

**CZECH UNIVERSITY OF LIFE SCIENCE, PRAGUE**  
**FACULTY OF ENVIRONMENTAL SCIENCE**  
**DEPARTMENT OF LAND USE AND IMPROVEMENT**



**EVALUATING THE DIFFERENCE IN VALUES AND HUMAN WELL BEING DERIVE FROM  
ECOSYSTEM SERVICE IN THE CITY: COMPARISON ACROSS DIFFERENT GROUPS AND  
PARKS**

**MASTER OF SCIENCES (M.Sc.) DIPLOMA THESIS**

**AUTHOR: PRINCE CHAPMAN AGYEMAN**

**SUPERVISOR: DOC. PETER KUMBLE**

**2018**

# CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Environmental Sciences

## DIPLOMA THESIS ASSIGNMENT

B.Sc. Prince Chapman Agyeman, BSc

Nature Conservation

Thesis title

**EVALUATING THE DIFFERENCE IN VALUES AND HUMAN WELL BEING DERIVE FROM ECOSYSTEM SERVICE IN THE CITY: COMPARISON ACROSS DIFFERENT GROUPS AND PARKS**

---

### Objectives of thesis

The objectives of this research is to

- determine the contrast between demographic groups, gender and parks.
- determine the value humans place on the urban parks

Hypothesis

There are no significance differences in the comparison across park, sex and age groups

1. What are the values human derive from ecosystem service?
2. What are the comparisons across demographic groups, parks and sex?
3. How to improve on the ecosystem to enhance continued services rendered to human well being.

### Methodology

- Literature review
- Methodology: Analysis of three key study areas in Germany
- Results of analysis
- Conclusions
- Discussion

The proposed extent of the thesis  
70 pages

**Keywords**

---

Ecosystem services; urban ecosystems; general demographics pedestrian circulation

**Recommended information sources**

Fabos, Julius Gy. and Ahern, Jack. (Eds.) 1995. Greenways: The Beginning of an International Movement. Amsterdam: Elsevier

Flink, Charles A. and Searns, Robert M. 1993. Greenways: A Guide to Planning, Design, and Development. Washington, DC: Island Press.

Hellmund, Paul C. and Smith, Daniel S. 2006. Designing Greenways: Sustainable Landscapes for Nature and People. Washington, DC: Island Press.

**Expected date of thesis** 2017/18 SS – FES

**The Diploma Thesis Supervisor**

doc. Peter Kumble, Ph.D.

**Supervising department**

Department of Land Use and Improvement

**Advisor of thesis**

Henry Hanson

Electronic approval: 27. 3. 2018

---

**prof. Ing. Petr Sklenička, CSc.**

Head of department

Electronic approval: 27. 3. 2018

---

**prof. RNDr. Vladimír Bejček, CSc.**

Dean

Prague on 17. 04. 2018

**DECLARATION**  
**STUDENT DECLARATION**

I Prince Chapman Agyeman, hereby declare that except for the reference for other peoples work which have been duly cited and acknowledge, this thesis is the results of my own effort and that it has neither in whole nor in part been presented elsewhere.

Signature .....

Date.....

(Prince Chapman Agyeman)

## **ACKNOWLEDGEMENT**

I will give sincere gratitude to God Almighty that through his favor and love insured me comprehensively to start this programme and saw to it that I will finish successfully. I will express my appreciation and great thanks to my supervisor, Doc. Peter Kumble Ph.D., MLA for his guidance enormous direction for the success of this challenging study. Also, I acknowledge all lecturers who impacted knowledge in me, particularly the environmental science department.

Finally, I would once again like to express my special thanks to my entire family for their encouragement and support for the study abroad and successful completion with this write up.

## ABSTRACT

The focus on the interdependencies between ecosystems and human well-being is tied to the appraisal of the condition and trends in the world's ecosystems as well as the services they provide and the scientific basis for action to conserve and use them sustainably. The continuing changes in the earth's system emanates from the dominant driver (human) that pushes the ecosystem beyond its natural limit. Conversely, it's vital to understanding that humans are living in a new geological age and Anthropocene which is connected to the migration of people into the cities which have increased population. Ecosystems are linked to human well-being in manifold ways, which is captured in the ecosystem services concept and vibrant field of research, have found their way into public debates as well as received high policy interest which is most central in current policy and management strategies. However, ecosystem services are only one of several approaches to conceptualizing the relationship between humans and nature, both come with potentials as well as challenges. This research aims to evaluate the difference in values and human wellbeing derived from ecosystem service in the city and it was accomplished by comparing across different groups and parks. The study was conducted in three parks in Baden Wurttemberg state in Germany and 103 respondents were interviewed by the semi-guided open-ended question. The data collected shown significant differences in values and human well-being across gender and age group during the results compared. Cultural service featured predominantly in the results which presupposes that there should be steps forward in making good use of the ecosystem Services concept include adopting a power-sensitive approach, considering the socio-cultural context and the diversity of stakeholder views and interests as well as taking into account the whole suite of Ecosystem Services, particularly cultural ecosystem service.

## TABLE OF CONTENTS

DECLARATION.....	iv
Acknowledgement.....	v
Abstract.....	vi
<b>CHAPTER ONE.....</b>	<b>1</b>
<b>INTRODUCTION.....</b>	<b>1</b>
1.1 Study aim.....	3
1.2 Research hypothesis .....	4
1.3 Research questions.....	4
1.4 Limitation of study.....	4
<b>CHAPTER TWO.....</b>	<b>5</b>
<b>LITERATURE REVIEW.....</b>	<b>5</b>
2.1 Introduction.....	5
2.2 History of Ecosystem Concept.....	5
2.2.1 Ecosystem Structure and Function.....	7
2.2.2 Ecosystem processes.....	7
2.2.3 Types of Ecosystem.....	8
2.3 Ecosystem Services.....	9
2.4 Linking Ecosystem Services and Human Well-being.....	12
2.5 Valuing Ecosystem Services.....	21
2.5.1 Total Economic Value.....	24
2.5.2 Direct use value.....	26
2.5.3 Quasi-option value.....	27
2.6 Payment of Ecosystem Services.....	29
2.6.1 Types of Payment of Ecosystem Services Schemes.....	30
2.6.2 Ecosystem Services Payments.....	31

<b>CHAPTER THREE.....</b>	<b>34</b>
<b>METHODOLOGY.....</b>	<b>34</b>
3.1 Introduction.....	34
3.2 Study areas.....	34
3.2.1 Killesberg Park.....	35
3.2.2 Ludwigsburg Park (Favorite Park).....	39
3.2.3 Hohenheim Castle Park or Garden.....	41
3.3 Research Strategy.....	43
3.4 Materials and Methods.....	43
3.3.1 Sources of data, information, and procedure.....	43
3.5 Data collection instruments and techniques.....	44
3.6 Survey question.....	48
<b>CHAPTER FOUR.....</b>	<b>49</b>
<b>RESULTS.....</b>	<b>49</b>
4.1 Rate of response.....	49
4.2 Overall results.....	50
4.3 Contrast among age groups and gender.....	52
4.4 Comparison across parks.....	53
4.5 Derived benefit Ecosystem Services.....	56
4.6 Valuing the service.....	56
<b>CHAPTER FIVE.....</b>	<b>58</b>
<b>DISCUSSION.....</b>	<b>58</b>
<b>CHAPTER SIX.....</b>	<b>65</b>
<b>CONCLUSION.....</b>	<b>65</b>
<b>REFERENCE.....</b>	<b>67</b>
<b>Appendix.....</b>	<b>78</b>



## CHAPTER ONE

### INTRODUCTION

The era of globalization, that we recognize places us as part of a global society, however, we have no clue how to make such a society work. Up until now, no cohesive vision or initiative has risen to direct us in this undertaking. We have not yet figured out how to extend the profound beliefs of democracy so they relate to human wellbeing, all creatures, and each plant and tree. Until the point when we do, human progress and the Earth's ecosystem service rendered to humans will keep on being in danger (uncertain future and growing populace). The ecosystem resembles complex embroidered works of art a million complicated strings, joined, make up the entire picture. Nature can adapt to trivial rent in the fabric; it can even, after a period, adapt to significant catastrophes like floods, flames, and earthquakes. But what the ecosystem can't adapt to is the steady undermining of its fabric by the activities of man.

Urban populaces depend on the associated benefits of multiple ecosystems found inside urban areas for services such as entertainment, recreation, microclimate regulation, erosion control, and air filtration (Bolund and Hunhammar, 1999, Martinez-Arroyo and Jáuregui, 2000, Niemelä et al., 2010). City occupants also rely upon the ecological footprint provided by ecosystems outside of urban communities for the supply of food, fiber, and other ecosystem services. (Folke et al., 1997). Urban populaces are a substantial consumer of ecosystem services (Folke et al., 1997, McGranahan et al., 2005,) and a key source of worldwide environmental impact (Bai, 2007) in a period when ecosystems services are in quick decline (Millennium Ecosystem Assessment, 2005). Wellbeing of humanity, also labeled quality of life satisfaction or welfare, might be considered in expressions of a target condition (e.g., wage), however, is progressively being found in conjunction with subjective perception, for instance, being satisfied with pay (Rapley, 2003; for an incorporated approach, see Costanza et al. (2007). Regardless of the approach picked, in any case, human prosperity or wellbeing is ordinarily addressed through the focus on issues of “personal” wellbeing, for example, monetary resource, physical wellbeing, and education, though the connections to our natural biosphere and the surrounding area. Millennium Ecosystem Assessment (MA, 2005) exhibited the first and much-recognized endeavor to thoroughly

evaluate how nature contributes towards human wellbeing. There have been a lot of publications, journal, and articles that have profoundly dive into the analyses of the wellbeing of humanity and which have, one way or the other throw more light on the work done by Millennium Ecosystem Assessment. Reyers et al. (2013) point to their bi-directional interconnectedness, which presupposes that revealing insight into the way that changes in wellbeing may likewise have an effect on ecosystem services in a bad way. In 2006, Butler and Oluoch-Kosura (2006) found that there is co-evolution of human well-being and ecosystem service. Summers et al. (2012), stressed such intricate linkages, which gave birth to the in-depth framework of the different components of human wellbeing and their relationship. King et al. (2013) surveyed the fast developing field of methodologies being utilized to elicit and investigate the environmental embeddedness of human wellbeing. Smith et al. (2013) and Yang et al. (2013) on the other hand laid the ground for the development of quantitative measures and guides to put together connections between ecosystem service and wellbeing of humanity. In this unique circumstance, Engelbrecht (2009) stresses the significance of subjective well-being indicators. Conversely, Wilson and Howarth, (2002) gave recognition to the significance normative character of ecosystem services and benefit valuation, also King et al. (2013) made a call, especially on the participatory methodologies. In dealing with the context-specific issue, regarding place-based and timing dependent character of the connections between human well-being and ecosystem service, this has been properly stressed by Wu (2013).

The concept of the cultural ecosystem has become a new paradigm and values cherished as well as feels connected to by the people (because of their cultural identity, sense of belonging to their homes, spiritual value or experience connecting to the environment), have received a lot of exposé and social discourse in academic peer-reviewed publications. The most basic preface of this approach focuses on the complexity of its interconnectedness to the relationships amongst humanity and nature (Jones, 2003; Matthews and Selman, 2006). The European Landscape Convention (Council of Europe, 2000), defines cultural landscape (e.g Tongariro National Park, New Zealand) as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”. In this manner, the social scene approach recognizes biophysical highlights, as well as the manners by which individuals make importance and incentive out of the material world, tending to

issues, for example, feeling of place and tasteful or profound esteems installed in scenes. Because of the long history of human inclusion with nature, all territories in Europe can be viewed as social scenes. Cultural landscape, for instance, the Šumava National Park is not only biophysical feature, but instead endowed with scenery that people create meaning with and its value to human wellbeing is out of any material things of the world. This biophysical feature addresses issues that have to do with a human sense of place that gives meaning to the love of nature, aesthetic or spiritual values embedded in landscapes ecosystem services defined by Daily, (1997) are the processes and conditions through that natural ecosystem and also the species that create them up, sustain and fulfill human life. There is a greater deal between human and ecosystem since it continues to be the repository that man's survival leans on. Santos-Martín et al. (2013) for instance, displayed how the relationship between well-being and ecosystem services can be empirically unraveled at a national level by using equation models, whereas Petrosillo et al. (2013) made available an instance of the use of local-level subjective indicators.

Against this backdrop, that the research conducted in this thesis aims to evaluate the difference in values and human wellbeing derived from ecosystem services in the city. It accomplishes this by a comparison of different group's users at different parks located in Germany, thereby seeking empirical analysis and advanced concepts regarding how the users perceive and value the natural amenities in each park and the ecosystem services that they provide. Based on the empirical analysis, the research seeks to explore within the confines of the following objectives

- to determine the contrast between demographic groups, gender, and parks
- to determine the value humans place on the urban parks.

### **1.1 Study aim**

The focus of this research is to evaluate the difference in values and human well-being derives from ecosystem service in the city: a comparison across different groups and parks in Germany (Baden Württemberg state). The intended aim of this research was actualized by carrying out the following objectives

- Determine the contrast between demographic groups, gender, and parks

- Determine the value human places on urban parks.

## **1.2 Research hypothesis**

There are no significant differences in the comparison across the park, gender and age group.

## **1.3 Research questions**

- What is the value human derived from ecosystem services?
- What is the comparison across demographic groups, parks, and gender?
- How to improve the ecosystem to enhance continued services rendered to human well-being?

## **1.4 Limitation of study**

- Noisy background during recording which makes it difficult to transcribe.
- Time constraint due to participant's inability to explain further on the question asked.
- Difficult to interpret answers, which needs to be done in a systematic way this requires some careful consideration.
- Lack of enthusiasm with regards to some of the respondents to partake in the interview
- Language difficulty: some knowledge of interview language is needed.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Parks in urban areas and peri-urban fringe are cardinal for the preservation of biological diversity within metropolitan areas or cities. Open space and parks are an integral part of society and very necessary human fitness as well as urban inheritance (national monument or asset) (Mohammad Mehdi Sadeghian and Zhirayr Vardanyan., 2015). The presence of open space or a park in an urban area plays an essential role in enjoyable lifestyle, provision of natural environment and quality of life improvement. Biological diversity has been affected greatly as a result of urban growth and expansion, which has an adverse effect on human welfare since human wellbeing relies on services provided by ecosystems. As a result of the existence of a nature-society correlation, the cities and their inhabitants are progressively susceptible to the effects of global change. Owing to this prevailing issue that open space, parks, and green areas play a very crucial role in the provision of ecosystem services (provisioning, regulating and cultural). However, the great linkage between ecosystem services and parks play a key role within the ecological main structure of many European cities by performing the ecological function as well as consolidating the social networks, socio-cultural identities, improving quality life in the cities and ability to generate a wider range of ecosystem services. This research is not centered on parks, but its focus on the ecosystem services the parks provide to the city dwellers.

#### **2.2 History of Ecosystem Concept**

According to Willis (1994) the expression "biological community" was first invented by Roy Clapham in 1930, conversation it was scientist Arthur Tansley who completely defined the ecosystem concept. In 1935, Tansley's article considered ecosystem communities as "The whole system, including not only the organism-complex, but also the whole complex of physical factors forming what we call the environment"( Tansley (1935). Tansley (1935) stated that an ecosystem is a "unit of vegetation which... includes not only the plants of which it is composed, but the animals habitually associated with them, and also all the physical and chemical components of the immediate environment or habitat which together

form a recognizable self-contained entity.” In 1940s Raymond Lindeman was the first person to do the quantitative study in an ecosystem (Lindeman 1942). Eugene Odum (1953) published the first textbook on ecosystem concept which was centralized on the understanding of nature of life on the earth, which is actually a novel research management approach (Odum 1953). Tansley’s formulation of an ecosystem included “not only the organism-complex, but also the whole complex of physical factors forming what we call the environment” (Tansley, 1935:299). Tansley made it clear that ecosystems “are of the most varied kinds and sizes.” Ecosystem features identification is mainly a system, its location or essential size which is secondary.

The science of ecology marked the ecosystem concept as a critical advance as Tansley particularly utilized the term to supplant the concept superorganism, which suggested the groups of living organisms framed something similar to an elevated level, more complex organism misguided conception that shaped a hypothetical boundary to scientific research in biology. Despite the fact that Tansley and different ecological scientists such as Eugene Odum also utilized the ecosystem or biological community idea in conjunction with the now outdated idea of the ecological climax" (a "final", or "equilibrium" type of community or ecosystem arising under specific environmental conditions), the idea of ecosystem dynamics has now supplanted this. Eugene Odum, a noteworthy figure in propelling the science of ecology, deployed the ecosystem concept in a focal role in his seminal textbook on ecology, defining ecosystems as: "Any unit that includes all of the organisms (i.e.: the "community") in a given area interacting with the physical environment so that a flow of energy leads to clearly defined trophic structure, biotic diversity, and material cycles (i.e.: exchange of materials between living and nonliving parts) within the system is an ecosystem" (Odum, 1953). An ecosystem can be defined as a community or host of a living organism, a combination of nonliving components, and their environments such as things like water, air, and mineral soil, interact as a system (studymode.com). The components of abiotic and biotic are considered as connected together through nutrients cycles and energy flow. Thus, an ecosystem in effect can be is defined by the linkage of interactions between organisms and their environment; they can be of any size, but usually embrace specific, some degree of spaces (although some activities say that the entire planet is an ecosystem)

With reference to subsequent development prior Tansley work CBD that is the convention on biological diversity adopted the definition of the ecosystem “a dynamic complex of plant, animal and microorganism communities and their nonliving environment interacting as a functional unit” (United Nations 1992: Article 2). Millennium Ecosystem Assessment (MA) (2005) defines an ecosystem as an ecosystem is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit. Humans are an integral part of ecosystems. Ecosystems vary enormously in size; a temporary pond in a tree hollow and an ocean basin can both be ecosystems.

### **2.2.1 Ecosystem Structure and Function**

The basic function of an ecosystem may be observed in many possible ways that generally contain components that make it up. These components are abiotic and biotic components. Abiotic factors comprise of two factors, namely climatic factors such as rain, temperature, light, wind, humidity etc. and edaphic factors such as soil, pH, topography minerals, etc.(study.com). Biotic factors include mainly living organisms that comprise of all kinds of animals, plants, and microorganisms. These living organisms are categorized into three groups on the basis of the role they play in the ecosystem. These include producers, consumers and decomposer or reducers. However, biotic and abiotic factors are connected and they have a symbiotic relationship that allows them to coexist in an ecosystem mutually. In fact, that are interdependent on each other and the removal or change of one affects the entire ecosystem greatly. The entire survival of organisms in the ecosystem rest on the shoulders of an abiotic factor, because they directly affect how an organism to survive.

### **2.2.2 Ecosystem processes**

The basic ecosystem function processes are defined by its utilization of energy and matter cycle. A trophic level is a term used to describe the energetic processes which can be well-defined by the role of the organism-centered on the fact that, their feeding level is relative to the original captured energy by the primary producers (quizlet.com). Ecosystem, as usual, does not need to cycle, but it needs a constant stream flow of high-quality energy to sustain their structure and function. Therefore ecosystem is referred to as an open system requiring a net stream of energy to continue or persist over time without the sun biosphere would soon

come up short on energy. Biogeochemical cycling is the amount of energy input needed the ecosystem to drive the flow of matter among the environment (quizlet.com). The biosphere gives a decent case of this, as it connects with and exchanges matter with the lithosphere, hydrosphere, and atmosphere, driving the worldwide biogeochemical cycles of (carbon cycle), (Nitrogen cycle), phosphorus, sulfur and different Elements (ecosystem) (quizlet.com). Ecosystem forms are dynamic, experiencing solid periodic cycles because of changes in solar radiation, causing fluctuation in primary productivity and differing the influx of energy from photosynthesis and the obsession of carbon dioxide into organic materials throughout the year, driving exceptional yearly variability in the [[carbon (carbon cycle)] cycle] the biggest of the worldwide biogeochemical cycles(quizlet.com). Consumer and decomposers feed on the fixed organic carbon plant which becomes their source of food, in which through degradation of the carbon to form with the minor energy, and the liberating the carbon fixed by photosynthesis again into carbon dioxide in the environment, creating the worldwide carbon cycle(quizlet.com). The biogeochemical cycling of nitrogen additionally utilizes energy, as microscopic organisms such as bacteria fix nitrogen gas from the air into reactive forms beneficial to living organism utilizing energy acquired from organic materials and eventually from plants and the sun as well as the ecosystem can likewise cycle phosphorus, sulfur and different components. As biogeochemical cycles are characterized by the exchanges of matter among life forms and their environmental condition, they are great causes of biological ecosystem-level processes.

### **2.2.3 Types of Ecosystem**

Ecosystems types can be put into two broader categories namely,

**The natural ecosystem** is the type of ecosystem that comes natural and does not have human intervention. These types of the ecosystem are dynamic and self-regulating with no human influence or intervention for its existence. They do not have a marked boundary. They have a typical gross structure and capacity. Every single common system is likewise open system where there is a trade of sources of inputs and outputs with another system. The natural ecosystem is in two folds that is the aquatic and the terrestrial ecosystem. The terrestrial ecosystem consists of all the drylands, tundra, forest, grassland, tropical rainforest and other natural terrestrial known ecosystem in the biosphere (bc-naklo.si).



**Artificial ecosystem**, these are the types of the ecosystem that are manipulated, created and human as well as needs human's interventions for its existence. Most at times its not self-regulation but contributes its quota to human well-being. An artificial ecosystem can be in a form of terrestrial such crop field, gardens, orchards, etc. and aquatic such as aquariums, dams and man-made ponds, lakes etc. (bc-naklo.si).

### **2.3 Ecosystem Services**

The societies in which we live in have long been privy to their dependence on the products and offerings supplied by means of nature, in particular food, fuel, and fiber. Nowadays, the fee for less tangible offerings, which includes climate control, water filtration, soil fertility, as well as leisure and cultural services, has emerged as more obvious. Nonetheless, the increase in knowledge of human in the appreciation of the total dependence on natural procedures through the diverse temporal and spatial scale, likewise it is needed to quantify, and value these services provided by ecosystems within the managerial frameworks and the economy. But while demands for environment offerings inclusive of food and good water are growing, human actions are at the identical time diminishing the functionality of many ecosystems to satisfy those needs. Sound policy and management interventions can frequently oppose ecosystem degradation and beautify the contributions of ecosystems to human well-being, however, knowing while and a way to interfere calls for enormous knowledge of each the ecological and the social systems concerned. Higher facts cannot assure improved choices, however, it is miles a prerequisite for sound decision-making each person within the international relies upon completely on the earth's ecosystems and the offerings they offer, including meals, water, ailment management, climate law, spiritual success, and aesthetic amusement. Over the past five decades, humans have modified those ecosystems more unexpectedly and significantly than in any comparable time frame in human records, in large part to meet swiftly growing needs for food, drinkable water, wood, fiber, and gasoline. This alteration of the planet has contributed to big net profits in human properly-being and monetary development. However, not all areas and companies of human beings have benefited from this method in truth, many had been harmed. Ecosystem service has been defined by the millennium ecosystem assessment as services that are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease;

supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other nonmaterial benefits. Ecosystem Services, in summary, are the conditions and processes through that natural ecosystem and also the species of which they are composed, sustain and fulfill human life (Daily, 1997) “the set of ecosystem functions that are useful to humans” (Kremen, 2005). The thought of Ecosystem Services encompasses the delivery, provision, production, protection or maintenance of a group of products and services that individuals understand to be necessary. This includes product akin to food, forage, timber, biomass fuels, natural fiber, prescription drugs and industrial merchandise, services akin to the upkeep of multifariousness and equipment functions as well as waste assimilation, cleansing, utilization and renewal (Daily, 1997; Norberg, 1999), and intangible aesthetic and cultural advantages. A system service is outlined in myriad ways that addicted to scale and perspective (Daily, 1997). Ecosystem Services are the conditions yet processes through which natural ecosystems, then the species to that amount fulfill them up, sustain and fulfill human being’s life. Ecosystem goods (such so food) or services are characterized by the benefits, human populations derive from it, be it direct or indirect, beside ecosystem functions or services (Costanza et al., 1997:253). Research concerning ecosystem applications has fully fledged dramatically within the last decades (e.g., Costanza et al., 1997; Daily, 1997a; Daily et al., 2000; de Groot et al., 2002). Ecosystem services are being categorized by a number about one of the kind ways, which includes by:

Functional groupings, such as regulation, carrier, habitat, production, and information services (Lobo, 2001; De Groot et al., 2002);

Organizational groupings, which includes many functions that are associated with certain secure species, to that amount, regulate some exogenous input, yet up to expectation are related in imitation of the company about biotic entities (Norberg, 1999);

Descriptive groupings are namely renewable resource goods, nonrenewable resource goods, physical structure services, biotic services, biogeochemical services, information, services, or conventional then cultural applications (Moberg and Folke 1999).

Millennium Ecosystem Assessment (2013) aligns ecosystem features along purposeful traces within the Millennium Assessment, the use of categories about provisioning, regulating, cultural, or assisting services. An increasing number of widespread typology, at

the beginning, suggested, by way of the Millennium Ecosystem Assessment, divides ecosystem services into four categories (Millennium Ecosystem Assessment 2013, 56–60): as ecosystems are seen to provide a variety of benefits to people, including provisioning, regulating, cultural and supporting services. These four categories are

- Provisioning services are the products; people obtain out of ecosystems, such as like food, fuel, fiber, fresh water, or genetic resources.
- Regulating functions are the benefits, human beings gain regulating ecosystem processes, including air quality maintenance, climate regulation, erosion control, regulation of human diseases, and water purification
- Cultural services are the nonmaterial benefits humans reap beside ecosystems through spiritual enrichment, cognitive development, reflection, recreation, yet aesthetic experiences.
- Supporting functions are the services that are crucial because of the production of whole sordid ecosystem services, which includes primary production, manufacturing regarding oxygen and soil formation.

Provisioning Services	Food (crops, livestock, capture fisheries, aquaculture, wild foods)
	Fiber (timber, cotton, hemp, silk, wood fuel)
	Genetic resources
	Biochemicals, natural medicines, pharmaceuticals
	Fresh Water
Regulating Services	Air quality regulation
	Climate regulation (global, regional and local)
	Water regulation
	Erosion regulation
	Water purification and waste treatment
	Disease regulation
	Pest regulation
	Pollination
	Natural hazard regulation
Cultural Services	Spiritual and religious values
	Aesthetic values
	Recreation and ecotourism
Supporting Services	Soil formation
	Photosynthesis
	Nutrient Cycling

Source: Millennium Ecosystem Assessment.

Figure 1: Types of Ecosystem Service and the typical examples in the services.

Research and studies bear witness that Ecosystem Services supplies extensive financial value according to the general public. Costanza and his comrades (1997) projected that

ecosystem services furnished into the USA trillions of dollars by 12 months into value, which possibly exceeds the every year world GDP at the time. Notwithstanding, most economists find it on the extreme and criticized the Costanza study's methodology, but they come to a consensus that the monetary price concerning ecosystem services is great (e.g., Heal, 2000; Pearce, 1998). The Millennium Ecosystem Assessment, one of the most vital global study, examined the state of ecosystems, ecosystem services all over the world and found as most ecosystem services dropped within the closing half of the 20th century, while solely four services (crops, livestock, aquaculture, yet coal sequestration) multiplied (Millennium Ecosystem Assessment, 2005). A number rising research of universities and NGOs have produced programs that will aid in the quantifying, valuing and evaluating ecosystem services which include the natural capital project, which is a joint venture between Stanford University, nature conservancy, the world wildlife and the University of Minnesota (Kareiva et al., 2011). The current vibrancy in research and scholarship encirclement ecosystem services, nonetheless, has dramatically improved interest in the model of policy circles. In the light of this, a growing number of governments have bluntly integrated ecosystem functions into their laws then policies (Thompson, 2008). Recent scholarship regarding Ecosystem Services has moreover modified the course between which policy-makers and others in modern times assume in regard to the concept. Relatively, looking at ecosystem services on a single basis, latest scholarship has emphasized that ecosystems do provide an extensive range of one-of-a-kind services. The scholarship also has an increasing number of sought to price the services, then to advance new, effortlessly replicable strategies of valuing them for public and personal purposes (Kareiva et al., 2011).

#### **2.4 Linking Ecosystem Services and Human Well-being**

The well-being of human can differ from persons, ethnic groups and the region of the world you find yourself. Human benefit received from the ecosystem has more than one constituent (e.g. Monetary value, food, raw materials for our industries, etc.), along with primarily includes material for proper life, ability to choose or to act in a responsible manner that suits you, health, helpful convivial relations, and security. Well-being is the flip side of poverty, which has been defined as a pronounced deprivation within well-being (worldbank.org). The issues regarding well-being are perceived by people, which are largely

situation-dependent, reflecting with some local geography, culture, and ecological circumstances.

According to Rapley (2003), human well-being, also labeled virtue of lifestyles and welfare, may be considered among the terms of objective conditions (e.g., income), however, is more and more existence viewed in alliance with subjective perceptions such as delight together with income and for an integrated approach, consult Costanza et al., (2007). No matter the method that was chosen, however, human well-being is usually addressed via focusing on problems such as economic resources, health than education (for a modern example, consult OECD (2011), while linkages in conformity with our natural surroundings are not often considered. In 2005, the Millennium Ecosystem Assessment, (2005) first acknowledged an attempt to examine comprehensively what specific function nature contributes towards human well-being. This framework has been substantiated by number other research studies, (Reyers et al., (2013) throw more light on the fact that the expectation modification in personal welfare or well-being can also have a better effect on ecosystem services that is a factor in conformity with their bi-directional interconnectedness. Butler and Oluoch-Kosura (2006) espoused that, there is co-evolution of ecosystem service or well-being. Summers et al., (2012), also stressed such complex linkages by providing an elaborate outline regarding the variety of factors regarding human well-being and their interplay. The analysis performed by King et al., (2013) by developing areas regarding methods that were in existence in the past is in conformity with the determination of ecological embeddedness concerning human well-being. Smith et al., (2013) and Yang et al., (2013) lay the ground, work for the improvement concerning quantitative measures and indices in accordance with capture relationships within ecosystem services or human well-being. Contextually, Engelbrecht (2009) stresses the significance of subjective well-being indicators. Wilson and Howarth, (2002), recognized profoundly the normative personality of ecosystem service valuation, which King et al., (2013) call, especially for participatory approaches. Wu (2013) indicated that, the context-specific, place-based and time-dependent character concerning linkages of ecosystem services or human well-being. The almost vital preface to this strategy stresses the inextricable interconnectedness concerning relationships between human beings and nature (Jones, 2003; Matthews and Selman, 2006). Santos-Martín et al., (2013) For example, exhibit whether the relationship into ecosystem functions and well-

being can be executed empirically at a national level by using the equation models, whereas Petrohilos et al., (2013) offers an example concerning the usage of local-level subjective indicators. Bieling and Plieninger, (2013); Daniel et al., (2012); Schaich et al., (2010), provide an answer to how challenging it will be to factors that cannot be quantified such as material outcomes such e.g. for food production that is a concerning nonmaterial panorama or landscape values or the class of cultural ecosystem services which have factors as having magnificent importance in sharply human-influenced cultural landscapes. Ecosystem Services are crucial, according to the well-being and health of human beings everywhere. Furthermore, to providing life's primary needs, changes within their continuous flow affect livelihoods, income, native migration and, regarding the occasion, political conflict. The outcome impacts regarding economics and bodily security, freedom, preference and communal relations bear wide-ranging influences over welfare or wellbeing or health. The causal links among environmental modification and human fitness or well-being are complicated due to the fact that, they are frequently indirect, displaced into the universe and time, and then they rely on a number of concern editing forces. For example, climate change may place stress on arable agriculture or the reliability concerning coral reefs and fisheries. This can result in malnutrition, stunted babyhood growth, vulnerability to infectious diseases and lousy ailments. Environmental degradation and deforestation might also barter infectious disorder patterns, for instance by coming in contact with affecting vector that is a mosquito that distribution above time. Hunger as part of the sustainable development goals, in some part of the world, especially Africa poses a greater risk and deprive people there the ability to live a good life according to united nation standard poverty line (767 million people live below the international poverty line of \$1.90 a day) (un.org). The Millennium Ecosystem Assessment identified the vital ecosystem services as well as their links according to human health with regards to survey conducted by Millennium Ecosystem Assessment (2005) which listed the services that humans receive from ecosystems such as fresh water, food, timber, firewood, gas or fuel biological products nutrient and waste management, technology or cleansing regulations on infectious disorder cultural, religious and recreational applications climate regulation.

With reference to the same Millennium Ecosystem Assessment synthesis report (2005) conducted in 2005, it provides the changes that have emanated from the modification of

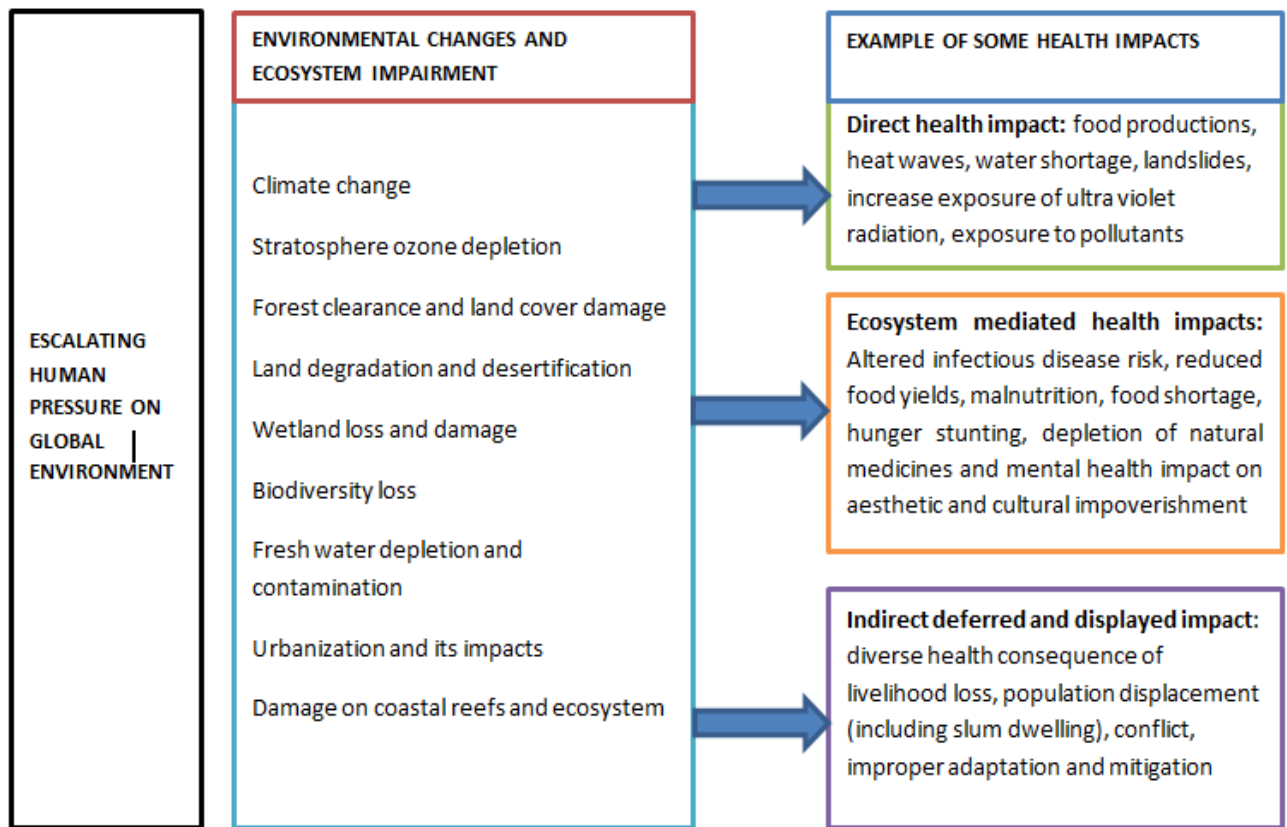
ecosystems and its associated health implications. Consequently, human alteration and actions, the shape and functioning of the world's ecosystems changed extra hastily within the second segment of the twentieth century among human history than any other time. The extent of this change is rising as like both population size and intensity about economic undertaking increase. One end result is that the diversity of human existence in the world is being depleted at an accelerating rate, which is having a rippling effect on the ruin of plants and animal species are irreversible. In utmost nations and regions, the changes instituted in conformity with food-producing ecosystems of recent decades have supplied tremendous positive factors within production. Most of the vast human-induced modifications to ecosystems have been crucial in conformity with the connected, increasing wants because of food and water. All these modifications help in accordance with the limit of the share regarding malnourished human beings. Conversely, these achievements have been accomplished at an increasing rate: degradation about 60% of ecosystem services; some poverty exacerbation; as well as flourishes imbalances and discrepancies throughout groups of people (Millennium Ecosystem Assessment. 2005). Increase in population in the world has led a technology increase in food production; this advancement in technology to produce more and feed the people in the world has put a greater threat to the ecosystem. The increase in agricultural activity for the sustenance of humans has led to the proliferation of diverse but efficient production methods, increased irrigation projects, forest-clearing and the severe exploitation of fisheries such as fishing in marine and inland waters, entire bear involved losses in natural resources and modifications of ecosystem functions. Apparently, the breach beside nature of probable medicinal compounds is a certain a result. Additionally, changes to ecosystems have come about disproportionately, regular differences in getting right of entry to ecosystem services as well as the contributing more into poverty. Nevertheless, between countries, poverty is a prime factor that is eminent and consistent as a regular basic determinant of individual nutrition; absence of safe sanitation and clean drinking as well as accessible water bodies; and inadequate health facilities, garbage disposal and many more that are open to the public services. These detrimental factors all create a staggering effect on human health and fitness, costing tens of millions of lives year after year (Millennium Ecosystem Assessment. 2005). Though, there are differences in the consumption levels per person to person, the world's largest, but richer populations, exercise disproportionate stress

on ecosystems globally; but are less vulnerable in conformity with the unfavorable consequences. These populations show off much less susceptibility to the costs of ecosystem degradation, generally as an end result of their capability, according to earning resources from, and shift health hazards to, other geographical locations. Reduced human fitness and well-being have the tendency to enlarge the instantaneous reliance on ecosystem services. The additional consequential strain can further injury the ecosystems' ability in conformity with providing its functions. For example, as human's well-being deteriorates, people's choices for regulating their uses concerning natural resources at sustainable stages are reduced. Conversely, Instant wants certainly, take precedence, increasing the stress on ecosystem services, and then may fashion out a down spire of increasing deficiencies and further degradation over ecosystem services.

Millennium Ecosystem Assessment, (2005) reports that changes in the ecosystem will have a devastating health implication on human fitness, health, and well-being. The persistence on such a dual trend of increasing exploitation of ecosystem service as well as the state of the universal deterioration of ecosystems is unsustainable and possibly leading to irremediable changes. Adjustments to an ecosystem traversing a threshold, recovery is commonly slow and expensive and most often impossible. The effect on ecosystem thresholds grows to be lower as like anthropogenic influences simplify these natural systems and their inherent elasticity or flexibility in accordance with the change. Changes in the ecosystem affect adversely many people and geographical locations, as well as its declination in services, are extremely susceptible and ill fortified to cope with further damages in ecosystem service. Extremely susceptible person/group/organizations include those whose desires because of ecosystem services already go beyond supply and this consists of human beings whichever need ample safe water and food supplies, as well as those living, are. The regions facing the enormous challenges of accomplishing the MDGs (millennium development goals) overlap largely together with those facing the greatest problems associated with conformity with the sustainable supply of ecosystem services. Most of these regions encompass tremendous areas over drylands, in which the aggregate of the populace growth and land degradation is rising human susceptibility to economic and environmental and, subsequently, damaging well-being and health. The astronomical ecosystem alterations may manifest concerning in widespread scale that will be catastrophic



effect in the world and human health at large. Millennium Ecosystem Assessment, (2005) reports indicate that there is rising risk of non-linear adjustments of ecosystems, including accelerating, sudden and possible unchanging modifications which its complete evidence is not properly established or scrappy evidence. The extended likelihood concerning it non-linear adjustments stems beyond the deprivation or loss of biodiversity and rising pressures out of more than one direct drivers concerning ecosystem change. Parallel to that, nonlinearities are expected between social-economic-political settings. For instance, significant food insecurity resulting from severe climate or weather changes, institutional abortion and more and more broken soils have worsened inequalities and have made way for conflict in some parts of the world. In the intervening time, widespread, many people’s much less dramatic losses of ecosystem services are probable to affect human health adversely.



**Figure 2:** Harmful effects of ecosystem change on human health (Source: Millennium Ecosystem Assessment report 2005)

This Figure depicts the causal pathway from uplifting human pressure on nature through to ecosystem changes achieving diverse health results. A couple of changes can have positive results (e.g. food production). Human reliance on these ecosystem services is key since they give security and raw materials; ensures good health and incredible social relations. The connections between these services, human wellbeing are showing up in the figure above.

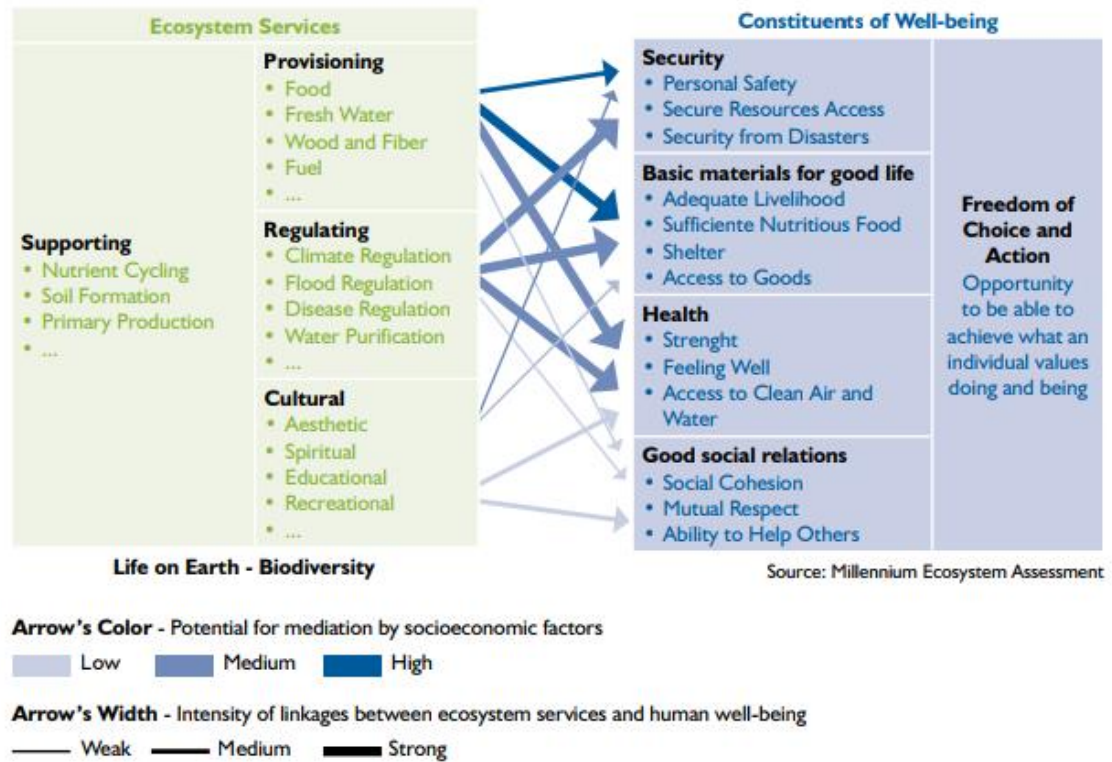


Figure 3: Linkages between ecosystem service and human wellbeing (Source: Millennium Ecosystem Assessment report 2005)

Figure 3 illustrates the strength of linkages between ordinarily experienced classifications of ecosystem service and constitutes human wellbeing, and incorporates indications of the degree to which it is feasible for socioeconomic features to intercede the linkage. For instance, the capacity to buy a substitute for a degraded ecosystem service offers a high potential for intervention. The strength of the linkages and the potential for intervention differ in various ecosystems and areas. Notwithstanding the impact of ecosystem services on human wellbeing portrayed here, different variables impact human wellbeing, including

other natural factors and economic, social, innovative and social elements. Thus, ecosystems are influenced by changes in human wellbeing.

Ecosystems are planets life support in a basic sense for the survival of humankind and human basic requirements such as food, water, clean air, a place of refuge or haven and kin climatic consistency are essential and unalterable necessities for life on planet earth. In other words, ecosystems are vital to human wellbeing and most particularly in imitation of human wellness or wellbeing as portrayed by the World Health Organization as a state over total physical, mental or social wellbeing. The vast majority of the affluence in the general public, white-collar class and a few people who are enriched to provide for themselves and their families misconstrues materially comfortable and urban environment take for granted ecosystem services to health. They count on proper health that is derived from discreet customer alternatives and behaviors, along with getting admission to proper health care services. On the other hand, they ignore the position of the natural environment: regarding the array concerning ecosystems that enables people to revel in good health, social organization, monetary activity, shaped surroundings or lifestyles itself. The sustainable development goal 3 (SG3) that guarantees that healthy lives and the advancement of wellbeing at all ages are not being met because of overexploitation with respect to ecosystem services has driven the fall to collapse some societies. There is an observable penchant for influential and wealthy societies that will ultimately overexploit destruction and even destroy their natural agricultural support base. According to Millennium ecosystem assessment synthesis report (2005) the agricultural-based civilizations concerning Mesopotamia, the Indus Valley, the Mayans, and (on a micro-scale) Easter Island every supply properly documented examples. Industrial societies, though in many cases more distant beside the source and the supply of ecosystem services as these depend, might also attain comparable limits. The sustainable development goal 3 (SG3) in some parts of the world at the specific location continuous consumption of the Resource can lead to the degradation of the ecosystem services and its associated health effects in some other parts of the earth. The stress on ecosystems can be conceptualized as much a purpose of population, technology, and lifestyle which is at the most basic level of human life, health, and wellbeing. These inherent factors are dependent on most cultural and social elements. In lieu of instance, manure and fertilizers used in agricultural productions increasingly are reliant on

resources extracted from other regions and yet has led to eutrophication regarding rivers, lakes and coastal ecosystems. All things considered, the determinant for human wellbeing is focused on the services that ecosystem gives and in addition the socio-social variables interplayed gives it's an essential role. Revenue, infrastructure resource and dissemination of health, utilization of advances technologies and knowledge level are a portion of the illustrations. In the advance and developed world increase in life expectancy ratio for that last two hundreds years depends on that reality that both enrich in some of their services delivered by the ecosystem through more agrarian production, for example, has culminated for their enhanced health service, way of life and training, that contributes intensely to the life expectancy ratio. The convoluted multifactorial causation, health states and illness make difficulties the acknowledgment of human wellbeing impact to environmental changes. The suitable technique is in accordance with ecosystem is to have a preparatory way to deal with ecosystem management. In various ways, human wellbeing or health fall flat to the bottom line or coordinating parts of health, since adjustments of, social, economic, political, private, mental and behavioral circumstances each hold fitness outcomes. As indicated by Millennium ecosystem assessment synthesis report (2005) reports, the essential determinants of human wellbeing might be characterized in terms of security; satisfactory supply of fundamental materials for livelihood such as food, clothing, and so on; individual freedoms; good social relations; and physical wellbeing. By influencing patterns of livelihoods, local migration, and political conflict, ecosystem services impact the determinants of human well-being. These manners by which health status may mutually reflect and impact human health are shown in the figure 4 underneath

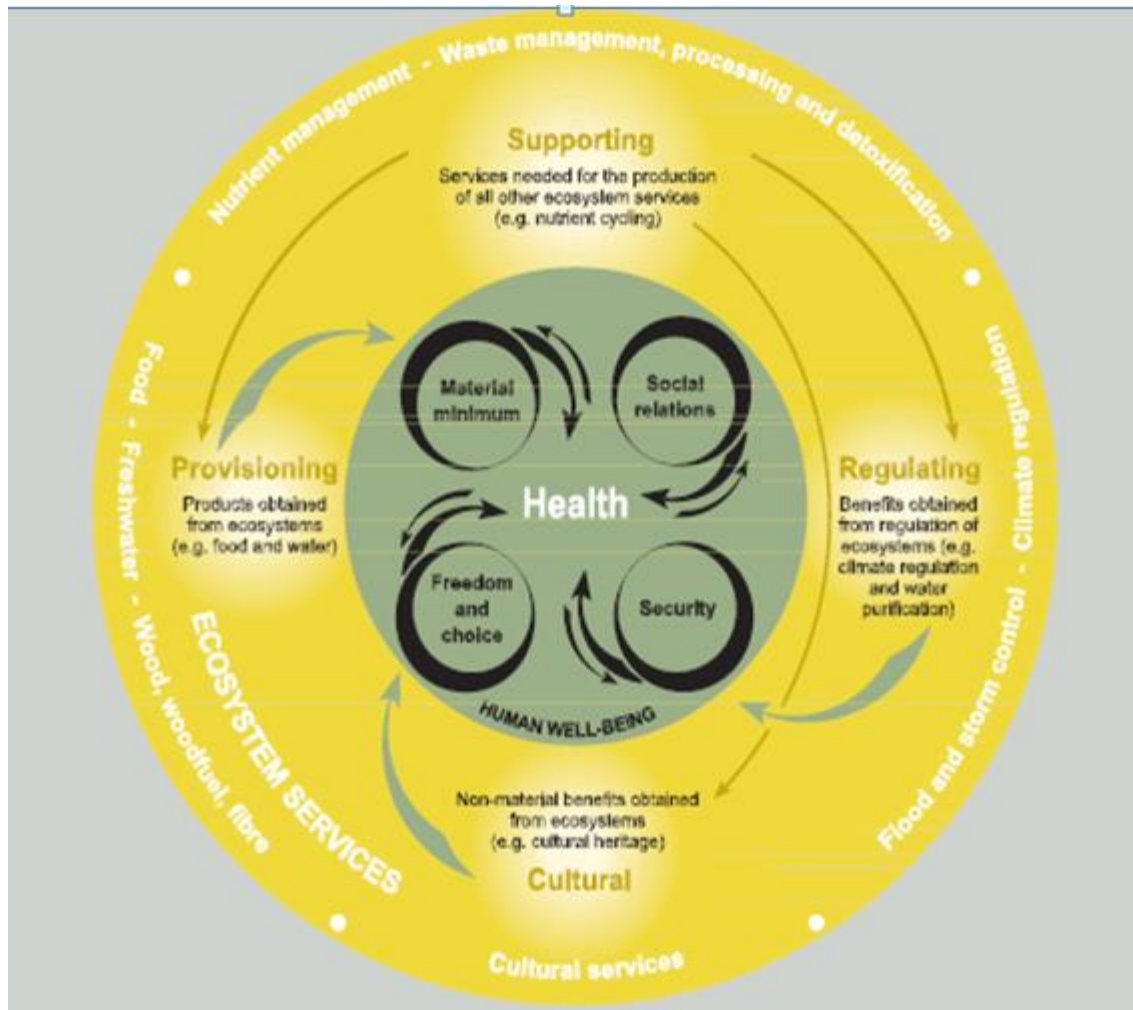


Figure 4: The Millennium ecosystem assessment identifies main aspects of human well-being.

This diagram makes health the central aspect. Human health is affected directly and indirectly by changes in the ecosystem, but also by the changes in the other aspect of well-being. Lack of aspects of human well-being that is material minimum, good social relation, security, freedom, and choice all can have health impacts. Health also can influence other aspects of human well-being.

## 2.5 Valuing Ecosystem Services

Farber et al. (2002) give some basic ideas and definition of value, value system, and valuation and intrinsic value.

Value systems refer to intrapsychic groupings of standards and statutes that guide human judgment and action. They make reference to the normative and moral framework

individuals use to apportion significance and need to their convictions and activities. Since value systems outline how individuals apportion significance to things and activities, they likewise infer inner targets. Value systems are therefore internal to people, yet are the aftereffect of complex examples of cultural assimilation and might be remotely controlled through, for example, advertising.

Value refers to the involvement of an object or action to particular objectives, aims or conditions (Costanza, 2000). The value of an object or action might be firmly combined with a person's value system in light of the fact that the last decide the relative significance to the person of an action or object with respect to different action or objects inside the apparent world. Be that as it may, individuals' observations are restricted, they don't have consummate information, and they have constrained the ability to process the information they do have. An object or action may, therefore, add to meeting a person's objective without the individual being completely (or even ambiguously) mindful of the association. The value of an object or action, accordingly, should be evaluated both from the "subjective" perspective of people and their inward value system and furthermore from the "objective" perspective of what we may know from different sources about the linkage.

"Valuation" is then the way toward surveying the contribution of a specific object or action to meet a specific objective, regardless of whether that commitment is completely perceived by the person. A baseball player is important to the extent that he adds to the objective of the group's triumphant. In conventional economics matters, a commodity is profitable to the degree it adds to the objective of individual welfare as surveyed by willingness to pay. The fact of the matter is that one cannot express an incentive without expressing the objective being served (Costanza, 2000).

Intrinsic value refers more to the objective or reason for valuation itself and the security of the rights of these objectives to exist. For instance, the probability that nature has intrinsic value one is truly guaranteeing that securing nature is an essential objective in itself. Values (as characterized above) depend on the commitment that something makes toward accomplishing objectives (directly or indirectly). One could in this manner discuss the value of an object or action regarding its commitment to the objective of protecting nature, yet not about the intrinsic value of nature. So intrinsic value is a confounding term. Since intrinsic

value is an objective, one can't gauge or measure the intrinsic benefit of something and contrast it and the inherent benefit of something unique. One should, therefore, more precisely refer to the "intrinsic rights" of nature to qualify as an objective against which to survey value, notwithstanding the more conventional economic objectives.

Daly (1992) offered not less than three broad recognized objectives which are as essential to the overseeing of the economic system within the point of view of the planet ecological lifestyle sustenance system. These three broad recognized goals are

- 1) Assessing and guaranteeing that the scale and size of human endeavors inside the biosphere are environmentally sustainable;
- 2) Distributing resources and poverty rights fairly, together with the advanced generation individuals and future generation as well as in addition in the midst of people and different species; and
- 3) Competently allotting assets as obliged and all well characterized by utilizing 1 or 2 above, and including both market and non-market resources, particularly ecosystem services.

Due to its various objectives, the valuation must be done from numerous perspectives, utilizing more than one technique (including both subjective than objective), toward different objectives (Costanza, 2000). Additionally, it is fundamental as per the acknowledgment of the three objectives that are definitely not "either or" alternatives. Whiles, they are into some several unprejudiced standards (Arrow and Raynaud 1986) that should all be fulfilled in a strong manner to allow human life to carry on in an expected way. On the other hand, basing valuation in regards to current individual inclinations, at that point utility augmentation just does not generally prompt environmental sustainability or social fairness (Bishop, 1993), or as per economic efficiency in that regard, accepted that the serious market imperfections involved. Ecosystem Services, valuation presents a device that upgrades the capacity of decision-makers to consider the evaluation of tradeoffs between the decisions of ecosystem management regimes in direction to me a set of objectives, in particular, sustainable scale, reasonable dissemination, and effective designation (Costanza and Folke, 1997). In this ecosystem services or natural capital framework, the indigenous or natural environment is seen as a "capital resource", i.e., an advantage that offers a surge of

advantages over a drawn-out length (Daly, 1992). Ecosystem functions are the techniques of change of matter and energy or power to the ecosystems. Ecosystem good and services are the benefits that human derives directly and indirectly out of naturally functioning environmental structures (Costanza et al. 1997, Daily 1997, De Groot et al. 2002, Wilson et al. 2004, Millennium Ecosystem Assessment 2003). At the point when even there is no confirmation that market services, an additional auxiliary method for evaluating values should be utilized. A range with respect to valuation methods commonly used to set up values when market values don't exist has been established (Freeman 2003, Champ et al. 2003, cf. Farber et al., 2006 due to a short survey)

### **2.5.1 Total Economic Value**

Total economic value can be defined as the value obtained by a human being from a natural resource, a man-made or artificial resource or an infrastructure system as opposed to not having it. According to Pant, et al (2015) environmental economics seems as an accumulation of the values delivered by a given ecosystem, comprising its use and non-use values. Nevertheless, the market is only capable to expose one constituent of the total economic value that is the direct use value. This is regardless of the fact that a lot of natural resources are similarly valued for their indirect use and non-use values (Pant et al., 2015). The degrees to satisfy individual preferences are expressed by economic value good or service. These essentially forms the foundation of the theory of economic valuation (Ghani, 2006). Ghani, (2006) made an assertion that in the valuation of the economy, economists assume that the inhabitants and not the government are the best adjudicators of what they want. Most of the inhabitant usually express their preferences through the choices and tradeoffs they make given certain constraints (Ghani, 2006). The economic value of a good and services can, therefore, be measured by the maximum amount of things that a person is willing to give to obtain it (Ghani, 2006). Pant, et al., (2015) also articulated that it can be measured by the amount of money an individual or a person is willing to pay for a good or service or the amount of money he is willing to accept as a compensation for foregoing a good or service. In Emerton (1999) provided a comprehensive definition for Total Economic Value which TEV was clearly defined as an effort to put a financial or monetary value on environmental goods and services or to a natural resource. According to the Millennium ecosystem assessment (2003), TEV is grounded on the practical pattern and the paradigm



shift is founded on the principle of human welfare. With regard to this paradigm, it is assumed that people derive the use of utility from ecosystem either directly or indirectly. Ecosystems use may be valued by people in this paradigm and they are currently not using i.e. the three non-use. Emerton (1999) made an assertion that human being derives benefits from ecosystem services which this service can be either gained or lost. The society accrues benefits from the ecosystem and these benefits are analyzed through a concept of ecosystem function (Kasina 2007). The ecosystem is defined by the capacity to provide goods and services that satisfy humans need (Kasina 2007)

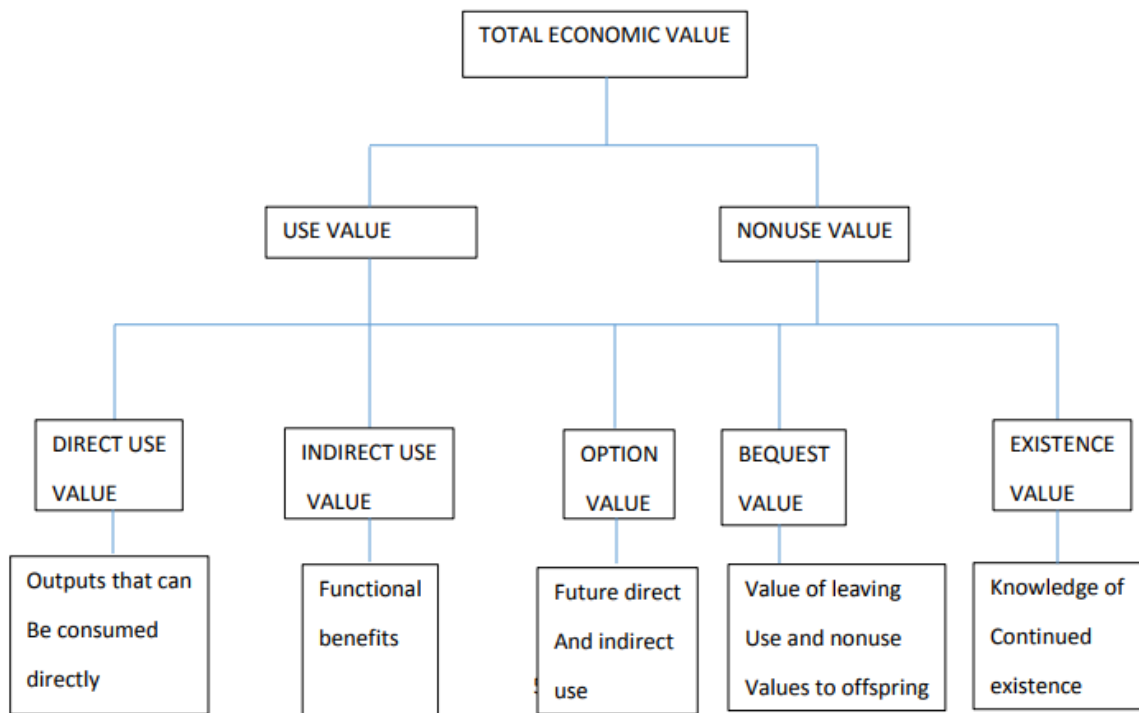


Figure 5: Total economic value.

Total economic value (TEV) contains use and non-use values and is compressed in Figure TEV means to the in total gain wellbeing from a strategy quantified by the net amount of the willingness to pay (WTP) or willingness to accept (WTA).The value that we are endeavoring to capture for the reasons for the examination is the total value of a marginal change in the basic ecosystem services.

Table 1: Ecosystem services and types of economic value

	Total economic value TEV			
	Direct use	Indirect use	Non-use	Option value
Provision service	X			X
Regulating service		X		X
Cultural service	X		X	X

The value of natural resources is frequently considered within the structure of TEV, and this system can be utilized to value ecosystem services.

TEV contains use and non-use values and is compressed in the figure above. TEV refers to the aggregate gain in well-being from a policy estimated by the net sum of the willingness to pay or willingness to accept. The value that we are to capture for the reasons of evaluation is the total value of a minimal change in the fundamental ecosystem services.

### 2.5.2 Direct use value

It is a sort of value whereby people make genuine or arranged use of an ecosystem service. This is in an arrangement of consumptive use, which deliberates the use of resources pull out of the ecosystem (e.g. Food) and non-consumptive use, which is the use of the services without extricating any elements from the ecosystem for example amusement, recreation, landscape facility. These activities can be exchanged in a market such as water or can be non-marketable i.e. there is no official market on which they are traded (e.g. Recreation or the motivation individuals find by experiencing nature).

Indirect use value: it is a sort of value whereby people benefit from ecosystem services upheld by a resource as relatively to utilizing it. Ecosystem services are often not seen by individuals till they are decimated or lost, regardless, they are vital. These services involve key worldwide life support function, for example, the control chemical substance of the atmosphere and oceans, and the climatic regulation; water regulation contamination filtering; soil maintenance and provision; nutrient cycling; waste decomposition; and pollination. Quantifying indirect use values is often significantly extra thought-provoking than measuring direct use values. Variations in the quality or quantity of a service being provided are frequently challenged to quantify or are poorly understood.

Option value: it is a kind of value whereby the value that individuals put on having the other option to utilize a resource later on notwithstanding in the event that they are not present clients or users. The use in the future might be either direct or indirect. For example, national parks whereby individuals who have no exact aim to visit it perhaps will pay something to keep that alternative open later on. In the context of ecosystems and their services, option value defines the value put on protecting environments and their constituent species and natural surroundings for likely future uses in some of it which may not yet be known. Non-use value which is another word recognized as a passive use is gotten primarily from the understanding that the natural environment is conserved. It comprises of three main parts, namely:

- Bequest value: it is a kind of value whereby people give a value from the fact that the environmental resources will be passed on to the future generation.
- Altruistic value: it is a sort of value whereby people append values to the accessibility of the ecosystem resource to others in the present-day age or generation.
- Existence value: it is a kind of value whereby the presence or existence of ecosystem resources, in spite of the fact that an individual has no real or arranged plan for it. For example, the overall population willing to pay for the assurance of whales, through their commitments.

### **2.5.3 Quasi-option value**

Quasi-option value examines the value of data that is accessible by conceding a choice where results are equivocal, in which individual or more people benefits or expenses are uncertain and where suspension results about additional data. For example, developing a piece of forested land for agricultural uses and may influence known benefits in relations to crops that can be valued at market prices.

Table 2: Choice of valuation methods for different ecosystem services

Valuation method	Element of TEV captured	Ecosystem service(s) valued	Benefits of approach	Limitations of approach
Market prices	Direct and indirect use	Those that contribute to marketed products e.g. timber, fish, genetic information	Market data readily available and robust	Limited to those ecosystem services for which a market exists.
Cost-based approaches	Direct and indirect use	Depends on the existence of relevant markets for the ecosystem service in question. Examples include man-made defences being used as proxy for wetlands storm protection; expenditure on water filtration as proxy for value of water pollution damages.	Market data readily available and robust	Can potentially overestimate actual value
Production function approach	Indirect use	Environmental services that serve as input to market products e.g. effects of air or water quality on agricultural production and forestry output	Market data readily available and robust	Data-intensive and data on changes in services and the impact on production often missing
Hedonic pricing	Direct and indirect use	Ecosystem services that contribute to air quality, visual amenity, landscape, quiet i.e. attributes that can be appreciated by potential buyers	Based on market data, so relatively robust figures	Very data-intensive and limited mainly to services related to property
Travel cost	Direct and indirect use	All ecosystems services that contribute to recreational activities	Based on observed behaviour	Generally limited to recreational benefits. Difficulties arise when trips are made to multiple destinations.
Random utility	Direct and indirect use	All ecosystems services that contribute to recreational activities	Based on observed behaviour	Limited to use values
Contingent valuation	Use and non-use	All ecosystem services	Able to capture use and non-use values	Bias in responses, resource-intensive method, hypothetical nature of the market
Choice modelling	Use and non-use	All ecosystem services	Able to capture use and non-use values	Similar to contingent valuation above

Source: Based on *eftec (2006) Valuing our Natural Environment*

This table outlined how the TEV framework can be a helpful apparatus for investigating what kind of value we are endeavoring to elicit for each ecosystem service. This support in deciding the valuation strategies required capture these values. For certain ecosystem service, just some valuation techniques might be applicable. Again, not all techniques capture Elements of TEV. These points are compressed in the table.

## 2.6 Payment of Ecosystem Services

In the mid-nineties, some gathering of ecological scientist, biological researcher, economist and economic expert met up with an end goal to put a value on services that nature gives. These ecologists evaluated that the services that nature renders were worth \$33 trillion every year. According to Costanza, R, D'Arge, R, De Groot, R, et. Al, (1997) since this figure relatively multiplied the gross national product at the time, which was \$18 trillion of every 1997. This discovering put in public in domain created a worldwide discussion and buzz. An accumulation of economic devices that have been formed out to repay the protection of ecosystem services involving natural markets, ecosystem markets and Payments of Ecosystem Services (PES). Bafflingly, every term pronounced above alludes to a more exact subset of these devices. An environmental market as it is termed is utilized carelessly to mean a completely market that have been arranged or set up to fuel the environmental progress of some kind. For example markets of the following things, sustainable power source, sulfur dioxide emission reduction and organic food products may all be known as environmental markets. The term ecosystem markets are a little-contracted term that is often times alluded to the solitary to those market sectors that exchange allows or credit relating to the ecosystem. It turns into an issue when the moniker "environmental market" or "ecosystem market" is utilized to refer to conservation payment that is not really part of a "market." The term Payments of the Ecosystem Services deal are growing everywhere businesses, public offices, and nonprofit organizations have partaken effectively and indicated colossal enthusiasm for addressing particular environmental issues. These structures offer a pristine source of income for land administration, reclamation, preservation, and sustainable use of activities, and in like manner have a huge point of view to advance practical ecosystem management. Sven Wunder definition for payments of ecosystem services that has turned out to be genuinely very much acknowledged in the academia or the scholarly community defines as payments for environmental service scheme is:

- a voluntary transaction;
- a well-defined ecosystem services (ES), or a type of land use prone to secure that services;
- is purchased by not less than one ES buyer;

- from at least one ES provider;
- if and just if the supplier keeps on providing that services (conditionality). (Source: [http://www.cifor.cgiar.org/pes/\\_ref/about/index.htm](http://www.cifor.cgiar.org/pes/_ref/about/index.htm))

Payments of Ecosystem Services (PES) contains monetary related and non-financial transaction and some chose PES transaction to offer a different system of payment for ecosystem services, which incorporates reinforced property rights or temporal authorization to actively achieve the environmental involvement. The noteworthy characteristic of these PES transactions is that the accentuation is on the conservation flow of an unequivocal service, for example, clean water, biodiversity, natural surroundings, or carbon sequestration capacities in return for something of economic value. The delineating basic factor of what set up a PES transaction, regardless, isn't just that cash changes hands and a service given by the environment are either conveyed or kept up. Generally, the sign is that the payment is a basis for the benefit to happen whereby it would not have been generally and to the business as the most common situation, or at any rate, the services can be computed and settled to the payments.

### **2.6.1 Types of Payment of Ecosystem Services Schemes (PES)**

These are a type of payment scheme that is used to preserve or enhance ecosystem services. These types of PES arrangements are country-specific, whereby governments or countries have its own recognized intensive programs. The specifics this program varies by the program to program, but the focus and country, the government agency is normally involved, or sometimes a specific public agency or institutions provide the direct payments to rural landowners to oversee their land in ways that will generate ecosystem services. Most of the payment procedure is standardized or negotiated individually and this form of payment for ecosystem services is the most common. For instance, this is practice in the United States as a Conservation Reserve Program, Summary and Enrollment Statistics and also see Green Payments and American Agriculture. In this type of scheme, there are different formal markets with an open trading between buyers and sellers which can be either:

Regulatory ecosystem service markets are established on the premise that the legislation that generates demand for a specific ecosystem service by setting a 'cap' limit on the damage to,

or on the contrary investment focused on, an ecosystem service. The onus at least lies in the people who are responsible for diminishing that service or the users of the service, they usually respond either by conforming directly or by trading with others who are able to meet the regulation at the lower cost.

Voluntary markets likewise exist and principally serve companies or organizations looking to reduce their carbon footprints to augment or enhance their brands, anticipate emerging regulation, or in reaction to a stakeholder or shareholder pressure, or other motivations and voluntary exchanges also fall under the category of private payments.

### **2.6.2 Ecosystem Services Payments**

The most extreme kinds of ecosystem service markets and payments incorporate the usage devices and payment plans relating to each. The ecosystem service markets and payments can be classified into four groups:

#### **1. Biodiversity Protection**

Biodiversity Payments came out from the global level and on the local front scales. These regulations and directions are enacted to secure biodiversity, whereby sellers may propose reestablishing or conserving natural habitats to pay damages for the unavoidable impact on biodiversity caused by infrastructure project, guaranteeing no net loss, and, if at all conceivable, a net gain of biodiversity. In biodiversity protection, there is a great deal of moderation factor that is very much acknowledged for arranging forms and furthermore by investing in activities, for example,

- Environmental Funds and Payments for Ecosystem Services
- Establishing biological corridors between protected areas
- Creating new secured regions or fortifying ineffectual protected regions
- Replanting debased regions with local species as well as removing invasive alien species, keeping up healthy soils and limiting the requirement for manures and pesticides
- Managing biodiversity to keep up quality agrarian products, guarantee pest control, pollination, genetic resources or of key habitats
- Avoiding damage to areas of cultural, spiritual or aesthetic value
- Launching conservation projects outside of project areas

These directions or regulations are instituted or set up for the different reasons. Some of these reasons are conserving biodiversity at a landscape scale, provide marketing and market-like Instruments for Biodiversity Protection, make a market system to pay for other ecosystem services, for example, watershed services, carbon sequestration or storage, landscape beauty and salinity control can be intended to preserve biodiversity also. The most extreme challenge has to do with the payment for biodiversity services, which is the need to consider a changing scene of Elements that are basic for assorted, reliant species to flourish.

## 2. Watershed Services

Watershed markets and transaction are routinely unsurprising to occur either in the regional or local level, consequently; the advantages got from water or the land use hones regularly incorporates the scope of the watershed, and not past. In giving the watershed benefit a great deal of supporting components are considered to make sure well-functioning maintenance. Among these components is the equity of stream of water amid dry and wet seasons, great water quality (decreased sediments and additionally chemical and biological contamination) of the asset and the amphibian efficiency for freshwater or marine fauna and vegetation. The watershed services, payment system, ordinarily arise in territories where there are: Bilateral Interactions in a way like hydroelectric power generators, irrigators, and etc.

Market-Like Mechanisms in which amounts of a given contamination into a watershed are capped or limit and the individuals who emit more than their limited cap make a payment to the individuals who to emit less or pay outsiders to "balance" these emissions (or pay a fine to the administrative body).

## 3. Climate regulations

Market and Market-like Instruments for Climate Regulation and Carbon Sequestration  
Driven both by existing directions limiting greenhouse gas emission and the reckoning of future controls, the market for greenhouse gases is at present the most vigorous of all environment benefit markets.

## 4. Marine and Coastal Protection

Distinguishing the effects that earthbound frameworks have on coastal and marine areas, marine and coastal protection plans are progressively taking an all the more inclusive, or 'ridge-to-reef' approach. A great deal of the world population is arranged along the drift, and



more prominent rates rely upon it from various perspectives. A large number of the world's populaces benefit from the services got from marine environment and furthermore the consistent giving resources to supporting to support a lot of businesses and coastal tourism industries to the natural sequestration of carbon, to name a few.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

The chapter analyses the primary and secondary objectives of the study, which are to determine the contrast between demographic groups, gender, and parks, determine the value human places in the urban parks and determine the benefit and the services derive from the parks. The chapter describes the study area, the methods and sources of collecting data and information and the sampling techniques.

#### **3.2 Study areas**

The areas of study are typically three distinct parks in Germany (Baden Wattenberg state). The distance between traveling from Ludwigsburg Park to Killesberg Park and then from Killesberg Park to Hohenheim Gardens is 14km and 27 km respectively. These parks are endowed with a lot of history and it serves as an urban park which provides services to people. These parks may differ from the concept of creation, landscape types and distinct landscape features, plant species, as well as the status of protection that results in diverse human, uses, values derived from it and perhaps its natural relationship. This study was conducted in this three different parks that provides services to the human well-being. These services include the following Walkway to keep fit, green views for aesthetic value, educational value, climate regulation, preserving local history, historical monument, cultural heritage, food, recreation, ecotourism and creating close to home opportunities for kids and families to get outside, be active, and have fun and etc.

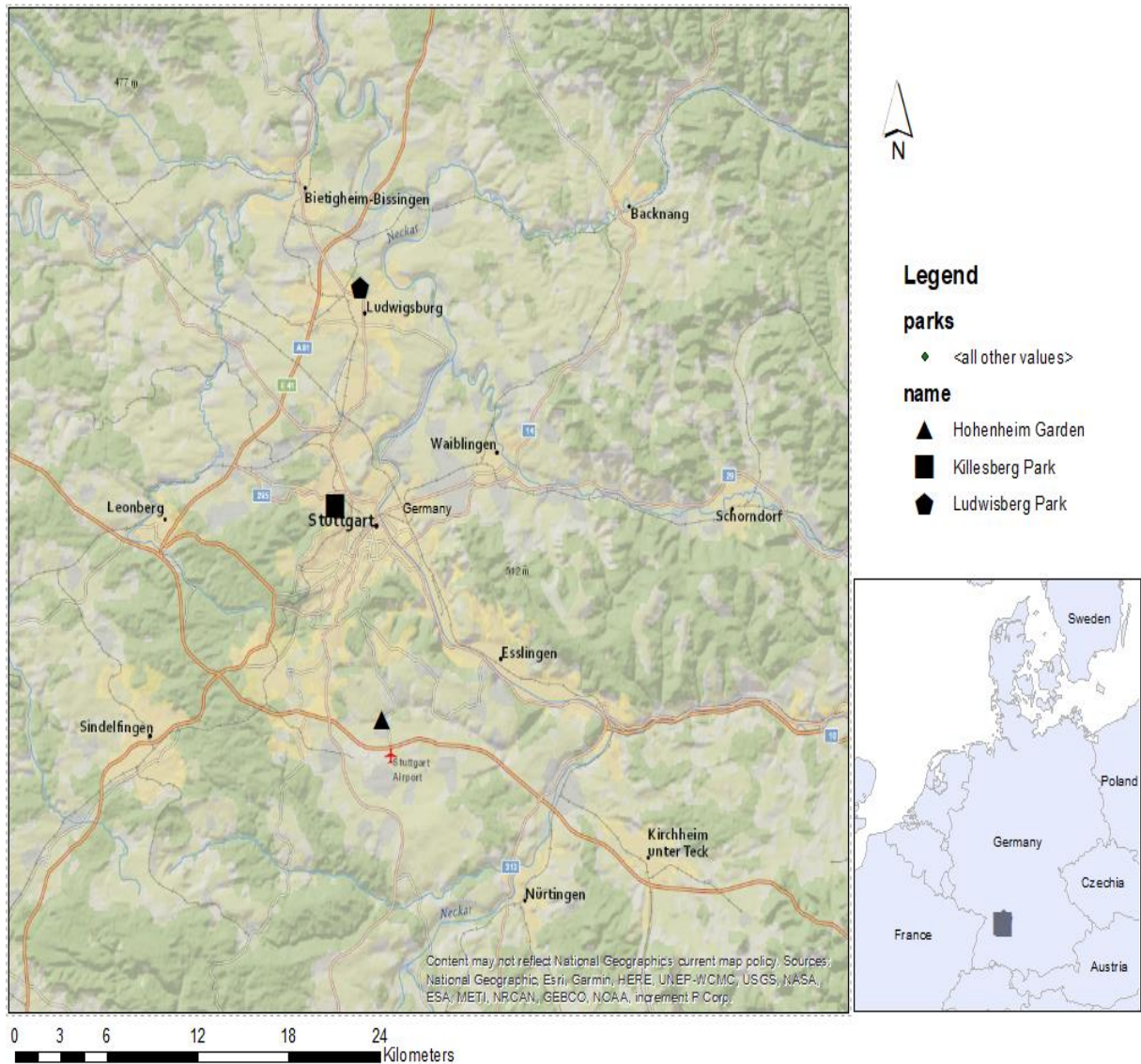


Figure 6: Location of the study areas (Hohenheim Garden, Killesberg Park, and Ludwisburg Park)

### 3.2.1 Killesberg Park

The Killesberg Park is an urban public park of half a square kilometer. It is to the north of Stuttgart. Designed in 1939 by the architects Hermann Mattern and Gerhard Graubner for one horticultural show. Killesberg is about 50 hectares which lie in the district of Stuttgart Nord (district Killesberg) which is the capital of the state and forms part of the green U (U-shaped green corridor eight kilometers long in Stuttgart) as well as adjoins the Warberg in the eastern part and Rote Wand in the south. In 2012, the Green Fugue (green joint or interconnected green spaces see figure) on the surfaces of the previous trade fair has been

part of Hohenpark. Killesberg originally used as a quarry, but the abandoned terrain was redesigned according to plans of landscape architect Hermann Mattern to park and exhibition grounds. In 1941 the site was a gathering place for the Jewish citizens from the Württemberg and Hohenzollern for the concentration and extermination camps. 2,000 Jewish fellow citizens "who, during the period of disaster in 1941 and 1942, have a stone as a memorial to commemorate their death and the ordeal that took place at the extermination camp(DER KILLESBERG – Ein Volkspark und seine Geschichte). The park became a scene of other horticultural plants exhibition after the Second World War (DER KILLESBERG – Ein Volkspark und seine Geschichte page 3). German Garden Show in 1950 was the first postwar garden show in Stuttgart and also planned and realized by Hermann Mattern. The German garden show was followed by the Federal Garden Show in 1961 for the first time in the upper and middle castle garden and at that time the first federal horticultural show in Baden-Württemberg. The Höhenpark was re-established as an exhibition area and in 1993 it had its first International Horticultural Exhibition. Ever since Killesberg forms part of Stuttgart's green u (U-shaped green corridor eight kilometers long in Stuttgart). In October 2007, the new fair adjacent the old fair was dismantled which was completed in 2009 December and afterward the city Stuttgart has invested an amount totaling 7million euros for the new construction of the Killesberg park which approximately covers 10 hectares (DER KILLESBERG – Ein Volkspark und seine Geschichte page 7). A ten-hectare park area green spaces joined to each other or interconnected green spaces (green fugue) has been created and opened in May 2012 found by city authorities. They expanded the amount Park and The Green U layout paths which are inspired by quarries and irregularities and making way for a gentle meandering pattern taken as one ascends the gentle side of streets the intersects the park (landezine.com)



Map of Killesberg park (source :runmap.net/)



Figure 7: The green fugue (Source: rainerschmidt.com)



Figure 8: Relief cuboid with horses. The birdbath in the form of a sandstone cube with four horse reliefs was erected on the occasion of the Reichsgartenschau 1939 ( Source: stuttgart.de).



Figure 9: Commemorative Stele "Sammellager": The granite site with a bronze inscription was erected in 1962 to commemorate the deportation of Jews from Württemberg (Source: stuttgart.de).

### 3.2.2 Ludwigsburg Park (Favorite Park)

The Ludwigsburg garden is situated about 12 kilometers (7.5 miles) north of Stuttgart city center, near the river Neckar. Ludwigsburg Palace is surrounded on three sides by gardens with a total area of 30 hectares. Ludwigsburg is roughly 72- hectare and fully confined Favorite Park is situated at the north of the city center of Ludwigsburg. The name Favorite Park came into existence because the park is surrounded by Favorite Castle and was once used as a pheasantry. The main entrance borders directly on the Blooming Baroque (The gardens' surrounding the Royal Palace) in the south, separated only by the Marbacher Straße, which is crossed by a pedestrian bridge as shown in figure 8. An additional entrance is located in the northwest of the park in the immediate vicinity of the S-Bahn stop *Favoritepark* on line 4. A third entrance is in the east of the park in the district Hoheneck. Despite the fact that, the park leads from the south entrance to the entrance in the northwest the central axis of the Wilhelmsallee past the favorite castle.

Formerly communal forest, also called Mönchwald, around the forest area of the park, was used from the Middle Ages till the beginning of the 18th century for the acorn mast (corner Rich) of livestock, particularly domestic pigs (blueba.de). The cattle were eating the fruits of the trees and at the same time compact the soil. Consequently, it became very difficult to see any young trees grow in the area of the acorn mast. Subsequently, the area deteriorated by the constant browsing and leads to nutrient deficiency to a wood pasture. Duke Eberhard Ludwig hunting enthusiast had the forest fenced in 1707 to build a pheasantry and it ended the use of the forest as pasture. As a final point, the Duke had the hunting and pleasure palace built Favorite in the years 1717 to 1723 (stuttgart-tourist.de/en). In 1806 the first king of Wurttemberg Duke Friedrich II had the park turned into zoo comprising of animal such as fallow deer, chamois and soon after got stag after his ascension to the throne (stuttgart-tourist.de/en). The interior of the small palace was redesigned by architect Nikolaus von Thouret and subsequently, the favorite place was opened to the public in 1983. This guaranteed that the young trees and fruits were eaten again and conserved the pasture, forest character with the non-existing under story to this day.



Aerial photo of Ludwigsburg park (source: luftbildsuche.de )





Figure 10: Layout of Ludwigsburg park (Source: stationedingermany.com)

### 3.2.3 Hohenheim Castle Park or Garden

In 1772 to 1793 the Duke of Württemberg Carl Eugen extended the Garden of the estate and established new prestigious castle Hohenheim and the engineer behind the edifice was Master Reinhard Ferdinand Heinrich Fischer ([uni-hohenheim.de](http://uni-hohenheim.de)). The park was like an old botanical garden which was created by the Höhere Forstliche Lehranstalt (Higher Forestry Institute) in 1829 directly in front of a building for the educational purpose. Prior 1829, the entire schlossvorgelände (closed pre-landing) in the south was barely large trees and only low hedges, as well as potted plants, lined the paths that were transplanted with a 30 to 50-meter wide strip of wood ([gaerten.uni-hohenheim.de](http://gaerten.uni-hohenheim.de)). Sequel the establishment, the garden contained many tree species and herbaceous (krautige) plants, amid them many

useful plants, which were transposed in the course of the establishment of the south development of a new botanical beginning from 1974 exempting woody plants. In recent time the later baroque castle surrounds itself with many magnificent woody plants, including sequoias, the yellow flower magnolia, a wingnut, and the ginkgo and giant trees (gaerten.unihohenheim.de). The castle park, which is a home to Hohenheim university which was established 300 years ago (1818) as an agricultural teaching, experimental and musteranstalt school (pattern institution) by King William (uni-hohenheim.de). It has also become an arboretum, whose plants are all signposted and also intertwined paths along the lawns as well as the meadows.



Aerial photo of Hohenheim Castle Park or Garden(uni-hohenheim.de)

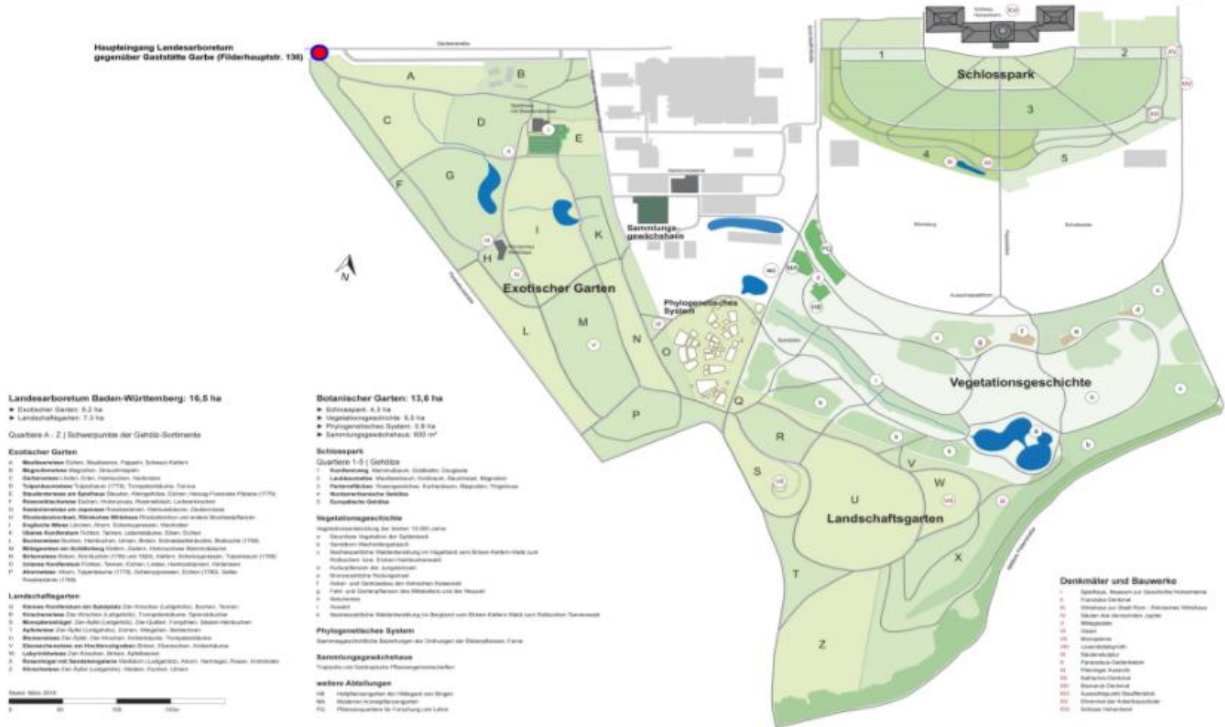


Figure 11: Layout plan of Hohenheim garden or castle park (gaerten.uni-hohenheim.de)

### 3.3 Research Strategy

The research strategy employed in this study is in the format of comparing the difference in benefits and values derived from parks across three parks. This gives a better context to the study and the focus on a specific study area that allows for the specific evaluation of variables such as gender, park and age groups. The comparison gives a better background to what is actually on the ground, taking into consideration group dynamics and social-economic characteristics of the respondents across various parks. These are regular people who visited the park for their amusement and their views were sought after with regards to feeling and connection towards the parks.

### 3.4 Materials and Methods

#### 3.3.1 Sources of data, information, and procedure

Data were collected within the month of June 2017. The basic source of information for this research is primary data and the primary data was collected by me and two other friends

(Enrique Bargueño Ariza and Akbarjon Khamraliev). The data were collected by using simple open-ended interviews by using guided questions. Respondents were approached and the import of the interview was mentioned before asking each and every person the same kind of question. The response was recorded by audio and by note-taking. The Interview was conducted in both English and German. The German interview was done by Enrique Bargueño Ariza and I took care of the interview done in English. The third person handled the note and at the same time taking the audio recording. The audio recording was transcribed so that we can compare it to the notes taken and also be able to do content analysis. All the data, information collected was then coded into a spreadsheet. In all, 89 different items were mentioned by the respondents from various parks and out the 89 it was condensed to 21 items. The condensation was done in such a way that items that have the same meaning were put in the same category. For instance nice looking, good looking and beautiful fall under the same category beauty. This data was analyzed based on age groupings, gender, salience, mean rank and topmost items. However, further comparisons were made across gender, age groups, and items. Notwithstanding, comparison of the data and research from other articles, research, books, and journals related to the subject matter in this study. In each park minimum of 32 people were approached randomly and interviewed. The interview, conducted was to ascertain the value and the benefit they receive from the park and also the environmental functions associated with places as well as landscape elements perceived by the community and local residents. The question survey questions used refer to page sub heading survey question on page 48.

### **3.5 Data collection instruments and techniques**

The technique used to collect the data is free listing and photovoice. Free listing is a technique used to elicit information from people in a certain cultural domain or a locality which are predominantly based on different kinds of knowledge. The interview was carried out in three different locations, namely Killesberg, Ludwigsburg and Hohenheim castle parks. In each park some of the items mentioned by respondents were repeated on countless occasions by different respondent. Despite the repetition the combination of freelisting and photovoice approach were able to bring out a lot of very good information. Respondent provided very significant information that contributes to human wellbeing, value, and benefit. However, this technique (Freelisting) has been carried out by a lot of researchers in

their studies, for instance, Rodríguez et al. (2006), conducted free listing interviews in local communities to ascertain how they identify and value good and services. In another vein, Bernard (2002:, 285) in his classical methods made it clear that there are valuable insights provided by study with free listing interviews where people were asked “What are the things that make life good around here?” and he ended that, “The free list techniques has many uses and researcher use it a lot.” Photovoice is a research method that is used in the early 1990s to describe the way of a mixing narrative with photographs to explore community issues, express how you feel towards historical foundation of individuals or belong to the communities mix up images and words to express their needs, history, culture, problems, and desires (Wang & Burris, 1997). In my approach, the method was improvised in a way that, set of pictures was sent to show it to the respondent to express the feeling towards it. Simple semi-structured questions were used during the interview to extract information on the benefit and the values each respondents receives from the services the park offer. Also, a set of the photo was presented to them to determine the environmental functions associated with places and landscape elements as perceived by the community, local residents or land users. This was done in each park showing photos of the other two parks to determine why they will prefer to go to park A instead of B or C. The survey questions used in the interview was designed in relation to the primary and secondary objectives of the study. Using the free listing procedure each respondent was asked to list freely what benefit and value they derive from the parks. The respondents were placed under three different age bracket which will be displayed on the table as well, but age 1<sup>st</sup> is from 20 to 30; age 2<sup>nd</sup> group is from 31 to 40 and age 3<sup>rd</sup> is from 41 upwards. The analysis was done by using a t-test, mean rank, charts, mean rank salience, and graphs.

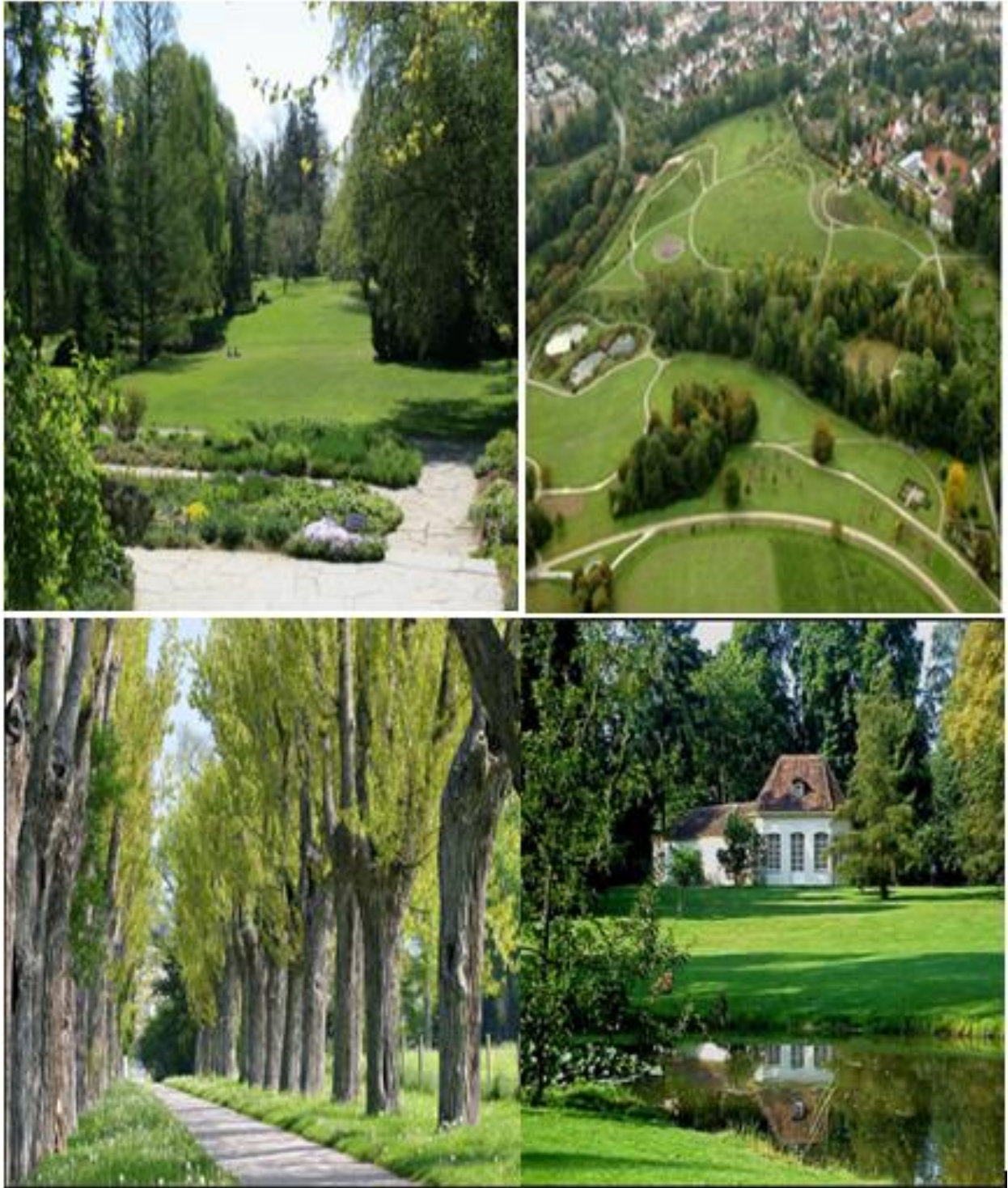


Figure 12: Picture sample one from Hohenheim gardens ([uni-hohenheim.de](http://uni-hohenheim.de))

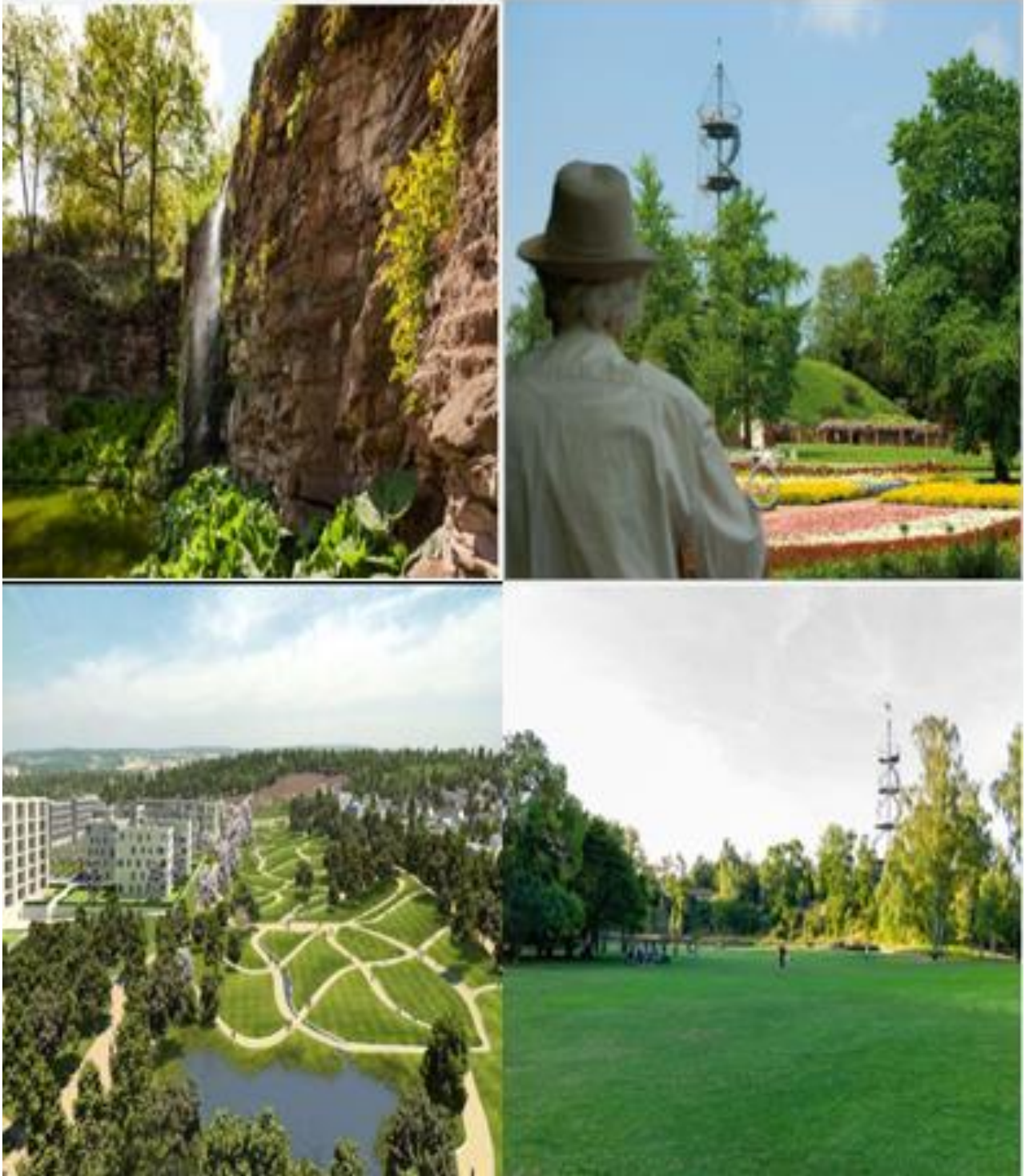


Figure 13: Picture sample two from Killesberg Park (stuttgart.de)



Figure 14: Picture sample three from Ludwigsburg (blueba.de)

### 3.6 Survey question

- What values do you receive from this park to you?
- What kind of benefit do you gain from the park?
- What kind of services do you receive from the park?
- Why have you chosen this park and not the other?
- What improvements can be done?
- Which of these pictures do you like or you can choose your favorite picture that brings memories to you?



## CHAPTER FOUR

### RESULTS

This chapter presents the results of the user survey and analyses the data obtained. The primary data obtained from the three parks will be presented in a table and analyzed based on the goal and the objectives of the research. More in-depth presentations of the results are discussed under various headings provided in this chapter.

#### 4.1 Rate of response

The rate of responses from the respondents differs from park to park. At the parks (Hohenheim castle park), we have to approach a lot of people to get at least 32 people to respond to the interview. Most of the students who are supposed to understand the essence of the interview have to decline and give a flimsy excuse. 51 people have to be approached to ascertain 32 respondents, but contrary to the other study areas they were more responsive and 37 and 34 respondents, responded to the interview at Killersburg and Ludwigsburg respectively.

Table 3: Response from the study area

<b>Study area</b>	<b>No of respondent</b>
<b>Castle Park</b>	<b>32</b>
<b>KILLESBERG PARK AND</b>	<b>37</b>
<b>LUDWIGSBURG PARK.</b>	<b>34</b>
<b>Total number of respondents</b>	<b>103</b>

## 4.2 Overall results

The study accumulated a lot of response from the respondents and in the aggregate the entire items mentioned by the respondents to express their views with regard to cultural Identity, heritage, aesthetic values, inspiration, spiritual value, religious values, recreation, and tourism. In the entire data collected, the respondent mentioned 89 different items which have to be condensed into 21. For instance, in one breath the respondent used the word calm to represent how quite the park is and on the other hand, another respondent will use peaceful and tranquil. These attributes were used by the respondents to express how the park contributes to their benefit and well-being. Table 2 below displays the items ascertained from the respondents during the interview. Additionally, the table displays the most mentioned items, that is easily accessible, followed by the garden as well as well as flowers, beauty, tranquility and it follows in that rank of responses to the least open space for activities. From the table 39 respondents, one way or the other mentioned how easily accessible the place is. On the other hand, 34 of the respondents admires the garden and the flowers, whereas 33 of the respondents both mentioned how beautiful and tranquil the parks are. Table 3 shows 21 items with the highest salience across all the respondents, covering a wide range of concerns that refer to ecosystem activities, perception, value, and features. The most salient items are easy accessible, gardens and flowers, beauty, tranquility, naturalness and nature, unspoiltness and integrity, free entry and membership, historical monuments, walking, memories, recreational and relaxation and it follows on to the least salient item that is water bodies. The most mentioned item was easy accessibility and the least mentioned item was water bodies and parking accessibility.

Table 4: Condensed items mentioned by respondents.

Items	Male	Female	Age Group 1	Age Group 2	Age Group 3	Total	% of respondents
Easy accessibility	20	19	16	17	6	39	37.86
Gardens, flowers	18	16	10	16	8	34	33.00
Beauty	17	16	12	13	8	33	32.03
Tranquility	17	16	9	12	12	33	32.038
Naturalness, nature	15	15	14	7	9	30	29.12
Unspoiltness, integrity	13	14	10	7	10	27	26.21
Free entry, membership	13	14	6	12	9	27	26.213
Historical monuments	10	12	9	9	4	22	21.35
Walking	10	11	6	9	6	21	20.38
Memories	10	9	7	5	7	19	18.44
Recreational, relaxation	9	9	6	7	5	18	17.47
Shade	8	9	4	8	5	17	16.50
Diversity, variedness	8	7	5	7	3	15	14.56
Food	8	6	3	3	8	14	13.59
Views	8	6	5	5	4	14	13.59
Cultural offer	7	5	4	4	4	12	11.65
Greenness	7	5	2	6	4	12	11.65
Impressive	7	5	6	3	3	12	11.65
Parking accessibility	6	5	2	4	5	11	10.67
Water bodies	5	4	2	3	4	9	8.73
Open Space for activities	5	4	1	4	4	9	8.73

Table 5: Percentage of respondents mentioning, mean rank and salience for 21 items with the highest salience

Items	% of respondents mentioning	Mean Rank	Salience (Sutrop index)	Rank Salience
Easy accessibility	40.17	1.38	0.2735	1
Gardens, flowers	35.02	1.56	0.2118	2
Naturalness, nature	33.99	1.52	0.2115	3
Tranquility	33.99	1.58	0.2033	4
Beauty	30.90	1.60	0.1820	5
Walking	27.81	1.78	0.1475	6
Unspoiltness, integrity	27.81	1.85	0.1416	7
Historical monuments	22.66	1.27	0.1678	8
Recreational, relaxation	21.63	1.24	0.1647	9
Diversity	19.57	1.47	0.1252	10
Food	18.54	1.56	0.1123	11
Memories	17.51	1.82	0.0905	12
Shade	15.45	1.73	0.0840	13
Free entry, membership	14.42	1.71	0.0793	14
Views	14.42	1.93	0.0705	15
Green	12.36	1.92	0.0608	16
Cultural offer	12.36	2.08	0.0559	17
Open space for activities	12.36	2.25	0.0518	18
Impressive	11.33	2.09	0.0511	19
Parking accesibility	9.27	2.11	0.0414	20
Water bodies	9.27	2.33	0.0374	21

### 4.3 Contrast among age groups and gender

From table 2 above, the respondents mentioned a lot of items, but the most mentioned item was easy accessibility. 20 respondents were male and 19 females with regards to that attribute. Also looking at the attribute beauty, tranquility, naturalness, unspoiltness, 17, 17, 15, 13 males mentioned those attribute and 16,16,15,14 female did the same respectively.

Among the age classes out of the five topmost items mentioned by the respondent's, age group two highly placed their attributes to easy accessibility gardens, flower's beauty, tranquility naturalness, nature, followed by the age group one and three correspondingly. Most of the respondents from different age classes mentioned attribute that has linkage to their benefit and service they derive from ecosystem service be it food, water bodies, historical monument and etc. It was evident from the data displayed in table 2, that there is a significant difference in how male-female relish attributes with regards' to landscape value, benefit and well-being derived from ecosystem service. This difference in gender was ascertained by using the t-test to compare the significant variance. The T-test calculated evidently displayed that the P (T<=t) of the one-tail value is 0.002285924 at 0.05 significant level. Conversely, with regards to the age classes T-Test (that is the two paired Sample Means) was calculated to compare the difference in age group with regard to the items mentioned by respondents in a different age group in the manner displayed below. In age group, 2 by 1 the t-test at 0.1 significant levels did not show a significant difference in the items mentioned as well as 1 by 3 but age class 3 by 2 showed a significant difference in the items mentioned between the different age groups.

Table 6: Comparison across age groups

Test	One-tailed t-Test:	
	Test	Significant level
Age G 2 by 1	0.146958383	at 0.1 significant level
Age G 1 by 3	0.257082958	at 0.1 significant level
Age G 3 by 2	0.075595839	at 0.1 significant level

#### 4.4 Comparison across parks

From the table 5 below listed ten selected items mentioned by the respondent during the face to face interview from each park. From the table, the item labeled easy accessibility out of the consolidated table; Ludwigsburg had 38 % out of the total number of 39 respondents and Ludwigsburg and Castle Park attaining 32% and 30% accordingly. In terms of historical

monuments, 22 respondents mentioned that item and Killesberg had 48% of the respondent attributing their coming there because of historical reason, whereas Ludwigsburg and castle park scoring 22.7% and 27.3% on that item. With regards to diversity, since the castle park is part of Hohenheim university, most of the respondents from the school mentioned that item, premise on that fact that the school uses some part of the park as a learning area and ensure that more varied species are brought to the garden for learning purpose. 48.1 % of the respondents tallied, made the castle park more diverse than Ludwigsburg (23 %) and Killesburg (23 %). Making reference to the items shade, garden and flowers, out of 19 and 34 both Killesburg and castle park out of the tallied response had higher percentages to the other park. The details of how the parks performed on each selected items mentioned by the respondents have been displayed on a chart and a table below.

Table 7: Represent a tallied response on items.

Items	Respondent %		
	KILLESBURG	LUDWIGSBURG	CASTLE PARK
Easy accessibility	32	38	30
Historic monuments	50	22.7	27.3
Shades	35	33	32
Diversity	28.9	23	48.1
Garden and flowers	30	25.4	44.6
Tranquility	37	28	35
Greenery	45	22	33
Scenery	31	37	32
Memories	55	19	26
Recreation and relaxation	24.5	52.5	23

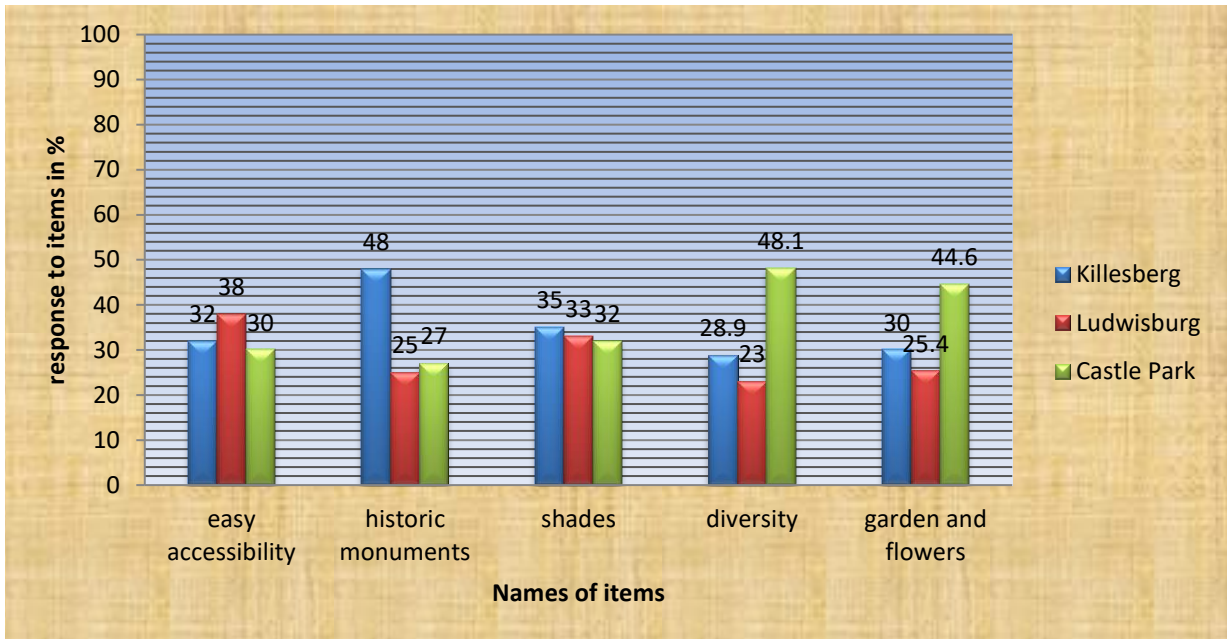


Figure 15: statistics of randomly selected items represented on the bar chart

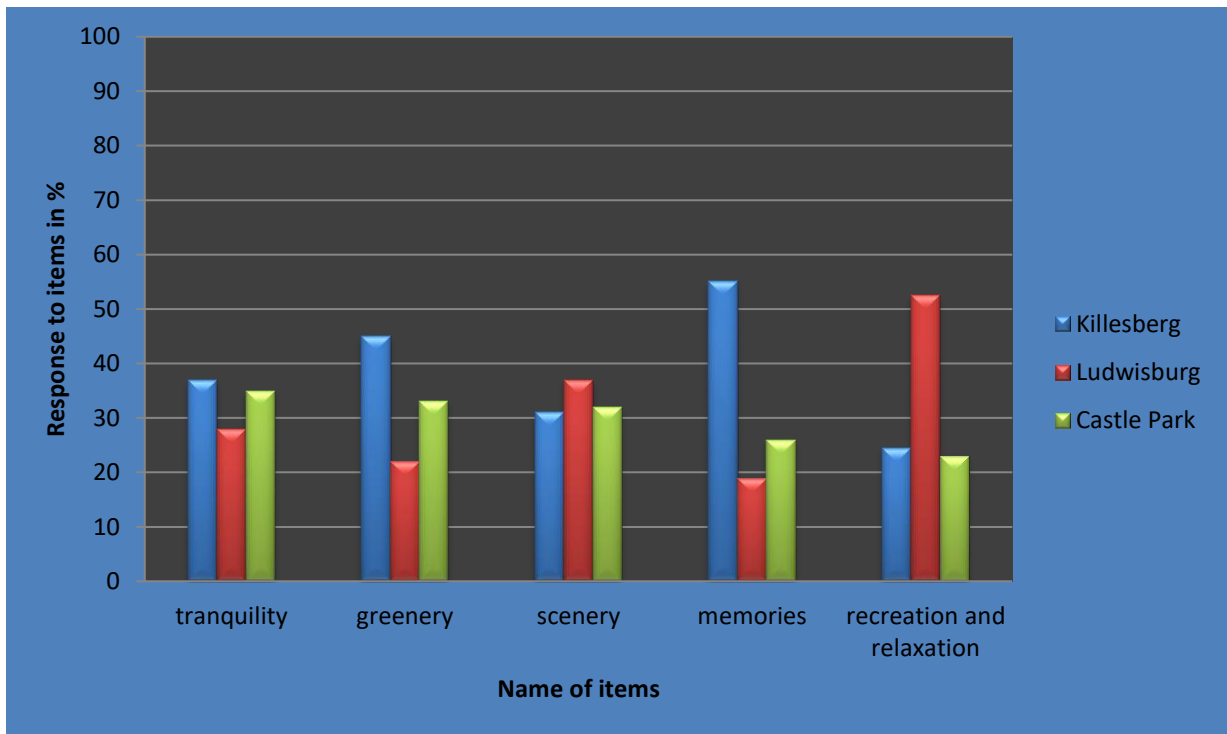


Figure 16: statistics of randomly selected items represented on the bar chart based on a unique character of how some people perceive how the park should be and look like. With these items, Killesberg had a higher percentage score in 3 of the attributes (tranquility, greenery, and memories) and Ludwigsburg also having a higher score in the other two (scenery, relaxation and recreation).

#### **4.5 Derived benefit Ecosystem Services**

Millennium Ecosystem Assessment (2005) report Approximately 60% (15 out of 24) of the ecosystem services evaluated are being degraded or used unsustainably. The report further points out that economic values depending on ecosystems Agriculture is 50% of labor force worldwide and 24% of GDPs(gross domestic products) are in low income developing countries. A. Vemuri and R. Costanza (2006) explains the role of human, social, built, and natural capital in explaining life satisfaction at the country level: toward a National Well-Being Index (NWI). They further articulated that the value of ecosystem services per km<sup>2</sup> is an important factor in explaining life satisfaction at the country level and together with UN Human Development Index -can explain 72% of the variation in life satisfaction. The services ecosystem provide one way or the other are intertwined together looking at how the people responded and related to the benefit they derive from it. Form the interview of 89 respondent's, 78 responses received from the interviewee can find its place in the service extracted from ecosystem services (cultural Identity, heritage, aesthetic values, inspiration, spiritual value, religious values, recreation, and tourism.). The 11 accounts for the extra effort, humanity make to turn around what nature has provided us to derive additional things such as physical fitness, conviviality, partying as well as the green fugue (green joint or interconnected green spaces), the tower as shown in figure 13 in Killesberg park and the train for children. From the condensed table generated 72 percent of the name attributes relates to cultural service, leaving the 23 percent to both regulating (the benefits obtained from the regulation of ecosystem processes) and provisioning services (the products, people obtain from ecosystems; may include food, fresh water, timber, fibers, medicinal plants (Millennium Ecosystem Assessment 2005). The 5 percent relates to the relationship that is predominantly immaterial (e.g.memories)

#### **4.6 Valuing the service**

*The U.S. Department of Agriculture Secretary Mike Johanns (2005), makes a statement that "I see a future where credits for clean water, greenhouse gases, or wetlands can be traded as easily as corn or soybeans"* Putting a price on nature creates exchangeable commodities and puts conservation policies at the core of neoliberal economic thinking. Many ecosystem Services can't be assessed in economic terms, especially cultural ecosystem Services.



Payment schemes drive attention to a single service and may blind out other services and trade-offs. Sometimes the difficulty of a just acknowledgment, of placing an economic value from different stakeholder perspectives, particularly regarding contested values and property rights (e.g. Landowners as ecosystem service ‘providers’). But be it as it may, there should value attached to services received from nature. Most of the respondents really appreciated what nature has given and are willing to pay a levy or price for the sustenance of the parks. For instance, in Killesberg, ancillary services are being provided on a fee basis, such as the train (for kids) and a voluntary fee collected for climbing the tower. On the contrary, in Ludwigsburg, you are required to pay a fee to enter the park and most of the residents around have a membership that allows them to pay a premium to access the facility. This payment service allows maintenance and regulating the access which will enhance the longevity and upkeep of the parks. Some of the respondents complain about the green nature of the park, are not properly maintained and others call upon authorities to bring more seats to allow visitors to rest. From the condensed table on page 51, the age group 3 that is people from the ages of 41 and above are of the view that the parks should be properly maintained and it will serve as a bequest value that will be bequeathed to future generations.

Conversely, most of the respondent agrees that the accessibility of the park to others in the present-day generation, every now and then is very vital and they are willing to pay for the protection of parks, through contributions. Valuing ecosystem services primarily is based on payment of ecosystem services. These services can be in a form of voluntary or conditional agreement enacted between a seller of the service and a buyer of the service. For instance, Maramures project (Romania) has a problem of unregulated tourism and lack of funding for protected areas. This project aims at supporting biodiversity conservation and cultural values of protected areas as the main priority. The main idea behind the project is landscape beauty / traditional land use. In order to sustain the project, demonstration and promotion of payment of ecosystem service as well as other sustainable financing schemes in the Lower Danube river basin (Romania, Bulgaria) are put in place which is the establishment of a fund (managed by local association) for allocating financial resources in equal proportion to nature conservation and development needs associated with ecotourism. (panda.org)

## CHAPTER FIVE

### DISCUSSION

This study has attempted to identify the services provided by different man-made ecosystems by conducting both open-ended interview capture the meanings and environmental functions associated with places and throughout the different landscape elements as perceived by the communities, local residents, and land users. This research was carried out in Stuttgart, Ludwigsburg and Hohenheim suburbs of the Baden Wurttemberg state in Germany. The combination of the photovoice and free listing approach provided enormous and germane data on valuing biophysical features, in a manner of landscape engagement with the perceived benefits and value. This research triggered thinking of respondents and attracting their attention as well as allowed us (Enrique, Akbar and me) to ask follow-up questions for them to answer and then discuss the strengths, concerns they face, complimenting non expert ecosystem service assessments, promoting wider community engagement and empowerment through comparisons across different sites and across different respondent groups (socio-demographic, cultural background). The research, based on the comparison of age groups, parks, and gender showed that some of the results were statistically significant and others not significant. These results will be discussed further in paragraphs below.

This study found out that the difference among age groups and gender falls contrary to the facts attached to landscape challenges from the millennium ecosystem assessment point of view which propose that the link between cultural ecosystem services and human well being inclined to be comparatively weak (Millennium Ecosystem Assessment, 2005). This study provided two statistically significant and two not significant, but on the overall comparison between gender which encompasses all the age groups. The statistic proves significant ( $P(T \leq t)$  one-tail 0.002285924) at 0.005 significance level. Nevertheless, Daniel et al, (2012) described in general characteristic of European cultural landscapes as the outstanding role of cultural services over other ecosystem services, but Schaich et al., 2010 describes it to be characteristics that are essential for the appreciation of beautiful scenery. Well being of humanity, be it significant or not, statistically stretches across ecosystem services provided to mankind as MacDonald et al. (2013) juxtapose out the petite acknowledgment of other types of benefits receives from regulating services, may reveal a

lack of understanding of these functions rather than a discord in values. Meanwhile, from the research conducted, from various parks and the response put together from the respondents' views, points out to the fact that benefit and value may accrue differently to different participants at another spatial scale (Martín-Lopez et al., 2009) in which this accession is strongly supported by Hein et al. (2006). Human satisfaction differs from person to person, but looking at a larger picture, people who fall within age group have common taste and preference as to how they relish and value things. It is common to identify age groups or contemporaries within the same age bracket have a similar taste for particular value or benefits or material things to satiate the appetite. These things really matter and satisfying a human need or want may not just be a figment of human imagination but rather a necessity of life. This accession is parallel to the results Stedman (2003) and (Vemuri and Costanza, 2006) to a larger scale inquiry on factors that elucidate life satisfaction at the country level, highlighting a particular role for natural capital.

A key element of human well-being is dependent on the benefit received from ecosystem services. The ecosystem serves as a life support and the human reliance placed upon it as a focal point of mankind's existence. The research found 78 responses out of 103 respondents (75.7%) mentioned items that, benefit derived from ecosystem service. Cultural services dominated the response, whereas regulating and provisioning service fall into the later. Though the response stressed on cultural service may waver or differ based on ideology, but further developments of the ecosystem services framework provided by CICES (Common International Classification of Ecosystem Services) Version 4.3 (EEA, 2013) are quite helpful to overcome some of the problems, predominantly in terms of a solid acknowledgment of the part of activities for cultural ecosystem services. Recreation and relaxation which do not fall within the framework, but was mentioned 18 times are found difficult to distinguish the relationship between the practical use of an ecosystem which can one way or the other connect several activities. In another vein, the Millennium Ecosystem Assessment, which is identified on their classification list can somehow be an indicator but not visibly connected to any concept of CICES in the categories (class, group or division). In connecting ecosystem benefits to human well-being, is difficult because it differs from concept to concept, in capturing related benefits and values received from the landscape, especially emotional feeling that can not be seen but listed under cultural ecosystem service.

Conversely, it was stated by Busch et al. (2011) that there are difficulties in connecting the concept of ecosystem benefits with well-being. An article published by Chan et al. (2012) realign and provide alternatives for the classification of ecosystem services considering the deficiencies through an affirmative way and recent journals as well as studies done by Daniel et al., (2012); and Martín-López et al., (2012); Raudsepp-Hearne et al, (2010) provides a different view of rethinking the packages (putting together the complete landscape related values and benefit to human) instead separate and individual services. The concept of services provided by an ecosystem is not acknowledged sufficiently based on values, benefits and in a way that it may terminate the connection amongst the well being of human and nature. Consequently, biophysical structures may offer them, but there may be a distinction, essentially between the components and the determinants services of human well being which does not fall in line with views and way of reasoning of the *connoisseurs*. Social processes support ecosystem services critically (Ernstson (2013). Despite the fact that basic human needs and wants derived from the ecosystem over-stretches its support to mankind such as urban sprawl, overconsumption, etc., however, ecosystems stays resilience to continually mimic their original function. Smith (2006) puts this into the perspective with a vivid description of heritage values which is seen as a manner of procuring with the logic of history, instead of it being more rooted primarily in a certain set of characteristics. Most of the attribute received from the respondent largely fall within the domain of the cultural services which in a way are parallel with most of the thought, of many of the articles and studies published thus far. They have their roots and connection as well as correlate with the relationship that human have with Mother Nature. The linkage between man and the quest for deriving benefits of ecosystem services makes it evidently clear that all items derived from the respondents are intertwined to ensure human wellbeing.

Based on the results accrued it's evident that the study site Killesberg park produces a little more respondents than Ludwigsburg and the Castle Park. Out of the 103 respondents, Killesberg had 37 and Ludwigsburg had 34 as well as Castle Park 32 respectively. There are many factors that propel people to spend their time in the parks. Most of the respondents I interviewed alluded to the fact that the accessibility of the park in relationship to where they lived informed their decision to visit a particular park instead of choosing to visit one of the other parks. The influx of the people in Killesberg was more than the people in both

Ludwigsburg and Castle Park. The reason for that was centered on the playgrounds for children and coupled to the train that carries most kids make it more lively for families to spend their time in such place. Earlier studies by Cohen et al., (2006); Kaczynski et al., (2009); Kaczynski et al., (2014), and Kaczynski et al., (2016) confirm that despite that fact that the number of parks may be close to one's home accessibility will be related to various types of features and physical activity present in the park. At Ludwigsburg Park, most people interviewed were elderly folk who relishes the monumental figure on the park and some added that they have a membership card that allows them to visit the most times. In the Baden Wurttemberg states, there are a lot of parks that are created based on reasons, but proximity to residents and its environs is a key factor. The preference of a respondent to a particular park to the other is dependent on the kind of fun the person wants to have and the emotional attachment to the park. Ekkel and De Vries (2017) maintained that the chance to access a park, be it private or public and engage in preferred events are premised on that fact that there are better significance in what you want to do there than the distance to the park which in a way is parallel to what some of the respondents are saying. For instance, during interviews conducted in the Castle Park, most students interviewed pointed out that they visit the park for relaxation, scenery, shade and the greenness of the lawns which gives them the ambient condition to relax, reflect and study. Information gathered from the other parks was not entirely different, but rather was expressed in a different sentiment and views. Sugiyama et al., (2010) in their research made it clear that having an attractive park be it large or small which have green space nearby, historic monuments, recreational walkways may inure to the benefit to all sundry be it adults or children for their physical fitness, relaxation, and conviviality. Finally, the underlining factor in this section may be attributed to a lot of factors enumerated in table 2 (page 51) displaying the items based on hierarchy pronouncement made by the respondents from various parks; easy accessibility is the major issue to all respondents across the parks. Parks may be beautiful and have all the necessary aesthetic value, but if it's not accessible, it becomes a social liability. On the score of 100 and out of 39 respondents with regard to the attribute easy accessibility, Ludwisburg scored 38 percent, whereas Killesburg and castle park scoring 32 and 30 correspondingly. This proves to the fact that the attribute easy accessibility is an essential item. This confirms studies conducted in Australia in 2015 by Wang et al (2015), put accessibility as a most

important factor perceived to urban parks remained physical and location features such as nearness to the park, enjoyable walkways and a sufficient number of parks clustered in the neighborhood.

Human continued existence on earth is undoubtedly limited to the sustenance and the conservation of the ecosystem and in the bid to do that, it's critical that mankind's aim at ecosystem sustainability improvement and preservation that will inure to the benefit of human well-being. This objective cannot be accomplished without simultaneously guarding the earth's life-support system. Levin (2012) made it clear that, Sustainability denotes many things; it comprises the steadiness of financial markets and economic systems, reliable sources of energy, as well as of biological and cultural diversity. At the core, though, it must mean the conservation of the services that we derive from ecosystems.” Likewise, Perrings (2007) pronounced that “the main scientific challenge of sustainability is to learn the dynamics of complex coupled systems without compromising their ability to deliver the things that people value.” NRC report (1999) and Millennium Ecosystem Assessment report (2005) made a consistent view concerning the sustainability of the ecosystem. For the past two decades, there has been a consistent discourse in the academic circle, journal, article, and reportage on the term ecosystem services and how its utilization has been over-stretched. A report issued by Millennium Ecosystem Assessment report (2005) on services provided by ecosystem has thoroughly considered the vital connection between the general public, the environment and the creating of foundation idea in preservation, environmental economics, the ecology and management resource (Costanza et al., 1997; Daily, 1997; Perrings, 2005; Braat and De Groot, 2012; De Groot et al., 2012). According to Forman (2013) personal communication, it is vital that ecosystem service to human well-being is evident, therefore there should be an understanding of nature's ecological patterns, processes and changes are as essential in their own context. Be it that human population is a billion, hundred, one or zero. “Goods” and “services” are prominent in the current usage of the term, ecosystem services in provisioning service provides, food, raw material etc. to feed our industries and human. Human needs (i.e. well-being) depend on the environment which has been made clear by ecosystem service. Abraham Maslow's hierarchy theory that provides motivations and focuses on the growth stages of human needs and ecosystem services are connected

conceptually, and this correlation can be operationalized in practice (Dominati et al., (2010) and Wu (2013) see (Fig 17).

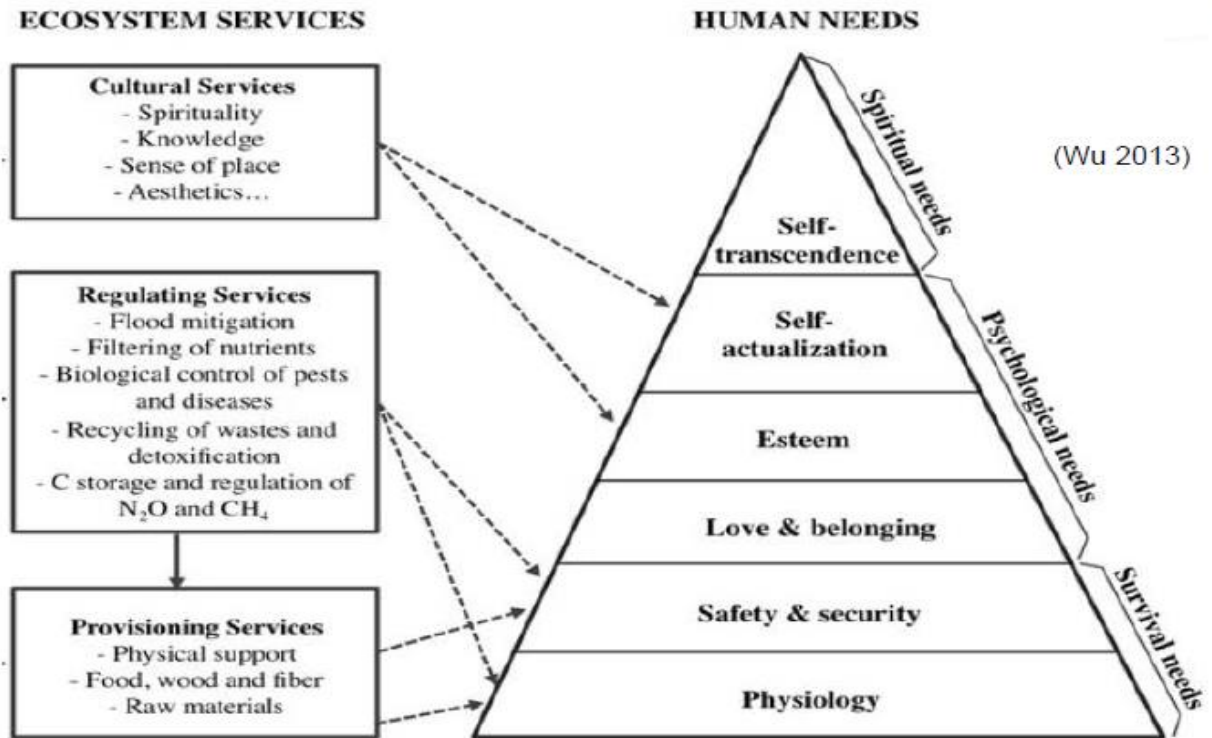


Figure 17: The relationship between ecosystem services and human needs (modified from Wu 2013)

Valuing of ecosystem service largely is in a form of payment of ecosystem services to its stewards. According Wunder (2007) payment of ecosystem service can be defined as the ‘Voluntary’, conditional agreement between at least one ‘Seller’ and one ‘Buyer’ over a well-defined environmental service or a land use presumed to produce that service”. The value of ecosystem services can be guided through the prioritizing system that will commensurate with its measures. For instance, DeGroot et al., (2002) projected the economic value of biomes globally and based on their analysis, prudential policies that would protect as well as conserve the highest values biomes comprising of coral reefs and coastal wetlands. The difference in value is the subject to the kind of service you are receiving from the steward or services from the biophysical structure you are visiting. From the research it obvious that service rendered to the respondents differ from park to park, but

to measure the value is on an individual basis. Sometimes it is intriguing to see how different people express their concern regarding the kind of service they have received and differently they place value on a service rendered to them. Some respondent places emotional value to the service gotten from Mother Nature and others seem to admire how well the stewards have preserved it. On a different twist, a typical example of the value placed on ecosystem service differently is that when Vittel (bottled water company), France whose main aim is a reduction in groundwater pollution. The ecosystem service provided here is the purification of water. Vittel pays above-market prices to purchase land around its water springs and sign contracts with farmers to use more improve farm facilities (CBD.int/financial). Another typical example is Pico Bonito Forests, Honduras whose main goal is plantation of native trees to capture carbon. The ecosystem service provided here is the climate regulation Mission-driven, a for-profit joint venture between investors and local communities. Carbon credits are sold through the World Bank's BioCarbon Fund to countries aiming to meet their carbon emissions reduction targets. Through payment of ecosystem, value has been placed on the service received from nature which goes a long way to address the essential human service need to survive on earth (forestcarbonportal).



## CHAPTER SIX

### CONCLUSION

The mechanisms that affect human biological health and well-being are so dynamic when people change their lifestyle. The success of a nation largely reflects on the most telling measures the country, city or state put together and it provides the potential of the most promising elements in its future. Safeguarding our future is reliant on how sensitive and responsive we are to all dimensions of ecosystem services and approach to solving lingering issues we design to achieve our highest potential for our wellbeing. The wellbeing of a human is not a random phenomenon, but a spontaneous process that allows humans to relish what he or she wants with regards to service received from the ecosystem. The time and era we live in are when science validates what humans have known throughout the ages: that compassionate benefit and values received from services deployed by the natural environment is not a luxury; but rather it is a necessity for human well-being, resilience, and survival.

This research has examined the difference in values and human wellbeing derived from ecosystem service in the city: a comparison across different users groups and three urban parks. The scale of one's preference basically allows a person to tabulate their personal needs, according to desire; benefit and value differ from person to person, but at a certain age class there are similarities with regard to the trending phenomena that will inform a decision on the choice of an activity one will like to engage in. The concept of cultural value or cultural service seems to be closer to human than the other services (provision and regulating service) but in terms of human well-being, a complete ecosystem service is needed. According to A. Vemuri & R. Costanza (2006), National Well-Being Index (NWI) is the human role, social, built and natural capital in the explanation of satisfaction of life at the country level. This national wellbeing index regularly moves in tandem with the personal well being index and are a strong predictor of life satisfaction. The value of ecosystem services per km<sup>2</sup> is an important factor in explaining life satisfaction in the country, city or state level and together with UN Human Development Index can explain 72% of the variation in human life satisfaction.

Z. Guo et al. (2010) mentioned that there is the Increasing dependence of humans upon ecosystem services and biodiversity. Humans become more dependent on ecosystem services in the course of a country's economic development, but the clear differences are reducing dependence on provisioning services, Increased dependence on regulating and in particular on cultural ecosystem services. The perplexing question is if humans are aware of this dependence or simply "take it for granted" that being in or near natural settings or phenomena makes them feel "better". When this dependence is out of balance, meaning that we feel unwell or unhealthy, do humans attribute this internal dysfunction of mental and physical health as a result of an absence of connections to nature, or as this thesis is suggesting – absence of services from key ecosystems?

In conclusion, the results revealed that there are differences in value and wellbeing of human across gender and a particular age class, but notwithstanding the paradox of the issue is that well-being is dependent on the quality of food services that we receive, which are increasing, and not on other services that are declining. Technology has decoupled well-being from nature and time lags may lead to further declines in well-being. Diversity makes it possible to select the kind of park that will satisfy your appetite dependent on your need or want. Therefore, in my view, it is relevant that there should be an alternative concept that allows humans to play a role in nature relation and have the possibility to be co-creators of ecosystem service. Based on that fact, I agree with the submission of Raymond et al. (2013) that "the origin of the living things of this world are our ancient relatives and that they must be treated with respect, and the islands, the salmon, and the living things can be called upon for help to survive in this life." Therefore it is incumbent on the world which ultimately has become a global village to raising of societal awareness of the value of ecosystems and nature, more comprehensive and systematic way of valuing ecosystems, new financing mechanisms for biodiversity and landscape conservation as well as support in decision-making be it land-use conflicts, landscape planning etc.

## REFERENCE

- Aerial photo 204104 The Residenzschloss and the Favorite Castle in Ludwigsburg in the state of Baden-Wuerttemberg: <https://www.luftbildsuche.de/info/luftbilder/das-residenzschloss-schloss-favorite-ludwigsburg-baden-wuerttemberg-204104.html>
- Arrow, K. and H. Raynaud (1986). Social choice and multicriterion decision-making. Cambridge, MA, MIT Press.
- Bernard, H.R., 2002. Structured interviewing: cultural domain analysis, in: Bernard; H.R. (Ed.), *Research Methods in Anthropology: Qualitative and Quantitative Approaches*, third ed. AltaMira Press, Walnut Creek, pp. 280-297.
- Bolund, P., and S. Hunhammar. 1999. Ecosystem services in urban areas. *Ecological Economics* 29:293-301. [http://dx.doi.org/10.1016/S0921-8009\(99\)00013-0](http://dx.doi.org/10.1016/S0921-8009(99)00013-0)
- B.O. Jansson, N. Kautsky, S. Levin, J. Lubchenco, K.G. Mäler, D. Simpson, D. Starrett, D. Tilman, and B. Walker, 2000: The value of nature and the nature of value. *Science*, **289**, 395–396.
- Bishop, R. (1993). "Economic efficiency, sustainability, and biodiversity." *Ambio* **22**: 69-73.
- Braat LC, de Groot R (2012) The ecosystem services agenda: bridging the worlds of natural science and economics, conservation and development, and public and private policy. *Ecosyst Serv* 1(1):4–15
- Busch, M., Gee, K., Burkhard, B., Lange, M., Stelljes, N., 2011. Conceptualizing the link between marine ecosystem services and human well-being: the case of offshore wind farming. *International Journal of Biodiversity Science, Ecosystem Services & Management* 7 (3), 1-14.
- Butler, C.D., Oluoch-Kosura, W., 2006. Linking future ecosystem services and future human well-being. *Ecol. Soc.* 11 (1), 30 (<http://www.ecologyandsociety.org/vol11/iss1/art30/>).
- Castle Park [https://gaerten.uni-hohenheim.de/bg\\_schlosspark](https://gaerten.uni-hohenheim.de/bg_schlosspark)

- Champ, P. A., K. J. Boyle, et al., Eds. (2003). A primer on nonmarket valuation. Dordrecht, The Netherlands, Kluwer Academic Publishers
- Chan, K.M.A., Satterfield, T., Goldstein, J., 2012. Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics* 74, 8-18.
- Cohen, D. A., Ashwood, J. S., Scott, M. M., Overton, A., Evenson, K. R., Staten, L. K., Catellier, D. (2006). Public parks and physical activity among adolescent girls. *Pediatrics*, 118(5), e1381-1389. doi:10.1542/peds.2006-1226
- Costanza R, d'Arge R, De Groot R, Farber S, Grasso M, Hannon B, Limburg K, Naeem S, O'Neill RV, Paruelo J, Raskin RG, Sutton P and Vandenbelt M (1997). 'The value of the world's ecosystem services and natural capital', *Nature* 387:253–260.
- Costanza, R, D'Arge, R, De Groot, R, et. al. "The Value of the World's Ecosystem Services and Natural Capital." *Nature* 387 (1997): 253-60
- Costanza, R. (2000). "Social goals and the valuation of ecosystem services." *Ecosystems* 3(1): 4-10.
- Costanza, R., Fisher, B., Ali, S., Beer, C., Bond, L., Boumans, R., Danigelis, N.L., Dickinson, J., Elliott, C., Farley, J., Gayer, D.E., Glenn, L.M., Hudspeth, T., Mahoney, D., McCahill, L., McIntosh, B., Reed, B., Rizvi, S.A.T., Rizzo, D.M., Simpatico, T., Snapp, R., 2007. Quality of life: an approach integrating opportunities, human needs, and subjective wellbeing. *Ecol. Econ.* 61, 267–276.
- Costanza, R., R. d'Arge, et al. (1997). "The value of the world's ecosystem services and natural capital." *Nature* 387(6630): 253-260.
- Costanza, R., R. d'Arge, et al. (1997). "The value of the world's ecosystem services and natural capital." *Nature* 387(6630): 253-260.
- Costanza, R., R. d'Arge, R. De Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. V. O'Neill, J. Paruelo, R. G. Raskin, P. Sutton, and M. Van Den Belt. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253–260.
- Council of Europe, 2000. The European Landscape Convention. Council of Europe, Strasbourg.

- Daily, G. (1997). *Nature's services: societal dependence on natural ecosystems*. Washington, D.C., Island Press.
- Daily, G. C., ed. (1997). *Nature's services: societal dependence on natural ecosystems*. Island Press, Washington, DC.
- Daily**, G.C., T. Söderqvist, S. Aniyar, K. Arrow, P. Dasgupta, P.R. Ehrlich, C. Folke, A.M. Jansson,
- Daly, H. E. (1992). "Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable." *Ecological Economics* **6**: 185-193.
- Daniel, T.C., Muhar, A., Arnberger, A., Aznar, O., Boyd, J.W., Chan, K.M.A., Costanza, R., Elmqvist, T., Flint, C.G., Gobster, P.H., Grêt-Regamey, A., Lave, R., Muhar, S., Penker, M., Ribe, R.G., Schauppenlehner, T., Sikor, T., Soloviy, I., Spierenburg, M., Taczanowska, K., Tam, J., von der Dunk, A., 2012. Contributions of cultural services to the ecosystem services agenda. *PNAS* 109, 8812–8819.
- De Groot R, Brander L, van der Ploeg S, Costanza R, Bernard F, Braat L, Christie M, Crossman N, Ghermandi A, Hein L (2012) Global estimates of the value of ecosystems and their services in monetary units. *Ecosyst Serv* 1(1):50–61
- De Groot, R. S., M. A. Wilson, et al. (2002). "A typology for the classification, description and valuation of ecosystem functions, goods and services." *Ecological Economics* **41**(3): 393-408. *Economics* **41**(3): 393-408.
- De Groot**, R.S., M. Wilson, and R. Boumans, 2002: A typology for the description, classification, and valuation of ecosystem functions, goods and services. *Ecological Economics*, **41**(3), 393–408.
- DER KILLESBERG – Ein Volkspark und seine Geschichte [https://www.akbw.de/fileadmin/download/Freie\\_Dokumente/Landschaftsarchitektur/Gruene\\_Fuge\\_Flyer.pdf](https://www.akbw.de/fileadmin/download/Freie_Dokumente/Landschaftsarchitektur/Gruene_Fuge_Flyer.pdf) page 3
- Dominati E, Patterson M, Mackay A (2010) A framework for classifying and quantifying the natural capital and ecosystem services of soils. *Ecol Econ* 69(9):1858–1868
- Ecosystem 2013, [www.studymode.com/essays/Ecosystem-39135724.html](http://www.studymode.com/essays/Ecosystem-39135724.html)

- Ekkel, E. D., & de Vries, S. (2017). Nearby green space and human health: Evaluating accessibility metrics. *Landscape and Urban Planning*, 157, 214-220. doi:<http://dx.doi.org/10.1016/j.landurbplan.2016.06.008>
- Ellis, E. (2014). Ecosystem. Retrieved from <http://editors.eol.org/eoearth/wiki/Ecosystem>
- Emerton, L 1999. Economic tools for the management of marine protected areas in Eastern Africa. IUCN
- Engelbrecht, H.J., 2009. Natural capital, subjective well-being, and the new welfare economics of sustainability: some evidence from cross-country regressions. *Ecol. Econ.* 69, 380-388.
- Ernstson, H., 2013. The social production of ecosystem services: a framework for studying environmental justice and ecological complexity in urbanized landscapes. *Landscape and Urban Planning* 109, 7-17.
- Evans, F. C. 1956. Ecosystem as the basic unit in ecology. *Science* 123:1127-1128.
- Farber, S., R. Costanza, et al. (2002). "Economic and Ecological Concepts for Valuing Ecosystem Services." *Ecological Economics* 41(3): 375-392.
- Farber, S., R. Costanza, et al. (2006). "Linking ecology and economics for ecosystem management." *Bioscience* 56(2): 121-133.
- Folke, C., Å. Jansson, J. Larsson, and R. Costanza. 1997. Ecosystem appropriation by cities. *Ambio* 26:3.
- Freeman III, A. K. (2003). The measurement of environmental and resources values. Washington, D,C,, Resource for the Future.
- Ghani, A.A 2006. Economic valuation of forest ecosystem services in Malaysia. Putra University
- Golley, F. B. 1993. A History of the Ecosystem Concept in Ecology: More Than the Sum of the Parts. Yale University Press, New Haven. ISBN: 0300066422.
- Haughton and Khandk What Is Poverty and Why Measure It? [http://siteresources.worldbank.org/INTPA/Resources/4299661259774805724/Poverty\\_Inequality\\_Handbook\\_Ch01.pdf](http://siteresources.worldbank.org/INTPA/Resources/4299661259774805724/Poverty_Inequality_Handbook_Ch01.pdf)

- Heal, G. 2000. *Nature and the marketplace: Capturing the value of ecosystem services*. Washington, DC: Island Press.
- Hein, L., van Koppen, K., de Groot, R.S., van Ierland, E.C., 2006. Spatial scales, stakeholders and the valuation of ecosystem services. *Ecological Economics* 57, 209-228.
- History of Ludwisburg palace garden <https://www.blueba.de/en/history.html>
- Hohenheim before its foundation <https://www.uni-hohenheim.de/en/history-1100-1799>
- Hohenheim garden university of hohenheim: [www.gaerten.uni-hohenheim.de](http://www.gaerten.uni-hohenheim.de)
- Hunting and pleasure castle Favorite <https://www.stuttgart-tourist.de/en/a-castle-favorite>
- Introduction to vertical greening systems [http://bc-naklo.si/index.php?id=4447&no\\_cache=1](http://bc-naklo.si/index.php?id=4447&no_cache=1)
- Jones, M., 2003. The concept of cultural landscape: discourses and narratives. In: Palang, H., Fry, G. (Eds.), *Landscape Interfaces: Cultural Heritage in Changing Landscapes*. Kluwer Academic Publishers, Dordrecht, pp. 22–51.
- Kaczynski, AT, Schipperijn, J, Hipp, JA, Besenyi, GM, Stanis, SAW, Hughey, SM & Wilcox, S (2016). ParkIndex: Development of a standardized metric of park access for research and planning' *Preventive Medicine*, vol 87, pp. 110-114., 10.1016/j.ypmed.2016.02.012
- Kaczynski, A. T., Besenyi, G. M., Stanis, S. A., Koohsari, M. J., Oestman, K. B., Bergstrom, R., Reis, R. S.(2014). Are park proximity and park features related to park use and park-based physical activity among adults? Variations by multiple socio-demographic characteristics. *Int J Behav Nutr Phys Act*, 11, 146.doi:10.1186/s12966-014-0146-4
- Kaczynski, A.T., Potwarka, L.R., Smale B.J.A., Havitz, M.E. (2009). Association of parkland proximity with neighborhood and park-based physical activity: variations by gender and age. *Leisure Sciences* 31: 174-
- Kareiva, P., H. Tallis, T. H. Ricketts, G. C. Daily, and S. Polasky. 2011. *Natural capital: Theory and practice of mapping ecosystem services*. Oxford: Oxford University Press.

- Kasina, J.M 2007. Bee pollinators and economic importance of pollination in crop production; a case study of Kakamega, Western Kenya
- King, M.F., Reno, V.F., Novo, E.M.L.M., 2013. The concept, dimensions and methods of assessment of human well-being within a socioecological context: a literature review. *Soc. Indic. Res.* <http://dx.doi.org/10.1007/s11205-013-0320-0>.
- Kremen, C. (2005). Managing ecosystem services: what do we need to know about their ecology? *Ecology Letters*, 8, 468–479.
- Levin SA (2012) The challenge of sustainability: lessons from an evolutionary perspective. In: Weinstein MP, Turner RE (eds) *Sustainability science: the emerging paradigm and the urban environment*. Springer, New York, pp 431–437
- Lobo, G.**, 2001: Ecosystem Functions Classification. [online] Cited September 2002. Available at <http://gasa3.dcea.fct.unl.pt/ecoman/delphi/>.
- MA (Millennium Ecosystem Assessment), 2005. *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington D.C.,
- MacDonald, H.D., Bark, R., MacRae, A., Kalivas, T., Grandgirard, A., Strathearn, S., 2013. An interview methodology for exploring the values that community leaders assign to multiple-use landscapes. *Ecology and Society* 18 (1), 29. <http://www.ecologyandsociety.org/vol18/iss1/art29>.
- Martinez-Arroyo, A., and E. Jáuregui. 2000. On the environmental role of urban lakes in Mexico city. *Urban ecosystems* 4:145-166. <http://dx.doi.org/10.1023/A:1011355110475>
- Martín-López, B., Gómez-Baggethun, E., Lomas, P. L., & Montes, C., 2009. Effects of spatial and temporal scales on cultural services valuation. *Journal of Environmental Management* 90, 1050-1059
- Matthews, R., Selman, P., 2006. Landscape as a focus for integrating human and environmental processes. *J. Agric. Econ.* 57 (2), 199–212.
- McGranahan, G., P. Marcotullio, X. M. Bai, D. Balk, T. Braga, I. Douglas, T. Elmqvist, W. Rees, D. Satterthwaite, J. Songsore, H. Zlotnick, J. Eades, E. Ezcurra, and A. Whyte. 2005. Urban systems. Pages 797-821 in R. Hassan, R. Scholes, and N. Ash,



- editors. *Ecosystems and human well-being: current state and trends (Millennium Ecosystem Assessment Series)*. Island Press, Washington, D. C., USA
- Millennium Ecosystem Assessment. 2003. *Ecosystems and human well-being: A framework for assessment*. Washington, DC: Island Press.. 2005. *Ecosystems and human well-being: Synthesis*. Washington, DC: Island Press.
- Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: A framework for assessment*. Washington, DC: Island Press.. 2005. *Ecosystems and human well-being: health Synthesis*. Washington, DC: Island Press.
- Moberg, F. and C. Folke, 1999: Ecological goods and services of coral reef ecosystems. *Ecological Economics*, **29(2)**, 215–233.
- Mohammad Mehdi Sadeghian and Zhirayr Vardanyan. 2015 A Brief Review On Urban Park History, Classification And Function Institute of Botany . International Journal Of Scientific & Technology Research Volume 4, Issue 11, november: National Academy of Sciences of Armenia, Yerevan, Republic of Armenia
- N. Kosoy& E. Corbera(2010): Payments for ecosystem services as commodity fetishism *Ecological Economics* 69: 1228-1236
- Niemelä, J., S. R. Saarela, T. Söderman, L. Kopperoinen, V.Yli-Pekkonen, S. Väre, and J. Kotze. 2010. Using the ecosystem services approach for better planning and conservation of urban green spaces: a Finland case study. *Biodiversity Conservation* 19:3225-3243. <http://dx.doi.org/10.1007/s10531-010-9888-8>
- Norberg, J., 1999. Linking Nature’s services to ecosystems: some general ecological concepts. *Ecological Economics* 25, 183–202
- NRC (1999) *Our common journey: a transition toward sustainability*. National Academy Press, Washington, DC
- Odum, E. P. 1953. *Fundamentals of Ecology*. Saunders, Philadelphia. First edition, 384 pp.
- Odum, E. P. 1971. *Fundamentals of Ecology*. Third edition. W. B. Saunders, Philadelphia.
- OECD, 2011. *How's Life? Measuring Well-being*. OECD Publishing. <http://dx.doi.org/10.1787/9789264121164-en>.

- Pant, M.L. Lehticoinen, A. Uusitalo, L and Venesiarvi, R, 2015. How to value biodiversity in environmental management *Ecological indicators* 55(2015); 1-11
- Payments for improved watershed management practices <https://www.cbd.int/financial/pes/france-peswater.pdf>
- Pearce, D. 1998. Auditing the Earth: The value of the world's ecosystem services and natural capital. *Environment* 40(2):23–28. 1988. Economics, equity, and sustainable development. *Futures* 20:598–605.
- Perrings C (2007) Future challenges. *Proc Natl Acad Sci USA* 104:15179–15180
- Perrings C (2005) Economics and the value of biodiversity and ecosystem services. In: De Luc J-P (ed) *Proceedings of the international conference on biodiversity science and governance*. Museum National d'Histoire Naturelle, Paris, pp 109–118
- Petrosillo, I., Costanza, R., Aretano, R., Zaccarelli, N., Zurlini, G., 2013. The use of subjective indicators to assess how natural and social capital support residents' quality of life in a small volcanic island. *Ecol. Indic.* 24, 609–620.
- Pico Bonito Forest Restoration <http://www.forestcarbonportal.com/project/pico-bonito-forest-restoration>
- Plieninger, T., Dijks, S., Oteros-Rozas, E., Bieling, C., 2013. Assessing, mapping, and quantifying cultural ecosystem services at community level. *Land Use Policy* 33, 118–129.
- Prof. Rainer Schmidt : Park Killesberg Rainer Schmidt Landschaftsarchitekten ,2015  
<http://www.landezine.com/index.php/2015/11/park-killesberg-development-towards-an-urban-environment/>
- Rapley, M., 2003. *Quality of Life Research: A Critical Introduction*. Sage Publications, London, Thousand Oaks, New Delhi
- Raudsepp-Hearne, C., Peterson, G.D., Bennett, E.M., 2010. Ecosystem service bundles for analyzing tradeoffs in diverse landscapes. *PNAS* 107 (11), 5242-5247.

- Reyers, B., Biggs, R., Cumming, G.S., Elmqvist, T., Hejnowicz, A.P., Polasky, S., 2013. Getting the measure of ecosystem services: a social–ecological approach. *Front. Ecol. Environ.* 11, 268–273.
- Reyers, B., Biggs, R., Cumming, G.S., Elmqvist, T., Hejnowicz, A.P., Polasky, S., 2013. Getting the measure of ecosystem services: a social–ecological approach. *Front. Ecol. Environ.* 11, 268–273.
- Rodríguez, L.C., Pascual, U., Niemeyer, H.M., 2006. Local identification and valuation of ecosystem goods and services from *Opuntia* shrublands of Ayacucho, Peru. *Ecological Economics* 57, 30-44.
- Roy Linderman 1942 the Trophic-Dynamic Aspect of Ecology p 399
- Samantha Lienert Ecosystems and Ecology <https://quizlet.com/121155847/ecosystems-and-ecology-flash-cards/>
- Santos-Martín, F., Martín-López, B., García-Llorente, M., Aguado, M., Benayas, J., Montes, C., 2013. Unraveling the relationships between ecosystems and human wellbeing in Spain. *PLoS One* 8 (9), e73249
- Schaich, H., Bieling, C., Plieninger, T., 2010. Linking ecosystem services and the cultural landscape. *GAIA* 19 (4), 269–277.
- Smith, L., 2006. Heritage as cultural process, in: Smith, L. (Ed.), *Uses of Heritage*. Routledge, London, pp. 44-84.
- Smith, L.M., Case, J.L., Smith, H.M., Harwell, L.C., Summers, J.K., 2013. Relating ecosystem services to domains of human well-being: foundation for a US index. *Ecol. Indic.* 28, 79–90.
- Stedman, R.C., 2003. Is it really just a social construction? The contribution of the physical environment to sense of place. *Society & Natural Resources* 16 (8), 671-685.
- Sarah Friedl. Abiotic Factors of an Ecosystem: Definition & Examples <https://study.com/academy/lesson/abiotic-factors-of-an-ecosystem-definition-examples-quiz.html>
- Sugiyama T, Francis J, Middleton NJ, Owen N, Giles-Corti B. (2010). Associations Between Recreational Walking and Attractiveness, Size, and Proximity of

- Neighborhood Open Spaces. *American Journal of Public Health*. 2010; 100(9):1752-1757. doi:10.2105/AJPH.2009.182006.
- Summers, J.K., Smith, L.M., Case, J.L., Linthurst, R.A., 2012. A review of the elements of human well-being with an emphasis on the contribution of ecosystem services. *Ambio* 41, 327–340.
- Tansley, A. G. 1935. The use and abuse of vegetational concepts and terms. *Ecology* 16:284-307.
- Tansley, A. G. 1935. The use and abuse of vegetational concepts and terms. *Ecology* 16: 284-307.
- The Danube PES project: [http://wwf.panda.org/what\\_we\\_do/where\\_we\\_work/black\\_sea\\_basin/danube\\_carpathian/our\\_solutions/green\\_economy/pes/the\\_danube\\_pes\\_project/](http://wwf.panda.org/what_we_do/where_we_work/black_sea_basin/danube_carpathian/our_solutions/green_economy/pes/the_danube_pes_project/)
- Thompson, B. H., Jr. 1996. Environmental policy and state constitutions: The potential role of substantive guidance. *Rutgers Law Journal* 27:863–925. 2008. Ecosystem services and natural capital: Reconceiving environmental management. *New York University Environmental Law Journal* 17:460–489.
- Treasure chest of the Renaissance and baroque castle and castle Weikersheim garden <http://www.schloss-weikersheim.de/start/>
- United nation: sustainable development goals: [www.un.org/sustainabledevelopment/poverty/](http://www.un.org/sustainabledevelopment/poverty/)
- Vemuri, A.W., Costanza, R., 2006. The role of human, social, built, and natural capital in explaining life satisfaction at the country level: toward a national well-being index (NWI). *Ecological Economics* 58, 119-133
- Wang C, Burris M. Photovoice: Concept, methodology, and use for participatory needs assessment. *Health Education and Behaviour*. 1997; 24:369–387.

- Wang, D., Brown, G., & Liu, Y. (2015). The physical and non-physical factors that influence perceived access to urban parks. *Landscape and Urban Planning*, 133, 53-66. doi:<http://dx.doi.org/10.1016/j.landurbplan.2014.09.007>
- Willis, A.J. (1994) Arthur Roy Clapham, 1904–90. *Biographical Memoirs of Fellows of the Royal Society* 39, 73–90.
- Wilson, M., A. Troy, et al. (2004). *The Economic Geography of Ecosystem Goods and Services: Revealing the monetary value of landscapes through transfer methods and Geographic Information Systems*. Cultural Landscapes and Land Use. M. Dietrich and V. D. Straaten, Kluwer Academic.
- Wilson, M., Howarth, R.B., 2002. Discourse-based valuation of ecosystem services: establishing fair outcomes through group deliberation. *Ecol. Econ.* 41, 431–443.
- Wu, J., 2013. Landscape sustainability science: ecosystem services and human well-being in changing landscapes. *Landsc. Ecol.* 28 (6), 999–1023.
- Wunder, S. 2007. “The Efficiency of Payments for Environmental Services in Tropical Conservation,” *Conservation Biology* 21(1): 48–58.
- Yang, W., Dietz, T., Kramer, D.B., Chen, X., Liu, J., 2013. Going beyond the Millennium Ecosystem Assessment: an index system of human well-being. *PLoS One* 8 (5), e64582.

## **Appendix**

### **LIST OF TABLES**

Table 1: Ecosystem services and types of economic value

Table 2: Choice of valuation methods for different ecosystem services

Table 3: Response from the study area

Table 4: Condensed items mentioned by respondents

Table 5: Percentage of respondents mentioning, mean rank and salience for 21 items with the highest salience

Table 6: Comparison across age groups

Table 7: Represent a tallied response on items

## **LIST OF FIGURES**

Figure 1: Types of Ecosystem Service and the typical examples in the services.

Figure 2: Harmful effects of ecosystem change on human health

Figure 3: Linkages between ecosystem service and human wellbeing

Figure 4: The Millennium ecosystem assessment identifies main aspects of human wellbeing.

Figure 5: Total economic value

Figure 6: Location of the study areas

Figure 7: The green fugue and location of Killesberg park

Figure 8: Relief cuboid with horses.

Figure 9: Commemorative Stele "Sammellager"

Figure 10: Layout and aerial photo of the Ludwigsburg park

Figure 11: Layout plan aerial photo of Hohenheim garden or castle park

Figure 12: Picture sample one from Hohenheim gardens

Figure 13: Picture sample two from Killesberg Park

Figure 14: Picture sample three from Ludwigsburg

Figure 15: Statistics of randomly selected items represented on the bar chart

Figure 16: Statistics of randomly selected items represented on the bar chart

Figure 17: The relationship between ecosystem services and human needs