pills and Tabs (Legon), this means that an amount of *GH₵ 1200* would be spent annually on polluted air medication, an amount we would use as a proxy for the pollution reduction property of the park.

NB: We consider that some other forms of pollutions are either negligible or do not pose any significant health threat.

A prime example is that of sound pollution in the area which we consider not to pose any severe threat to the inhabitant's health even though the forest help absorb sounds. The same applies to water pollution as there's no fresh water flowing throw the forest or anywhere within the community close enough for the forest to have a considerable effect.

3.1.3 Real Indirect Tangible Benefits

These are gains that accrue to the project which are not directly or closely related to the objective of the project but can be quantified in monetary terms and also reflect indirect increases in societal welfare. These indirect benefits are tangible because they can be valued at given market prices.

- An indirect tangible benefits as a result of the Eco Park is the economic opportunities that would open up for local Small & Medium Scale Enterprises e.g. craftsmen, vendors, stall operators within the park, petty traders outside the park as well as big business investors like hoteliers and other players in the hospitality sector.

  Such employment opportunities would be mostly created in the operational stages of the project. The employment benefits would be evaluated through the incomes that accrue to these various groups and institutions.

Table 3.1.4 Summary of Incomes that may accrued to various parties and institutions after the projects execution

Institution / Party	Daily/ Weekly/ Monthly Income	Summations (Annual)
Stall operators within the park	100 stall units * GH₵80 income per day	GH₵ 8000 per day * 365 GH₵ 2 920 000
Petty traders outside the park	120 traders * GH₵ 20 income per day	GH₵ 2400 per day * 365 GH₵ 876 000
Hotels	1 Unit * GH₵ 120 per visitor 20 visitors per week	GH₵ 2400 per week * 52 weeks GH₵ 124 800
Guest Houses	2 units * GH₵ 80 per visitor 25 visitors per week	GH₵ 4000 per week * 52 weeks GH₵ 208 000
TOTALS		GH₵ 4 128 800

Source: Authors Own Compilation

The table above shows that after the project's completion individuals and institutions like petty traders, hotels et cetera would all be making a living indirectly. The table gives us an estimate of how much each of these bodies would receive annually.

The rates used are commensurate with that of the prevailing market rates in the Accra Metropolis. The petty traders include: craftsmen, hawkers, small stall operators and food joints all outside the park.

- It is anticipated that proceeds from the project, when it is fully completed and operational, would be substantial and thereby contribute greatly to the financing of conservation activities being carried out by the Forestry Commission across the country.

We expect that about 10 percent of the revenues accrued from the park's operations would be directed towards the development of other projects. The park's revenue to the Forestry Commission would be from Rent and Concession charges (GH₵ 600 000) and Entry fees (GH₵ 5 000 000) giving us a total of GH₵ 5 600 000 in revenues to the commission. Ten percent would therefore give an amount of *GH₵ 560 000* annually.

- The project will increase revenue to government in a form of taxes paid by employers, craftsmen and other businesses which may come up as a result of the projects implementation. These are considered as Indirect Tangible Benefits due to the fact that they are not accrued directly from the projects execution. The payers would be stall operators within the park, petty traders outside the park, hotels et cetera. By the Forestry Commission there would 100 stall units within the confines of the park, we also estimate 120 petty trading units outside the park or within the Achimota community, at least a hotel and two guest houses.

The table below gives us an estimate of how much income tax revenues that we expect to be accrued from the various groups that happen to have sprang up as a result of the parks creation.

Table 3.1.5 Summary of Tax Revenue expected to be accrued from the various groups

Narration	Tax Rate	Summation
Stall Operators within the Park GH₵ 80* 100 stall units* 365 days per year GH₵ 2 920 000	Using the flat income tax rate of 25% (current company tax rate)	GH₵ 730 000
Hotels 1 Unit * GH₵ 120 per visitor 20 visitors per week GH₵ 124 800	Using the flat income tax rate of 20% (current rate for establishments in the hospitality industry)	GH₵ 24 960
Guest Houses 2 units * GH₵ 80 per visitor 25 visitors per week GH₵ 208 000	20% For establishments in the hospitality industry	GH₵ 41 600
Petty Traders outside the Park GH₵ 0.5* 120 traders * 365 days	Such traders are charged a daily amount of GH₵ 0.5 (AMA rate)	GH₵ 21 900
TOTALS		GH₵ 818 460

Source: Authors Own Compilation

NB: The tax structure used is based on that of PKF Ghana's 'Ghana Tax Guide 2015' as provided by the Ghana Revenue Authority (GRA). A full view of the Income tax structure for the year 2015 is provided in the Appendix.

Table 3.1.6 Final summary of all Indirect Tangible Benefits that may be accrued

Item/ Benefit	Sub Total (GH₵)
Employment/Income creation	4 128 800
Tax revenue accrued	(818 460)
Revenue for Forestry Commission developmental projects	560 000
TOTALS	3 870 340

Source: Author's own compilation

For the sake of double counting, the figure of the tax revenue accrued would be deducted from the incomes generated to arrive at a figure representing the disposable incomes of the various beneficiaries.

3.1.4 Real Indirect Intangible Benefits

These are gains that accrue to a project which are not closely related to the setting up and implementation of the project, and cannot be quantified in monetary terms. They constitute indirect increment in societal welfare but cannot be measured in monetary terms.

- It has become very difficult to find a comparable place for family relaxation in a serene environment of the kind that only "organic infrastructure" such as parks can provide since the removal of the Accra Zoo. The implementation of the project will beautify the place making it attractive to all. The Accra Eco-park promises to offer a refreshing alternative to the traditional, well-beaten tourist circuit of Accra such as museum, beaches, thus placing less pressure on these existing facilities.

  To obtain a valuation of the serene environment, relaxation properties as well as the psychological health boost that the park possess, we would compare that with another

commercial facility that provides such properties. The Holy Trinity Spa and Health Farm in Sogakope on the Volta Lake is one of the few places in Ghana that renders such services. For a couple to have full access to their services costs GH₵ 1200 for an entire day. This implies that it costs GH₵ 600 per head and GH₵ 25 per hour to enjoy their services (even though they do not charge hourly, we have made these calculations to enable our valuation). Comparing this rate to that which tourists pay at the park, it implies that each tourist who comes to the park would save GH₵ 15. Multiplying it by the expected annual visits of 500 000 tourists gives us an amount of *GH₵ 7 500 000.*

- The project would provide huge opportunities for showcasing the rich and diverse Ghanaian cultural heritage to the outside world. This is beneficial for business and also offers the prospect of learning from outsiders to enrich our life experiences, thereby promoting cultural diversity.
- The implementation of the project will increase the prestige as well as self-esteem of the community members and that of the country at large to have such a premiere eco-tourism project in West Africa.

3.2 Costs

Costs talk about all the possible disadvantages that are incurred from the start-up stage to the implementation stage until the project is finally completed. There are several costs associated with implementation of the park under study. These can be classified into direct tangible cost, direct intangible cost, indirect tangible cost and indirect intangible cost.

3.2.1 Real Direct Tangible Cost

Direct tangible costs attempt to measure or value fund outflows which are directly related to the setting up of the project and its implementation. They constitute a direct reduction in

societal welfare. These costs are tangible because they can be valued at given market price. These include *preparation cost, operational costs, construction cost* and *administrative cost.*

3.2.1.1 Preparation Costs

There is no project that commences without preparations. The preparation cost basically involves all those costs incurred from activities that help to lay the foundation for the establishment of the park. These among others, include the cost of consultancy, registering with or obtaining permits from institutions such as the GIPC, EPA, AMA et cetera as well as publicity on the project. The summary is shown in the table below:

Table 3.2.1 Summary of all Preparation Costs that would be incurred for construction of the Accra Eco-Park project

Activity	Amount (GH₵)
Stakeholder sensitization workshop (photo exhibition, publications of draft plans et cetera)	50 000
Public awareness creation	100 000
Development of procurement plan	3 000
Investment forum for business community	10 000
Memorandum Of understanding with major partners	5 000
Routine meeting of project implementation structures	60 000
Development of park plans, designs and billboard installations	50 000
Rapid Biodiversity and Environmental Impact Assessment	50 000
Setup Environmental Audit System	12 000
TOTAL	340 000

Source: Forestry Commission

3.2.1.2 Operational Costs

These are the costs that are incurred to ensure the smooth operation of the projects construction as well as its effective running after the project is complete. Hence it is made up of costs like

website design and maintenance, data management et cetera. The table below gives a summary of all the operational costs that may crop up.

Table 3.2.2 Summary of all Operational costs that may be incurred for the Accra Eco-Park Project

Activity	Amount (GH₵)
Project monitoring and evaluation	40 000
Park Security and Safety Operations	50 000
Park Data Management	10 000
Website Design & Maintenance	50 000
Quality Assurance and Control	10 000
TOTAL	160 000

Source: Forestry Commission

3.2.1.3 Administrative Costs

These are the costs that make administration of the project possible. They are incurred on the various levels of management and the various activities that they are involved in. These may include costs on adverts, wages and salaries of the workforce as well as costs for training the workers. The table below shows a summary of these costs.

Table 3.2.3 Summary of Administrative Cost of the Accra Eco-Park Project

Activity	Amount (GH₵)
Development of Park Management Plan	8 000
Development of Business Strategy	8 000
Entry Ticket Management Plan	5 000
Recruitment and Training of park staff	30 000
Advertisement (Billboards, advertisement space, media activities, information parks and promotions)	100 000
Park Branding	50 000
Customer Care Training	20 000
Risk and Accident Management	40 000
TOTAL	261 000

Source: Forestry Commission

NB: The wages and salaries as a portion of the administrative cost has been set aside to make clear how its value was ascertained.

Wages and Salaries

There would be a total of 1000 non -professional workers or labourers throughout the developmental stage of the project (Forestry Commission). Assuming that they are each paid GH₵ 3 above the prevailing minimum wage (i.e. GH₵ 10) and that each works 3 days a week. It implies that we would have 156 days of work per worker out of the 52 weeks in a year. Multiplying the 156 days per worker by the 5 years we anticipate the project to take, we would end up with 780 days of work for each of the 1000 workers. Finally, the entire wages for the non-professional workers for the entire duration of the project would be *GH₵ 7 800 000 (GH₵ 1560 per worker per annum).*

There will be 200 professional workers (Forestry Commission). Assuming on average each claims GH₵ 1000 as monthly wages, then the total wages for the entire professional staff for the 60 months (5years) the project would take would be *GH₵ 12 000 000*

At the operation stage, there would be 500 workers left (100 professionals and 400 non-professionals). The non-professionals would be taking GH₵ 250 monthly, whilst that of the professionals would still be GH₵ 1000. This implies that annual salaries to the professionals would be (GH₵ 1000*12 months* 100 workers) *GH₵ 1 200 000*. That of the non-professionals would be (GH₵ 250*12months*400 workers) *GH₵ 1 200 000.*

3.2.1.4 Construction Costs

These are the costs that are incurred in the putting up of the projects structures. They are mostly incurred during the period before the projects final running and mostly do not reoccur. They however may include costs on road constructions as well as repairs and maintenance. The table below shows the summary of the construction costs.

Table 3.2.4 Summary of all Construction Costs that may be accrued to the Accra Eco-Park Project

Activity	Amount (GH₵)
Demarcation and Fencing	1 200 000
Installation of devices & security	40 000
Road network construction	1 750 000
Construction of buildings and structures	40 000 000
Species introduction and Husbandry	1 000 000
Landscaping & Habitat Modification	800 000
Maintenance and repairs of tools and equipments	10 000
TOTAL	44 800 000

Source: Forestry Commission

3.2.2 Real Direct Intangible Cost

It measures or values fund outflows which are directly related to the setting up of the project and its implementation but cannot be valued at market prices.

- Pollution during the construction stage by the heavy machinery used as well as noise from birds. We anticipate that as a results of the construction process there is going to be various forms of pollution which may affect the workforce and the community at large. However we do not expect such pollutions to persist beyond the 5 year construction stage. The pollutions may include sound pollution from the heavy machinery to be used causing ear defects. There would be air pollution from the dusts that may be produced as well as fumes from the machinery thereby causing catarrh and possibly skin diseases.

Our expectations are that, at most 30 people would be reporting nasal and optical defects monthly, skin and ear defects would however be rarer with and expectation of at most 10 reports monthly.

Table 3.2.5 Cost of pollution to the workforce as well as the society

Disease / Defects	Prescription	Unit Cost	Totals
Nasal	Ephedrine	GH₵ 4 per unit	GH₵ 4*30 patients per month * 60 months GH₵7200
Dermal (skin)	Derma cot	GH₵ 8.5 per unit	GH₵ 8.5* 10 patients per month * 60 months GH₵ 5100
Optical	Chloramphenicol Ophthalmic Solution	GH₵ 2 per unit	GH₵ 2*30 patients per month* 60 months GH₵ 3600
Ear	Hydrogen peroxide Solution	GH₵ 5 per unit	GH₵ 5* 10 patients per month* 60 months GH₵ 3000
Totals			GH₵ 18 900

Source: Pills and Tablets, Legon 2015

- Destruction of vegetation. During the construction process part of the vegetation cover would have to be cleared. The Forestry Commission proposes that predominant tree species like the Neem tree (Azadiratcha *indica*) and Cassia (Cassia *siamea*) would be put under check. Also some of the forest cover in certain areas of the park would have to be removed to make way for the construction of buildings (housing and stall units). From section 3.1.3, we obtained a valuation of how much the entire forests reduces pollution to the environment (by using the costs of air pollution to the inhabitants as a proxy).

However since just a portion of the entire vegetation cover would be lost; we would use just a proportion of that cost commensurate with the portion of the vegetation that has to make way for the various developments. According to the Forestry Commission, portions of the forest would be lost to the following developments: Creation of an amusement park (10 hectares), Cultural Village (9.95 hectares), Spiritual Enclave (8.24 hectares) and a Visitor Reception Facility (8.32 hectares). This implies that in all 36.51 hectares of forest cover would be lost, representing 10.14 percent of the entire forest cover. We can therefore obtain the value of the area lost by finding a percentage of the cost of the loss to the environment (a figure we have already ascertained in chapter 3.12 as a Real Direct Intangible Benefit), which was GH₵ 1200 per year. 10.14 percent of that would give us *GH₵ 121.68* per annum.

3.2.3 Real Indirect Tangible Cost

Real indirect tangible costs are losses that accrue to the project but are not directly related to the objectives of the project. They reflect indirect reductions in societal welfare as a result of the projects implementation. These indirect costs are tangible because they can be valued at given market prices.

- Opportunity cost of the fund invested into the project. Opportunity cost refers to the cost of an alternative that must be forgone in order to undertake a particular venture, in this case, the construction of the Eco-park. The land for this project could otherwise have been sold out to a private individual to be used for other productive ventures such as construction of a hotel facility, restaurant, a resort or a commercial golf course. Below is the computation for the opportunity cost.

  Three hundred and Sixty hectares (900 acres) of the parks original size still stands today (Forestry Commission). Using the prevailing market prices in the Accra Metropolis

(GH₵ 8500 per acre), it implies that the total amount that would have been accrued from the sale of the land would approximately GH₵ 7, 650, 000 (i.e. GH₵ 8500 * 900 acres).

- Societal cost of evacuating unauthorized inhabitants on the land. There are about 50 unauthorized structures present on the land mostly filled by squatters (Forestry Commission). These structures would have to be demolished and the inhabitants relocated and this would come as a cost to the inhabitants (society at large). We however used the cost of demolishing and relocation as a proxy for the cost of the entire process to society particularly to the inhabitants.

  We expect that the exercise would take two (2) days to complete and two (2) demolishing vehicles each charging GH₵ 950 per day (based on prevailing market prices in the Accra Metropolis). It would cost GH₵ 500 each and two vehicles to transport the debris. Finally there would be a compensation package of GH₵ 200 for each structure.

Table 3.2.6 Cost of evacuating unauthorized inhabitants from forest lands

Cost Item	Unit Cost	Total GH₵
Bulldozers	GH₵ 950 each per day* 2 vehicles* 2 days	3 800
Tructors	GH₵ 500 each per day *2 vehicles* 1 day	1 000
Compensation Package	GH₵ 200 each* 50 structures	10 000
Totals		14 800

Source: Authors own compilation

- Contingency Costs: This involves funds set aside to cater for unexpected occurrences that may result before and during the implementation of the project and also throughout its lifespan. In the case of this plant, this cost includes interest on loan, insurance against fire, theft, flood and employment related risks among others. This is stated as 10% of the entire construction cost per the contractual terms (Forestry Commission). From table… the total cost of construction is GH₵ 44 800 000. This implies that 10% would give as an amount of GH₵4 480 000.

3.2.4 Real Indirect Intangible Cost

These are costs that accrue to the project but are not directly related to the objectives of the project. These costs are intangible and as such cannot be quantified in monetary terms by the prevailing market system. They also constitute reductions in societal welfare. The real indirect intangible costs here include the following:

- Dissatisfaction would be created among the squatters who would be evacuated from the land.
- At peak periods such as holidays and on special occasions there is a high possibility of intense vehicular and human traffic in and around the Achimota community, thereby causing a nuisance to the indigenes of the community.

  We expect these peak periods to occur at most once a week mostly Saturdays together with number of public holidays and festive seasons. In all we expect a total of 52 Saturdays in a year, 10 public holidays and 15 days of festive seasons (these may include Christmas holidays, New year, Easter as well as Eid), giving us a total of 77 days of peak periods. On a normal day, we expect a total 1500 vehicles to use the route however we expect the figure to double during peak periods. Assuming that each vehicle takes approximately five minutes to escape the traffic then a total of (3000

individual cars* 5 minutes each) 15000 minutes is wasted daily during peak days, multiplying this by the 77 expected peak days give us a total 1,155,000 minutes wasted yearly representing a combined 802 days. Multiplying this by the current minimum wage rate of GH₵ 7 per day gives us a combined monetary value of time wasted as *GH₵ 5 615.* This value represents the average value of the time wasted on the road due to the traffic wasted. This cost would be borne by the entire community.

- The establishment of the park would surely bring a significant number of migrants and tourists into the community, this would cause significant amount of pressure on existing social amenities, dilute the cultural heritage and possibly breed crimes and other social vices. To have a value of the cost of the nuisance to the community as a results of the influx of migrants (mostly economic migrants) and tourists, we would represent this cost with the cost of collecting refuse created to the District Assembly. It is very obvious that once the population of the park swells as a result of the influx of tourists and migrants, refuse generated will surely swell as well, hence the possibility of using the cost of additional refuse generated as a proxy for the cost of nuisance to the community.

  Here is a breakdown of all the additional costs that we envisage the District Assembly would incur. First we expect an additional hectare of refuse collection site to be acquired (i.e. GH₵ 8500 per hectare as we have already evaluated in 3.1.1), an additional 12 metre cube SIP refuse collection bin to be placed on site (costs GH₵ 8700 per bin according to Zoomlion limited Ghana), an additional collection trip per week by a truck which costs GH₵ 120 per trip and finally two additional waste collection monitors who would be placed onsite to monitor waste collection. Each would claim GH₵ 250 per month. Tallying the figures above would give us an additional *GH₵ 28 400* due to the surge in refuse creation. However it should be noted that this cost has a

fixed component of GH₵ 17 200 representing the sum of the land and the 12 metre cube waste collection bin to be acquired.

3.3 Analysis of Costs and Benefits based on Construction and Operational stages

3.3.1 Analysis of Costs

There are two categories of costs expected to be incurred (aside the direct, indirect et cetera) those that will be incurred during the installation/construction process (most of which are fixed) and those that will be incurred during the estimated life span of the project (mostly variable or recurrent).We would therefore want to classify the costs as such to make our NPV calculations in the next chapter simpler. The table below shows a summary of all costs incurred at the construction stage:

Table 3.3.1 Summary of all costs incurred on the project at the construction stage

Type of Cost	Sub Total GH₵
Direct Tangible : Preparation Operational Construction Administrative (Including wages and salaries; with that alone being GH₵ 19 800 000)	 340 000 160 000 44 800 000 20 061 000
Direct Intangible Pollution due to construction works Destruction of vegetation due to construction	 18 900 121.68
Indirect Tangible Societal Cost of evacuation Contingency Costs Opportunity Cost	 14 800 4 480 000 7 650 000
Totals	77 524 821.68

Source: Authors own compilation

The table above gives a description of all the costs incurred before the commencement of operations. These range from the preparational costs to set the stage for actual execution through to the wages and salaries paid within the 60 month period.

It should be noted that most of the costs above would only cover the 60 month construction stage and would not reoccur again. However some of the costs in the table above would still be incurred at the operational stage of the project and these would include:

- **Administrative Costs**: These costs incurred would cover the costs of administration of the park. We expect that 20% of the initial administrative costs (excluding the wages and salaries at the construction stage) would continue to reoccur in the operational stages of the park (i.e. GH₵ 261 000*(from table 15) 0.2). This would give us an amount of GH₵ 52 200. The wages and salaries at the operational stage must also be included in the administrative costs, from *Appendix 1* the wages and salaries of the workforce per annum is GH₵ 2 400 000. This would give us a total recurrent administrative costs of GH₵ 2 452 200.
- **Operational Costs**: These are mainly the costs incurred in the day-to-day running of the project and we envisage that such costs would continue to occur even after the project is complete and operational. We expect that 65% of the initial operation costs would continue to reoccur yearly. This implies (GH₵ 160 000 * 0.65) GH₵ 104 000 would reoccur annually as operational costs.
- **Repairs and maintenance costs**: These are the costs that are incurred to keep the entire facility in good shape after its completion and as such would be incurred annually for the projects entire lifespan. According to the Forestry Commission, an amount of GH₵ 60 000 would be spent annually on repairs and maintenance costs.

Table 3.3.2 Summary of the recurrent costs that would be accrued at the operational stage

Cost Item	Amount GH₵
Operational Cost	104 000
Administrative Cost including wages	2 452 200
Repairs and Maintenance	60 000
Cost of traffic jams to the community	5 615
Cost of disposal of refuse created by tourists	28 400
Totals	2 650 215

Source: Authors own compilation

Aside the some of the costs in the construction stage reappearing here in the operational stage, certain cost items like cost of traffic jams and refuse disposal only occur when the park is operational and it would keep on occurring till the end of the park's lifespan.

3.3.2 Analysis of Benefits (Fixed and recurrent) at the construction stage

The benefits to be generated both during and after the completion of the park would comprise benefits by way of wages and salaries (income) to labour and other various economic units, tax revenues to central and local government as well as revenues from the sale of entry tickets.

According to the Forestry Commission, the project would take 5 years (60 months) to complete. This gives us two distinct periods in the projects lifespan (i.e. Construction and Operational periods). We would want to first touch on the issue of employment and tax revenue creation as benefits that may accrue since they are the only tangible benefits that may be accrued at the construction stage. Employment at this stage would only be created to the workforce directly

involved in the construction process. This is the part of employment benefits we deem as Direct and Tangible. Taxes would also be levied on such incomes. Therefore to prevent the problem of double counting (pertaining to the benefits) we would use disposable income rather than summing up employment (income accrued) and taxes paid directly.

Table 3.3.3 Summary of benefits that may be accrued from the Project at the construction stage

Item	Summations GH₵
Employment	19 800 000
Taxes Paid	(1 635 000)
Enhancement of the park's value after construction	13 145.57
Net Benefits	18 178 145.57

Source: Authors own compilation

It should be noted that the figures in the table above cover the 60 month construction period and as such do not reoccur at the operational stage. This implies that *GH₵18 178 145.57* accrued to the workforce at the construction stage.

Employment creation at the operational stage would however be different. Here there would be various forms of economic units that would be benefiting directly (park's workforce) and indirectly (stall units on the park, hotel operators et cetera). These benefits would however be reoccurring annually. At this stage too, taxes would be exacted from these units hence disposable income or benefits would be used to prevent double counting and as such the taxes paid must be deducted.

Table 3.3.4 Summary of benefits that may be accrued from the project at the operational stage

Item	Summation GH₵
Entry Fess	5 000 000
Rent and Concession Charges	600 000
Encroachment Reduction	34 000
Good Health	9 000
Employment (Directly to park's workforce)	2 400 000
Taxes (Paid by park's workforce)	(206 780)
Employment to other Economic Units	4 128 800
Taxes Paid by other Economic Units	(818 460)
Control of pollution	1 200
Increase in FC's budgetary allocation to other projects	560 000
Source of relaxation and psychological boost to visitors	7 500 000
Totals	19 207 760

Source: Authors own compilation

It should be noted that the taxes paid (figures placed in brackets) are deducted from the incomes of their beneficiaries to obtain their disposable income. These benefits would keep on

reoccurring throughout the lifespan of the facility other things being equal, however the presence of inflation would have to be accounted for.

CHAPTER FOUR

METHODOLOGY

4.0 Introduction

Generally, cost-benefit analysis has three parts. First, all potential benefits obtained and costs that will be incurred by implementing a proposed action must be identified. Secondly, these benefits and costs must be quantified. And finally, all identified costs must be subtracted from the expected benefits to determine whether the benefits outweigh the costs.

This chapter will focus on the last point, that is all the benefits and costs (both been discounted) will be deducted from each other and a comparison will be made in order to determine the project's feasibility.

The viability of every project is determined by a quantitative assessment of the costs and benefits of the project. Mathematical and systematic approaches have to be employed to value these streams benefits and costs over time. Investment criteria are used here as an evaluation method for checking the viability of the project. Because economic agents aim at optimizing utility, investment decisions must be subject to careful scrutiny. This helps to find out whether the project is worth undertaking or otherwise. The investment criteria to be used for this work are the Net Present Value (NPV) and the Benefit Cost Ratio. Data for the work is obtained from interviews, the internet and the Forestry Commission, Ghana.

4.1 Net Present Value

The Net Present Value is the present value equivalent of all cash flows less cash outlays associated with investments. That is it makes all cost and benefits accruing at different times comparable with respect to the present by discounting.

NPV is used because it introduces the time value of money and considers cash flows over the lifespan of the project. The NPV gives one specific value which is easier to interpret; if positive, the benefit is more than the cost and if it is negative, the cost is more than the benefit and hence the necessary decisions would be taken from there.

$$\mathbf{NPV} = \sum_{t=0}^{n} \frac{(B_t - C_t)}{(1+k)^t}$$ where;

B_t =benefit at time t

C_t = cost at time t

$1 / (1+k)^t$ = discount factor

Decision Rule for NPV

After calculating the value of the NPV, when the project is singular, then:

- NPV>0 – accept the project
- NPV<0 – reject the project
- NPV=0 – the person is indifferent whether to implement the project or not and hence a number of other factors would have to be considered.

  NB: It must however be noted that, there might be instances where the project would be accepted and implemented even though a negative NPV was obtained. This scenario mostly occurs with public projects where a lot of social factors rather than economic are taken into consideration.

In situations where there are two or more competing projects, the project with the highest NPV is accepted.

4.2 Benefits Costs Ratio (BCR)

The benefit cost ratio defines the present value of an investments project's future benefits divided by the present value of the total cost of constructing and /or operating the project. *This investment criteria was used because it gives a relative measure of profitability as to whether or not to accept the project.*

BCR = PV (benefits)/ PV (costs). That is

$$BCR = \frac{\sum B_t}{\sum C_t}$$

Where:

B_t = discounted benefit over time.

C_t = discounted cost over time

Decision Rule for BCR

- If BCR is the greater than 1, the project is worthwhile and accepted
- If the BCR is less than 1, the project is not worthwhile and should be rejected
- If the project is equal to 1, then the government and the ministry will be indifferent whether to accept the project or not and hence a number of other factors would have to be considered.

In situations where there are two or more competing projects the one with the highest BCR is preferable.

In computing the costs against the benefits, the following assumptions were made.

- The costs and benefits incurred in the Construction stages of the park were taken as year 0.

- The discount rate used in calculating the NPV was the monetary policy rate (k). The Bank of Ghana's monetary policy rate as at May 18, 2015 was 22% (monetary policy rate -www.bog.gov.gh).
- The inflation rate (π) used in projecting the future values of costs and benefits for the lifespan of the park was the average end of year inflation rate from the year 2000 to 2015 (except for 2015 where the average of the first four months were used) which when computed stood at 18.02%. (See appendix 3)

Justification for the choice of Social Discount Rate.

The discount rate used for this project is the monetary policy rate set by the Bank of Ghana's Monetary Policy Committee. The policy rate by BOG as at May 18, 2015 is 22%.

The following are the reasons why the Monetary Policy Rate was chosen as the preferred choice of social discount rate.

- It reflects societal preferences of the value of money since the central bank takes into account social factors in determining that rate.

- It forms the basis upon which commercial banks and other financial institutions fix their base rate which in turn determines the market interest rate.

- The monetary policy rate plays an important role in determining all other rates including the interest rate, hence the money supply.

The table below calculates the Net Present Value over the life span of the Accra Eco- Park

Table 4.2.1 Table showing the computation of the net present value

Year	Benefits GH₵	Costs GH₵	Discounting Factor $(1/(1+k)^t)$	Discounted Benefits	Discounted Costs	Discounted Net benefit
2007-2017	18178145.57	77524821.68	1	18178145.57	77524821.68	-59346676.11
2018	19207760	2650215	0.819672131	15744065.57	2172307.377	13571758.2
2019	22668998.35	3127783.743	0.671862403	15230447.7	2101440.3	13129007.4
2020	26753951.86	3691410.373	0.550706887	14733585.55	2032885.117	12700700.43
2021	31575013.98	4356602.523	0.451399088	14252932.51	1966566.406	12286366.11
2022	37264831.5	5141662.297	0.369999252	13787959.8	1902411.206	11885548.59
2023	43979954.13	6068189.843	0.303278076	13338155.86	1840348.939	11497806.92
2024	51905141.87	7161677.653	0.248588587	12903025.86	1780311.326	11122714.53
2025	61258448.43	8452211.966	0.203761137	12482091.08	1722232.317	10759858.76
2026	72297220.84	9975300.563	0.167017325	12074888.44	1666048.017	10408840.42
2027	85325180.04	11772849.72	0.136899447	11680969.95	1611696.615	10069273.33
2028	100700777.5	13894317.24	0.112212661	11299902.24	1559118.315	9740783.924
2029	118847057.6	16398073.21	0.091977591	10931266.08	1508255.275	9423010.809
2030	140263297.4	19353006	0.075391468	10574655.93	1459051.538	9115604.391
2031	165538743.5	22840417.69	0.061796285	10229679.45	1411452.971	8818226.477
2032	195368825.1	26956260.95	0.050652693	9895957.118	1365407.21	8530549.908
2033	230574287.4	31813779.18	0.041518601	9573121.796	1320863.598	8252258.198
2034	272123774	37546622.19	0.03403164	9260818.314	1277773.13	7983045.185
2035	321160478.1	44312523.5	0.022864579	7343199.257	1013187.213	6330012.044
2036	379033596.2	52297640.24	0.022864579	8666443.763	1195763.549	7470680.215
2037	447335450.3	61721675.01	0.018741459	8383718.795	1156754.213	7 226 964.582
TOTAL				250 565 030.6	109 588 696.3	140 976 334.3
B/C RATIO	2.286413098					

Source: Author's own compilation

- In calculating the future values for benefits, the formula used is $B_t = B_o (1 + \pi)^t$ where, Bt is the benefit in year t and Bo is the Benefit in year 0.
- In calculating the future values for costs, the formula used is $C_t = C_o (1 + \pi)^t$, where, Ct is the cost in year t and Co is the cost in year 0. These were done so as to account for the presence of inflation in monetary values over time. The rate used therefore is 18.02% (i.e. the average annual rate of inflation since the year 2000).
- 1/ (1+r) ^ t is the discounting factor for the NPV.

4.3 Summary of Findings

The computation of the net present value (NPV) indicates a positive NPV of *GH₵140 976 334.3* . Thus, the present value of benefits from the project far exceeds the present value of its costs. Therefore the proposed Accra Eco-Park Project is worth undertaking and should be implemented by the government.

- B/C Ratio = 250 565 030/ 109 588 696.3

  = 2.286

Decision Rule

On the average a benefit of GH₵2.286 accrues from the Eco- park project in Achimota per unit of cedi cost. Because the benefit outweighs the cost we conclude that the project is deemed viable.

4.4 Sensitivity Analysis

Sensitivity Analysis is a simulation technique used to determine how a projected performance is affected by changes in key quantitative assumptions and computations. Here the analyst asks questions like "what happens to the value of the investment criteria when certain assumptions and variables are changed?"

We would want to change certain variables in the investment criteria used so as to ascertain the robustness of our calculations. What would the NPV and B/C ratio be when the discounting factor (in this case the Monetary Policy Rate) is 25 percent instead of the 22 percent used.

Table 4.4 1 The computation of the Net Present Value when the discount rate is changed from 0.25 to 0.22

Year	Benefits Gh₵	Costs Gh₵	Discounting Factor $(1/(1+K)^T)$	Discounted Benefits	Discounted Costs	Discounted Net Benefits
2012-2017	18165000	77524700	1	18165000	77524700	-59359700
2018	11146500	2616200	0.8	8917200	2092960	6824240
2019	13155099.3	3087639.24	0.64	8419263.552	1976089.114	6443174.438
2020	15525648.19	3644031.83	0.512	7949131.873	1865744.297	6083387.576
2021	18323370	4300686.37	0.4096	7505252.352	1761561.137	5743691.215
2022	21625241.27	5075670.05	0.32768	7086159.059	1663195.562	5422963.497
2023	25522109.75	5990305.79	0.262144	6690467.938	1570322.721	5120145.217
2024	30121193.93	7069758.9	0.2097152	6316872.209	1482635.902	4834236.308
2025	35549033.07	8343729.45	0.16777216	5964138.064	1399845.512	4564292.552
2026	41954968.83	9847269.5	0.134217728	5631100.595	1321678.139	4309422.455
2027	49515254.21	11621747.46	0.107374182	5316659.937	1247875.632	4068784.306
2028	58437903.02	13715986.35	0.085899346	5019777.646	1178194.256	3841583.39
2029	68968413.14	16187607.09	0.068719477	4739473.262	1112403.889	3627069.373
2030	81396521.19	19104613.89	0.054975581	4474821.075	1050287.256	3424533.82
2031	96064174.31	22547265.32	0.043980465	4224947.067	991639.2158	3233307.851
2032	113374938.5	26610282.53	0.035184372	3989026.022	936266.0819	3052759.94
2033	133805102.4	31405455.44	0.028147498	3766278.808	883984.9839	2882293.824
2034	157916781.9	37064718.51	0.022517998	3555969.801	834623.2624	2721346.538
2035	186373386	43743780.78	0.018014399	3357404.447	788017.8993	2569386.548
2036	219957870.2	51626410.08	0.014411519	3169926.983	744014.9798	2425912.003
2037	259594278.4	60929489.18	0.011529215	2992918.26	702469.1834	2290449.077
TOTAL				127 251 789	103 128 509	24 123 279.93
B/C RATIO	1.233914755					

Source: Author's own compilation

From the table above it could be seen that as the discounting factor was changed the NPV fell from GH₵ 140 976 334.3 to GH₵ 24 123 279.93 signifying that an increase in the discounting factor decreases the NPV. The BCR also decreased from 2.286 to 1.2339.

It should be noted however that although the NPV and the BCR fell the project is still viable and should be pursued.

For prudence sake we did not consider lowering the discount rate as it would further increase the NPV thereby underscoring our initial claim. It is therefore appropriate that we only increased the discount rate in our sensitivity analysis.

CHAPTER FIVE

SUMMARY, CHALLENGES, POLICY RECOMMENDATIONS AND CONCLUSIONS

5.0 Summary

In analysing the costs and benefits involved in the proposed Accra Eco-park project, we divided our work into five main chapters.

In chapter one, we discussed the background, problem statement, objectives, research questions and significance and organization of the study. We also discussed why the project was chosen, how it would be analysed and what we expect to gain from the project. Demand analysis approach was the basis for which the project was identified. After identification, we talked about the background of the Achimota forest, how encroachment and settlement is gradually destroying the forest.

Chapter two was about the various project appraisals. In order to assess the feasibility of the project, the various appraisals were employed which included economic appraisal, commercial appraisal, financial appraisal, institutional appraisal, socio-cultural appraisal and technical appraisal.

Chapter three explained and evaluated the various benefits and costs associated with the implementation of the project. The benefits and costs were classified into real direct tangible benefits and costs, real indirect tangible benefits and costs, real direct intangible benefits and costs, real indirect intangible benefits and costs.

Chapter four was to evaluate the project to assess its economic feasibility as well as to investigate if it is worthy to undertake the Accra Eco-park project. In chapter four, we used the NPV and benefit cost ratio approach to determine whether to accept or reject the project.

The project was accepted since estimated benefits for the next twenty five years to be generated from the project outweighs that of the cost.

5.1 Challenges

Conducting a Cost Benefit Analysis at any level is not an easy task, and even at this stage in our academic careers we were faced with considerable challenges at various stages of the entire work. The following are some of the challenges we were faced with:

5.1.1 Difficulty in accessing information

From the early stages of analysing the project, we have had problems in accessing information from the various institutions like the forestry commission, Ministry of land and natural resources, Accra Metropolitan Assembly et cetera over a period of one month. Access to accurate reliable information in our country is very difficult to come by. Accessing information from these various institutions was difficult, because they were reluctant to disclose relevant and appropriate information concerning the project prior to its implementation as well as the nonexistence of certain information due to poor records keeping. Some resource persons we encountered were also very busy to attend to us even on appointment dates.

5.1.2 High travel and time costs

Travelling from Legon to the various institutions cost a lot to the group. In addition to the travel cost, there is also a cost involved in printing and binding of the project work. Time constraint was a major problem, since it was difficult combining the project with academic engagements and also fixing a common time to suit all members of the group.

5.1.3 Limited information for the quantification of intangible costs and benefits

Due to the inadequate information received from the various sources of information, it was difficult for the group to monetize some intangible costs and benefits like opportunity cost, size of encroachment of the forest and time wasted by commuters during peak hours.

5.2 Recommendations

The study and research has shown that the implementation of this project will be beneficial to the government and the society. Having closely observed the available information, we recommend the following:

- There should be a national sensitisation of citizens on this upcoming project and its importance to Ghana as another tourist attraction that would increase our Gross Domestic Product thus encouraging citizens to also patronize the park upon completion. Sensitization could be done by visiting schools putting up more billboards and using social media.
- Establishment of similar parks. Looking at how high the NPV of the Accra Eco-park project is, it would be economically rational to replicate such projects in other cities across the country given the available resources. Other urban green spaces are available for such initiative across Ghana. A prime example is the Nwabe Forest Reserve in the Ashanti Region an area reserved to protect the Nwabe River (a key source of water supply for the Kumasi Metropolis). There is no doubt that after Accra; Kumasi is the next commercially prominent region in Ghana and this forest reserve has similar commercial potentials just like that of the Achimota Forest. Aside its commercial value the Nwabe reserve also faces significant threat of depletion from mostly construction firms. We would therefore recommend that a similar project be rolled out there to get some economic value out of the reserve and protecting the environment at the same time.
- There must be a well-planned society around the Eco-park to prevent settlement on the forest.
- The right to information Bill should be passed to facilitate quick access to information on major projects of national interest.

5.3 Conclusion

The project will require a lot of financial commitments, time and effort in terms of properly supervising and managing of the Eco-park. In accordance with the NPV rule, we assure the major stake holders such as the forestry commission, Ministry of land and natural resources that the project will yield positive net benefits that will improve the welfare of the society. Based on the analysis of this study, a positive NPV and a Benefit-Cost Ratio greater than one was derived, meaning the project according to the decision rules of the various investment criteria used is considered viable.

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APPENDIX
Appendix 1

Wages and salaries

Construction stage: At the construction stage there would be a total of 1200 workers (1000 non-professionals and 200 professionals) according to the Forestry Commission. We expect the non-professionals to be paid GHC 10 per day and work for 3 days in a week. The professionals would however be paid GHC 1000 per month

WORKER	RATE	ANNUAL SALARY GHC
Non – professionals	GHC 10 per day * 3 days per week * 52 weeks per year	GHC 1560 * 1000 workers GHC 1, 560, 000
Professionals	GHC 1000 per month	GHC 12000 * 200 workers GHC 2 400 000
TOTAL SALARIES AT THE END OF THE FIVE YEAR DURATION		GHC 19 800 000

This implies at the end of the construction the professionals receive *GHC 12 000 000* whilst the non- professionals receive *GHC 7 800 000.*

Operational stage: Here, it is anticipated that there would be a total of 500 workers left (100 professionals and 400 non-professionals). At this stage we expect the non-professionals to be paid GHC 250 per month. The professionals would however still receive GHC 1000.

WORKER	RATE	ANNUAL SALARY GHC
Non – professionals	GHC 250 per month	GHC 250 *12 months * 400 workers GHC 1, 200, 000
Professionals	GHC 1000 per month	GHC 12000 * 100 workers GHC 1 200 000
SUM		GHC 2 400 000

Appendix 2

PERSONAL INCOME TAX STRUCTURE IN GHANA 2015

CHARGEABLE INCOME	RATE
First GHC 1584	NIL
Next GHC 792	5%
Next GHC 1,104	10%
Next GHC 28,200	17.5%
S Exceeding GHC 31,680	25%

Source: PKF Ghana, Ghana Tax Guide 2015

Appendix 3

Average Annual Inflation rate from 2000- 2015

Year	Inflation
2000	40.5
2001	21.3
2002	17
2003	31.3
2004	16.64
2005	13.9
2006	10.9
2007	12.7
2008	18.1
2009	16
2010	8.58
2011	8.73
2012	9.2
2013	11.6
2014	17.0
2015 January – 16.4 February- 16.5 March- 16.6 April - 16.8 AVG 2015 16.6	16.6
Total average	18.02

Source: Author's own calculations