

# **Investigating the Relationships between Land and Public Goods and Services**

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by

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# INVESTIGATING THE RELATIONSHIPS BETWEEN LAND AND PUBLIC GOODS AND SERVICES (PGS)

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## Abstract

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Land is the most invaluable resource for all nations and supports livelihood. As population increases, land becomes an increasingly scarce resource to the public and private sector. Land has peculiar characteristics which makes it different from all other forms of goods. It is limited in supply and cannot be created nor destroyed. Land can reclaim from shallow seas. But these increases are insignificant. The concept of public goods and service is one of the concepts in economic that since its inception in the 1950s is still highly debatable. Many goods and services do not into the strict economic definition.

The objective of this study was “Investigating the relationships between Land and Public goods and Services”. It was to better understand the role of land administration in the provision of public goods that are related to Land Bases Public Goods and Services. The two concepts- land and PGS are very sensitive concepts in most countries.

The methodology for conducting this research was complete based on the review of literatures. This method was suitable for the research as it uses content analysis to explore the societal perception of what is considered PGS and the role LAS play in their provision. This gives a wider understanding on the concept of PGS their optimal provision. All relevant information were obtain from literatures

The study reveals that public goods are good that can be optimally provided by the state for the benefit of the society.

No good by default fits as a PGS. A good is considered a public PGS via societal and policy decision. The state optimally and efficiently provides PGS. PGS have two main characteristics - non rivalry and non excludability. The markets do not optimally provide PGS because once the good is produced, it is available for all and it is almost impossible to exclude other consumers. The research reveals that public goods and service can be modelled conceptually using the spatial primitive of point, line and polygon. The LAS prove to be an inevitable information infrastructure that supports the state the provision of Land Based Public Good Services while securing the rights of the private land owners. It provides the government with information about land value which ensure fairness in property taxation and compensation during public interventions.

The entire research is made up of six chapters. Chapter one gives a vivid overview of the research. It states the research objectives and the questions. The second chapter discuss the theory of public goods and services. It later limits the theory to public goods related to land. Chpter three describes the research method. In Chapter Four, public goods and services were conceptually modelled using spatial primitives. Chapter looks at the role of land administration in the provision of public goods and services. Finally chapter six discuss and provide answers to research questions. It ends with tabular representation showing the degree of state rights restrictions and responsibility on land and the various types of public goods.

**Key words:** Public Goods and services (PGs), Land, Public Purpose (PP), Modelling, Land Administration (LA), Land Administration System (LAS), Rights, Restriction and Responsibility (RRR), Cadastre,

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***This work is a specially dedication to the NDUBU'S FAMILY especially my mother Mrs. Ndubu Frida Tatabot and to all my brothers, their wives and our grand children***



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## LIST OF ABBREVIATIONS

**CAO:** Consumer Area Object

**LA:** Land Administration

**LAS:** Land Administration System

**NL:** Netherlands

**RRR:** Rights, Restrictions and Responsibility

**PP:** Public Purpose

**PGS:** Public Goods and Services

**LABPGS:** Land Base Public Goods and Services

**SP:** Spatial Planning

**PAO:** Production Area Object

<b>SAO:</b>	Served	Area	Object
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# CHAPTER 1

## 1. INTRODUCTION

### 1.1. Background

Land is a source of wealth and asset to both the rural and urban population. Investments for Public purpose (PP) enables governments, local councils and state agents to acquire land, enter into partnership or impose restriction on land use. Every restriction on the right to real estate requires compensation but the rate of compensation tend to differ from one country to another. According to (Belej and Walacik 2008), the amount of compensation in Poland is strictly connected with market value. The loss of future profit, and all other inconveniences associated with public intervention do not influence the amount of compensation.

Investment for PP that requires land in its execution is effected in a number of ways. Acquiring land for investment should not be only acquiring the ownership rights. It also affects other forms of rights associated with the land such as contractual rights mortgages, easements etc. Examples of public investment with varied state of land ownership include; construction and maintenance of public and air transport facilities, construction and maintenance of facilities for water supply, for collecting, transport and treatment of wastewater and for solid waste utilisation, construction and maintenance of facilities for environment protection, land regarded as cultural heritage etc.

Economists widely agree that public expenditure for the provision of Public goods and services (PGS) is a justification for government action (Martin 2006) and to provide services which cannot be done through market forces. Examples are roads, railways, schools, hospitals, flood defence, public security, law and order and nature conservation and. Such goods can also be provided by the private sector. In most cases, private sector production is inadequate. These goods/services are term PGS/services. Contrary to PGS are private goods. These are goods and services that the ability to consume is determined by the price (invisible hand) and the market forces.

The provision PGS interfere with private property rights. At minimum, that state holds three [eminent domain, police power and the right to share proceeds from the land (taxation)] sticks in the private bundle of rights (Kelso 1972).The private rights are to be protected by the state while executing public functions. The ownership of real property is protected by law in the constitution of most countries. This has also been included in the First Protocol to the European Convention for the Protection of Human Rights and Fundamental Freedoms (Viitanen 2004). The state's power of eminent domain is exercised in almost every country in the world with the aim of pursuing socio-economic development for public interest. In the developed countries, there land is either under state and private ownership (Larbi, Adarkwah et al. 2004). A similar situation prevails in the Netherlands (NL) where the state own lands just like any other private individual with the only exception that it does not pay tax state lands. At the primary stage, land is needed for the provision PGS and services.



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In the NL, the expropriation or compulsory purchase act (Onteigeningswet) permits the government to purchase land for new roads, railways and flood defence construction and to develop land as approved by the Spatial Planning (SP) design of the municipality (Needham 2007). Expropriation may be executed if public goals cannot be achieved in any other way but by depriving, or restricting one's ownership rights and the rights cannot be acquired by negotiation. There are conditions that are usually taken into consideration in acquiring land for public interest through expropriation. E.g., in the NL, compulsory purchase shall not be used if the inconvenience for private outweighs the public advantage. Besides expropriation, state can also access land through the land consolidation, land market, land readjustments etc

### 1.2. Justification of Study

Recent reform of the European Union's Common Agricultural Policy (CAP) with its gradual phasing-out of direct market intervention (Martin 2006) and an emphasis on multi-functionality has led to a re-focusing on the role of government in providing PGS in the countryside. The concept of PGS describes goods that markets fail to provide despite the expectation of the society. The concept therefore provides a strong foundation to justify state policy intervention. This implies PGS not are influences by the forces of demand and supply.

Land as a primary source of wealth has becomes tradable and motivation for political issues, economic and power gains, and self fulfilling interests. The need to ensure there is good governance in Land Administration (LA) is important (Burns and Dalrymple 2008). Thus, good governance in LA is central to sustainable development within society. Adequate security of property with good governance supporting LA may affects the lives of the people socially, economically and even culturally when lands are concern. In most developing countries, the rural population are often away from many decision making processes (Shrestha 2009) and have limited access to LA services. These people have to be appropriately informed and their views included in decision making about public projects. The repercussions of such decision have impact on their lives of citizen and not free from environmental impacts. It becomes imperative to stress the reason for such projects and the stake of the ownership that will be involved. It will be important to study the relationship between land (ownership) and PGS/services. This is because of the different values, rights that different people attach to land.

Peoples' choice of residing in a given environment is a function of many factors. A vital issue that can be considered in choosing a location depends on the availability of PGS and services and the features of the surrounding areas. This is because activities within an area may affect the activities and choices behaviour of the people in the neighbouring area. (Papageorgiou 1987) points out that economic analysis explicitly recognised the impact of external affects on choice behaviour. Their analysis has conventionally explained the way peripheral effects arise within a spatial context. The analysis fails to incorporate how choice behaviour depends on the spatial aspect of the area. On the other hand, spatial analysis recognised the ways external effects arise within spatial context. But the spatial analysis failed to consider how choice behaviour depends on preferences. It will be important combining the lapses of the two analyses the (spatial and economic analysis). LA which regards land as an object is use to introduce the incorporate the spatial unit into the theory of PGS.



### 1.3. Problem statement

Acquiring land for PP requires particular caution especially through expropriation. Wrong regulations may result both in conflicts, economic instability and even in decreasing the economic growth rate.

The welfare and security of real property right of an individual is a prime goal of public administration and the LA system. On the other hand, the welfare of the citizens may restrict private interest. The restriction of private right for the wellbeing of community becomes a cause of dispute. It is important to have the consent of individuals who may be affected in realising a public project. In the NL and other European countries as Germany, Belgium where conservation project were carried out, only representative of stakeholder organizations were consulted during the selection process. Individual land owners were not involved until the official designation process (Bouwma, Kamphorst et al. 2000). With such situation, it was found that potential conflicts were deferred until a later stage of the implementation process. In the NL stakeholders criticized the lack of involvement during the selection of sites and the fact that predominantly ecological criteria were used. The development of nature conservation policy in the NL during the last decades and the way in which society deals with nature has fundamentally changed (Rientjes 2002). According to Rientjes, the Dutch policy with regards to nature conservation has been undergoing a process of postponement. People attached little value on environmental goods and use land for other profitable purposes. Conflicts between biodiversity conservation and other human activities are becoming increasingly apparent in all European landscapes. According to (Young, Watt et al. 2005) intensification of agricultural and silvicultural practices, land abandonment and other land uses such as recreation and hunting are all potential threats to biodiversity that can lead to conflicts between stakeholder and biodiversity conservation.

Experiences reveal that landowners are unwilling to lease or sell land to the state in areas where unclear planning exists (Molen 2001). There are differences between stakeholders interest against state interest in the provision of PGS/services. The dilemma now rely the government to strike a balance between private and public interest. The research problem is how much say (influence) has the state over land for PGS/services provision, i.e. the combination of state influence in relation to land to the provision (LBPGS). This implies the variation of public sticks (RRR) in the bundle of land rights for different PGS.

### 1.4. Research Objective

Economists widely agree the provision of PGS is a justification for government action (Samuelson 1954). PGS exhibit non-rivalry and non-excludability in consumption. Goods with these features cannot optimally be provided by market system and requires public policy mechanism. The provision of PGS could potentially be addressed by public policy (Martin 2006). Little attention was given to the role of land in the provision of PGS. The main objective of this research is “**Investigating the relationship between land and Public Goods and Services**”. This is to better understand the role LA in the provision of PGS. The following sub objectives support the attainment of the main objective.

- To examine and classify the various types of Public Goods and Services (PGS) and their relation with land.
- To Model Public Goods and Services using spatial objects



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- To identify the role of Land Administration System in the provision of Public Goods and Services.
- Evaluate the criteria used by the state to purchase or to impose restriction on land use.

## 1.5. Research questions

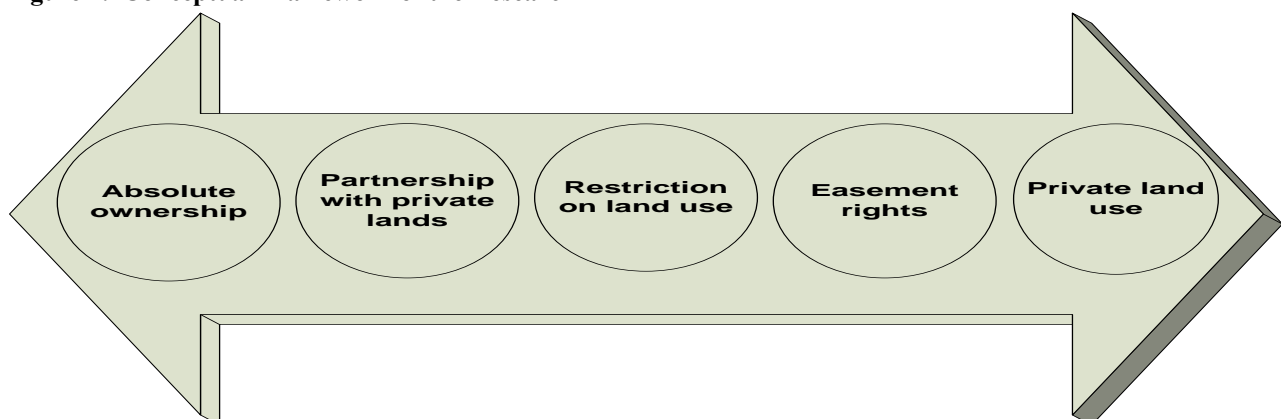
The following sub-questions are structured to attain main objective of this research;

- What are Public Goods and Services and what are their characteristics?
- How can Public Goods and Services be represented as spatial objects?
- What are the legal rights that the state needs to acquire land for the provision of Public Goods and Services?
- What is the role of LAS in the provision of Land Based Public Goods and Services?

## 1.6. Conceptual framework

The research conceptual framework is to observe the use of land by the state in providing PGS/services. It is the relationship with the degree of command over land that may be required by the state and the changes in the Rights, Restrictions and responsibilities (RRR) in providing PGS/services. Public rights on land range from absolute state ownership to absolute no ownership. How much of each Rs (in the three Rs) is actually involved in the provision of different PGS/services. Each land parcel has bundles of RRR and the balance between the RRR changes with the types of PGS/services. The core issue of LA typically involves processes that: manage public land, record and register private interests in land, assess land value, determine property tax obligations, define land use and management governance systems, and support the development application and approval process for land use. The figure below shows the degree of state command over land in providing PGS/services (PGS).

**Figure 1.1**Conceptual Framework of the Research





## **1.7. Thesis Structure**

### **Chapter 1 Introduction**

This chapter gives a general insight of the research. It begins with the background of study and discusses the problem statement. The chapter presents the research objective and questions. The later sections included the conceptual framework and the research plan.

### **Chapter 2 Research Methodology**

This is a narration of how the research was carried out. It highlights of the approach method of analysis for the research. It also gives an insight of the reason for conducting the research using the qualitative approach.

### **Chapter 3 Literature Review on the Concepts and Theories of PGS**

This chapter covers extensive literatures on the theory of PGS. It begins with introduction of the basic concepts which through the chapter. The general theory of PGS was skewed to PGS which requires land for their provision. It went ahead to highlight the concept of externality. The chapter round up with examples of land based PGSs which was used in subsequent chapters.

### **Chapter 4 Spatial Modelling of Public Goods and Services**

PGSs were conceptually model as spatial objects. The spatial representation of PG in this chapter was to determine the spatial dimension of the public that benefit that accrue to the PGSs when a produced. It also shows why different consumption areas benefit from PGSs.

### **Chapter 5 Land Administration System and Public Goods and Services creation**

This chapter explore scholastic study on LAS and it pivotal role in an economy. The chapter brings to ford the role of LAS in the management of land RRR in relation to land ownership use and value. In the chapter, it shows that the need of LAS need not to be over emphasize as it provide the government with information relation land rights, land value to fair taxation and compensation. Such information ensures the provision of PGSs which securing respecting the right of the private citizens. It guides the government with information to design and execute SP

### **Chapter6 Discussion, Conclusion and Recommendation**

This was the last chapter of the research. It was made of discussion. The conclusion present answers to the research questions and remark on the overall objective of the research. The chapter rounds up with recommendations



## CHAPTER 2

## 2. RESEARCH METHODOLOGY

### 2.1. Introduction

This chapter describes the specific research method and procedure used in the research. The prime objective of this chapter was to make explicit the strength of literatures reviewed to analyze phenomena. It also shows how the previous studies looked into the concepts of public goods, land and the representation of PGS using spatial geographic objects.

By the nature and scope of this research, a qualitative research approach was seen necessary to answer the research questions that gears towards attaining the main objective. According to (Webster and Watson 2002) an successful literature review construct a firm basis for advancing knowledge. A good quality literature review focuses complete on concepts. Therefore the way forward was a logical and critical analysis of arguments related to the research. This goes via content analysis of scholastic literatures.

### 2.2. Research Approaches

Any form of study can be categorised under a given research approach. Common research approaches includes; descriptive, exploratory, experimental, correlational research etc. This research adopts the exploratory technique. The approach searches within existing studies to tackle the goal of this study. It is highly dynamic, unstructured and qualitative in nature. For this study therefore, critical exploration of the concept of PGS provision and their relationship with land were the main areas of emphasis. It also laid emphasis on representing PGS conceptually as geometric objects

#### 2.2.1. Qualitative and Quantitative Research Approaches

These are two broad categories of research approaches- Qualitative and Quantitative. In sciences, most of the researches apply quantitative study. They make effective use of data and this tend the concept of qualitative research almost not realistic. Other forms of research study such as land tenure and tenure security do not use numeric values. A title holder feeling cannot be given numeric values. It is therefore relies on explanation and perception in understanding such concepts. Therefore, the two approaches are relevant. Both approaches should be regarded to harmonize each other rather than being competitive.

Qualitative research approach focuses on the feature, state and nature of experiences. According to (Labuschagne 2003) qualitative emphasises on processes and meanings that are carefully examined, but not measured in terms of quantity, amount or frequency. The qualitative researchers search for a wider understanding of complex situations and making clear concepts with fuzzy premonition. Qualitative data present vigorous and in-depth information through direct citation and cautious



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explanation of situations, events, interactions and observed behaviours. Qualitative research is therefore more parallel to the understanding gained from an art and social sciences.

On the other hand, quantitative research approach lays emphasis on the extent in which a situation have certain properties, states and characters, and the similarities, differences (Labuschagne 2003). It also looks at the cause-effect relationships that exist between two or more variables and the extent to which a unit change in one variable affect the other. Causal relations exist within and between two or more variables. The foundation of a quantitative research relies on empirical thought. The edge of quantitative over qualitative approach is that it gives numeric and discrete measures. Through quantitative research approach, absolute conclusions can be derived from a research.

### **2.3. Documentary Study**

Documents will be reviewed on the general theories of public goods and zooming in to lay more emphasis on theories that discuss public goods with land components. It discusses on the role of the LAS as a tool that facilitates state provision of the PGS that relates to land. The LAS has to secure the rights of the property holders so that they are adequately compensated if they are expropriated for public interest. In addition, the PGS that require land in their provision will be modelled as spatial objects. With the representation of PGS using the spatial objects, it becomes easier to determine the spatial extent of the benefit that the PGS will generate. Also, it helps to appropriately allocate resources for other PGS and to easily map out risk zones to restrict land use or settlement.

The data source is solely from related literature in the area of focus of the research. The collection of literature from economic and public theories constituted the foundation data on PGS theories. Literature on LA, land policy and journal articles from FIG, UNECE Reports and UN-Habitat supported the public provision of land-based PGS. GIS-based literature is grouped to represent PGS as spatial objects.

### **2.4. Method of Data Analysis**

The central focus of this study is to explore the degree of state command over land as it makes provision for different forms of PGS. How the state rights, restriction and responsibility change as it provides different PGS. It is also to represent PGS as spatial objects; as points, lines and polygons. A qualitative research approach is perceived suitable for this study as it provides a general understanding of the general concepts of PGS. According to (Webster and Watson 2002) an effective review creates a solid base for advancing knowledge and bridges the gap between areas where a plethora of research exists, and uncovers areas where research is needed. From the general concept the research narrowed down to PGS that are related with land to incorporate the LA component into the theory of PGS. Given the different types of PGS that are land-based, it studies which stick the state has related to different forms of PGS and the support of the LAS to ensure state provision of these goods.

### **2.5. Ethical Consideration**

All the information used for the completion of this research is collected from secondary sources. The work from other scholars has been duly quoted and referenced within the work. Overall, the information from the literature was used for the purpose of completing the research.

The Researcher assured all materials used for the development of this work will be used only for my academic work and not for commercial or for other users



## 2.6. Operationalization of the research

The LA System provides information to the government when governments want to apply taxation as a measure to achieve certain land use objectives, land registers and cadastres are to provide relevant information about taxable objects, taxable values and taxable persons. In addition, when governments need lands to realize certain land use plans public interest reasons, land registers and cadastres provides information about right holders to be compensated in the land acquisition process. In this way people's land rights are secure and respected and the risk of eviction is avoided. When land reform is at stake, land registers and cadastres provide information about the existing land tenure pattern and provide an operational process to change from old to new situations. Land use and land policy issues lay at the centre of the good economic, social and physical development. Improvement in many inter-related spheres such as economic development, social stability, investment in physical facilities, agricultural, sustainability, environmental protection, urban growth and management involves a clear and transparent legal and administrative system to be in place to regulate competing property rights and other interests.

**Table 1 Operationalisation of the Research**

Research Objectives	Research Questions	Conclusion
To examine and classify the various types of Public Goods and Services and their relation with land	What are Public Goods and Services and what are their characteristics?	Public goods are goods "Optimally provided" the state. Non rivalry and non excludability are the two main characteristics of PGS
To Model Public Goods Services using spatial objects	How can PGS be represented as spatial objects?	Public goods can be modelled conceptually as point, line and Polygon
To identify the role of Land Administration System in the provision of Public Goods and Services	What are the legal rights that the state needs to acquire land for the provision of Public Goods and Services?	Land consolidation, land resumption, pre-emption, eminent domain, and escheat for public purpose, sustainable development.
Evaluate the criteria used by the state to purchase or to impose restriction on land use.	What is the role of LAS in the provision of Land Based Public Goods and Services?	Provides information on land value for taxation and compensation, secure tenure. Support land policy and spatial planning.



## CHAPTER 3

### 3. LITERATURE REVIEW ON THE CONCEPTS AND THEORIES OF PGS

#### 3.1. Concepts

Within an economy, there are two major sectors of any economy. These are the public and the private sectors. These two sectors complement each other and ensure the provision of goods and services in the economy. The nature of a good or service consumption determines which sector of the economy can best provide the good at “Pareto Optimal”. The extent of the benefit generated when it is produced and the determinant of consumption of such good or services indicates that a collective or individual initiative is efficient to provide them. In reality, there is no clear definition between a private and PGS. But for a better understanding of what constitute a public or a private good economics have put forth two main characteristic to distinguish between a public and a private good. The adjective “public” may appear vague to give a concise definition. The term public does not imply only to activities under state control.

##### 3.1.1. Public and Public Goods and Services

The words "public" and "private" have often been a focal in policy discussion. Although widely used, their meaning tends to vary within different countries and even within the same nation. The term ‘public’ has a variety of meanings depending on the context that it used. In addition, even for the same activity, service or good, there will be groups who would want to consider the action in the public domain while others want to push it into the private domain. From the academic and real life perspectives, the notion public tend to be things that are not being owned by private actors and has the implication of inclusiveness, that is being for all (Discussion Forum Summary Report 2003).

PGS will refer to services rendered by the state (government) to its citizens either directly (through the public sector) or indirectly (by financing or subsidizing the activities of the private sector). Such services benefit the community irrespective of class or income level. Public service has the features of inclusiveness and most of them may be underprovided by the market (private sector). These services may not be provided at all if left to market (or without government subsidies).

The determination of the term public or private remains in the consumption of the good or service irrespective of its production. When a good or service have the characteristic of non-rivalry and non-excludability, then it is considered to be public irrespective of whether it produced by the public or private sector. What is made public or private is highly a political decision.



### **3.1.2. Public Interest and Public Purpose (PP)**

The concept public interest is synonymous to social welfare. The dimension of public interest is usually not clearly defined. In most country legislation, it is stated that that state can interfere into private right for public interest. But most law do not clear define what a public interest. There is ambiguity in the definition of the term public interest, but for the benefit of the public at large. Public interests are activities under-taken by economic agents that affect the wellbeing or welfare of the general society. The public interest is central to policy debates, politics, democracy and the nature of government. However, the extent of the public beneficiary is not clear and therefore, various countries have diverse definitions of public interest, which refers to benefiting either all members of society or certain groups (People's Republic of China Country Report 2007).

There are different views on how many members of the public must benefit from an action before it can be declared to be in the public interest. According to (People's Republic of China Country Report 2007), on the one hand, an action has to benefit every single member of society in order to be truly in the public interest. On the other hand, any action can be in the public interest as long as it benefits some of the population and harms none. It is possible that in some cases, the public interest interferes with private or individual interest or the interest of the minority. Therefore, protecting the interest of the minority (of the individual interest can) also is considered as part of the public interest. The phrases "public interest" shall be used to refer to activities that benefit the public at large as distinguished from activities or interests that benefit a private individual.

Another terminology of interest is PP which is changing concept. It refers to the purposes which have been thought to be suitably public. That is those for which the government may own assets to be used in a release of its public tasks or to be held as charged with a public use. Therefore, private rights may be intruded or taken for provision of streets, highways, parks, recreational public grounds, cemeteries, air and seaports for the purpose of the public. Public interest and purpose will be interchangeably used henceforth.

### **3.1.3. Private Goods and Services (Market goods and service)**

Private goods are goods provided by the private section of the economy. Private goods and services are goods whose use or consumption benefits only the consumer (Block 1983). They are goods that when produced, the consumption by one person affects the consumption of the other person and the total supply of the good (once consumed by one person, it reduces the available for the other person to consume). In the case of private goods, the consumer can prohibit all others from the benefits. They are goods provided based on the market forces of demand and supply. The main determinant of the ability to consume such good is the price. Private goods are not to satisfy public interest. They provide satisfaction only to the immediate producer and consumer.

There are two distinguish characteristics of a private good or service- Rivalry and excludability. By rivalry it means that the consumption of the good by one person makes the good not available for the other. For a good, service, or factor to be "exclusive", everyone but the buyer of the good must be excluded from the satisfaction it provides (Block 1983). That is when the owner of the product has the right to exclude all other consumers or users from consuming the good. Examples of private goods include loaves of bread, cloth, cars, etc.



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### 3.1.4. Public Goods and Services

While many goods and services can be effectively and efficiently provided by the private sector (market or individuals) sector, there are some few goods that can be effectively provided by governments or the public sector. Generally, governments try to provide the goods and services that are necessary but that individual consumers might not purchase directly on their own. These goods and services provided by the state are termed PGS.

Economist has put forth various definitions of the term PGS with the characteristics of non-rivalry and non-exclusion as the re-occurring term in the definitions in academic literatures. PGS theory assumes that with these two characteristics of “Publicness”, such goods cannot be produced efficiently by the private sector of the economy. The private sector creates market failure which seeks a role for government in the production of those goods for which the market fails. Before the Samuelson’s article, PGS were assumed to be goods provided by the public sector (Holcombe 2000). Paul Samuelson is usually credited as the first economist to develop the theory of PGS. In his classic 1954 paper “The Pure Theory of Public Expenditure”. He defines a PGS, or as he called it in the paper a “collective consumption good”, as follows: “[goods] which all enjoy in common in the sense that each individual’s consumption of such a good leads to no subtractions from any other individual’s consumption of that good” (Samuelson 1954). That is, a good when supplied, implies a supply to everybody. Samuelson’s definition only considers the characteristic of “Jointness” in consumption.

Economist after him also recognized non-excludability as a feature of “Publicness”. According to (Campbell 2007), a PGS is one which is provided in the same amount to all consumers if it is provided at all. Also, (Kaul 2000) PGS are defined as goods produced by state for the interest of the public or community with non-rivalry and non-excludability in consumption. PGS are goods or services that can be consumed by several individuals simultaneously without diminishing the value of consumption to any one of the individuals. Economists define a PGS rigorously as a good that is non-“rivalled” and non-excludable in consumption. This means, respectively, that consumption of the good by one individual does not reduce availability of the good for consumption by others; and that no one can be effectively excluded from using the good. Pure PGS are subject to non-exclusion and non-rivalry in consumption and their production is financed indirectly through taxes. Examples of PGS includes; public school, hospitals, roads, railways, Wildlife Park, national parks, green areas, public spaces, environmental conservations etc

### 3.2. The Theory and Characteristics of Public Goods and Services

The political struggle over what to make/keep public and private is an age-old one. What is considered public or private is not the same in all countries and even within the same country it changes over time. The public/private issue has always been a debate with fussy boundary because countries worldwide have been changing to and from nationalization, privatization and economic liberalization (Discussion Forum Summary Report 2003). However, some goods considered as PGS are thought to be produced by the state while private goods are produced by the private sector control by the forces of demand and supply (Market mechanism). Samuelson argued that there is no good revealed-preference mechanism for PGS, so they will not be produced efficiently in the private sector. Regarding to conventional economic thinking, the state should provide PGS and services. This assertion seems too clear and accepted by many other economic scholars. The classical economist are of the view that, it is the objective and function of the state to provide basic the needs of citizens that



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cannot be offered by the private sector restricted by high organizational cost. Organizational cost are usually high when it comes to the context of PGS such as dikes and road construction network (Philipp 2006) and such cost are in most cases too high for a private firm given that it is not possible to charge the consumers for the all benefits.

PGS theory has been a cornerstone of the economic theory of the public sector since the 1950s. PGS theory asserts to explain why goods with the rigorously defined characteristics (non-rivalry and non-excludability) of “publicness” cannot be produced efficiently by the private sector of the economy. There is the risk of creating a market failure which implies a role for government in the production of those goods for which the market fails (Holcombe 2000). Given the characteristic of a PGS, people can consume (free ride) the good without paying. The private sector will under produce such goods and this will lead to under production (market failure) and thus requires the state intervention in their production. Public sector production is thus required for efficiency production of PGS. Nevertheless, Samuelson rigorously defined the term and showed why markets fail to produce PGS efficiently. Most economists have accepted the notion that for reasons of efficiency the government has to produce PGS, and PGS theory has become the foundation of the theory of public expenditure.

Most theories on PGS look at the production of these goods as the responsibility of the government. As cited by (Brownstein 1980) citing Pigou popularized the idea that the existence of external benefits is grounds for government intervention, which would take the form of a subsidy to the activity generating external benefits. In contrast to this view, Musgrave argues that the consumption or production of primarily private goods also give rise to external benefits.

The PGS justifications for the state is of immense interest to economists and political scientists. While a market system may allow profit oriented individuals to create and allocate many goods optimally, there existed classes of goods (collective or PGS) that are not produced adequately in a market system. These goods are goods that all individuals want but for whose production it is often not individually rational for people voluntarily to do their part to secure a collectively rational outcome (Garrett 1992). Examples of such goods are national defense, Road construction; flood defense (dykes), education, hospitals, urban parks etc. It is worth noting that some of these goods can be provided by the public sector can also best and efficiently provided by the public sector.

An often recurrent example of a public good in conventional public finance theory is national defense. National defense is one of those PGS that cannot be provided efficiently by the private sector. There could however be reasons why the market cannot produce national defense. Generally, government activities are a representation of the result of mutual advantageous exchange between the citizens and the government. (Buchanan 1968) recap the case of Hobbesian anarchy to re-iterate why national defense should be provided by the public sector, in which no social rules exist and the strong loot the weak. Under such situations of insecurity, weak becomes reluctant to produce and the strong will not have enough to rob. In this regard, nobody is better off. The exchange model of government explains much about the design of government institutions. Through national defense the government protects its citizen which is the source of its revenue.

PGS theory is well-established as a theory of public expenditure that it is often accepted as sufficient explanation, when considering why a government does execute an activity. It is observed that most of the actions of the government are to provide social goods and welfare services that that benefits the public. According to (Holcombe 2000), PGS theory would not provide a substantial theoretical basis



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for explaining most of the activities of the government as being public. He based his argument was based on the capitalist view that earlier economic analysis on PGS theory elaborated the myth that in real world, PGS can also be produced by the private sector. He pointed out that most government restricts the service of national defense to the public sector as a result of self-interest of those in the government and public interest is secondary. Furthermore, it shows the production of national defense as an activity that benefits those in government directly by protecting their source of income (Holcombe 1997). It is reasonable, moreover, to question whether national defense is actually PGS. People unthinkingly equate protecting the borders of a nation with protecting the individuals within those borders. Economic literature has proven this thinking as a fallacy. It becomes apparent that national defense protects the sovereignty of the government, and only peripherally protects the citizens under that government.

By the Samuelson definition, a good is public only if existing users of a good would not have to give up any of their consumption in order to allow additional users to use the good. Therefore, a good in which an increase in the number of users results in some users losing, may not be considered as a PGS. The analyses of single human actions have shown that if people do not build dikes or not “enough” dikes, they demonstrate that they want to use their resources for something they value more highly. If people are not in agreement to share the burden, forcing them by taxation to an “agreement” they do not want, and building a dike, obviously lowers social welfare (Philipp 2006). E.g., if two individuals A and B live on the coast of a sea, A and B can cooperate to build a dyke. Also, if one person is not willing to cooperate, then he both revealed his preferences to live at risk of flood and allocate his resources to something else. This choice of combine leaves him better off than paying for the dyke. To actually ensure that the government is producing a PGS, it would have to be shown that if the beneficiaries of the good have to increase, the existing group could consume just as much without any additional expense (Holcombe 2000).

The PGS theory of national defense is based on the premise underlying economic model which assumes that people act in their own interest. This theory suggests that the government produces national defense as a PGS because if left in the hands of the market, there would be market failure. Samuelson argued that there is no good revealed-preference mechanism for PGS, so they will not be produced efficiently, if at all, in the private sector (Samuelson 1954). Public-sector production is thus required for efficiency

Samuelson's articles show the implication that PGS should be produced in the public sector. The logical problem is that even if market production fails to reach the theoretical ideal of Pareto efficiency, there is no guarantee that government production will be any more efficient than private production. As (Buchanan 1968) explains, if Pareto efficiency is used as the benchmark for success, then government can fail to allocate resources efficiently in the same way that markets can. Thus, one would, have to compare market versus government production by evaluating the real-world institutions in each case, rather than comparing the theoretical efficiency of Pareto optimality with the real-world performance of markets (Buchanan 1968). Pareto efficient means any exchange or reallocation of resources is only Pareto optimal if the exchange or reallocation will not harm somebody. However, the two contrasting view of market failure and government benefits tend to have some real world reality within as in seen in the exchanged model of the government.

In his articles (Holcombe 1997; Holcombe 2000), is also pointed the alternative view that national defense is for the benefit of the state. It will therefore be the responsibility of the government to



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protect its territory and citizens from foreign invasion. While protecting the citizens, the government is also protecting its source of income as the citizens are assured of their safety and re-enforces their incentive to be more productive as long as they pay their taxes. This rational exchange of protection for tribute is the fundamental exchange that defines the relationship between the government and its citizens.

Given the diverse literature put forth, it can be concluded that PGS and services should be provided by the state as result of market failure associated with their production. This is because private sector cannot charge for all the benefits. Thus, the government makes provision for basic goods and services. With the characteristics of these goods, the governments have to apply coercive measures in order to fund their expenditure. This has been the views of economics. Organizations works to meet the needs of community and the state appears to be one of such organizations. To conclude, it is difficult to absolutely distinguish between the private and the public sector. The two are intermingled among each other as the private sector provides products with some public characteristics and vice versa. Moreover, it is inherent that non-rival and non-excludable good must be public, or a rival and excludable good must be private and is best left to the market. The properties of goods changes over time and their provision changes sectors. In addition, what is public and private [(non) rivalry and (non) excludability] is a result of political decision of choices. The phrase PGS(s) shall be used to refer to the economists' idea of goods (in the broad sense that includes both "goods" and "services") that meet the criteria of non-rivalry and non-excludability.

PGS and/or service will be interchangeably used as goods and/or services whose consumption is not decided by a single person but by the society as a whole financed by taxes. Also, they are goods that the consumption of "consumer X" does not reduce the amount available to "consumer Y" and X cannot Y from the consumption of the good when it is produced. Such goods must not necessarily be provided by the government and it can be provided by private sector.

### 3.2.1. Characteristics of Public Goods and Services

Given the above mentioned definitions of PGS, there two main characteristics of a PGS. These are the characteristics of non-rivalry and non-excludability. PGS like the war on terrorism, national defense, judicial system, and police protection, roads, railways etc cannot efficiently be produced through the private sector.

#### ❖ Non-rivalry

By non-rivalry, it implies that one person's consumption doesn't diminish the amount available to other person the good (Varian 1998; Campbell 2007). This implies goods cannot be confined to only those who have paid for it. In this sense, non-payers can take a free ride and enjoy the benefits of consumption. Once such goods are produced, they are available to every member in the society.

#### ❖ Non-excludability

Another characteristic of PGS/service is that of non excludability. These are goods that an individual cannot be prevented from consuming the good whether or not the individual pays for it. That is the goods cannot be confined to those who have paid for it. In this sense, non-payers can take a free ride and enjoy the benefits of consumption Non-excludability is a relative and not an absolute



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characteristic of most PGS. A good is usually termed non-excludable if the costs of excluding individuals from consuming the good are very high.

To conclusion, the service rendered by the state are considered as a public service. Public in the sense that they are devoted to the public interest, that they are for everybody. However, there can be many other views in which the term public service can be considered; service to the public, service on behalf of the public, service providing PGS, service accountable to the public etc.

With enormous controversies of the term “PGS”, a service is considered to be public when it does not refrain to be public even in the hands of private ownership. (Haque 2001) pointed out five specific criteria or measures of public service to define publicness;

- I. The degree of public-private distinction: though there is no clear-cut distinction between the private and the public sector, a service is public service when it has the characteristic of impartiality, openness, equality.
- II. The scope and the extent of the recipients: according to Haque, the larger the number and wider the range of service recipients, the higher the degree of publicness, and he refers to a ‘shared and universally accessible domain representing the interest of all citizens’.
- III. The extent of the socioeconomic impact of a service: When the impact of a service is felt by wide range of the society and the more intense role the service represents, the greater the degree of publicness. This is also one of the characteristics of a public which is the extensive scope of their social impact or externalities.
- IV. The extent of public accountability: this goes beyond the existence of institutions to the extent to which those institutions are influenced by particular classes or sections of society. The institution accounts for its services beyond its institutional frontiers and also to the members of the community or citizens.
- V. The level of public trust: that is, how much people trust the credibility, leadership or responsiveness of a service. Services which guarantees trust worthiness without limited social influence will increase public trust in PGS.

There are other criteria for assessing whether or not a service is to serve the public. Unlike PGS, PGS also possess the features of non-rivalry and non-excludability. In different countries there are different patterns and forms of ownership and control of public activities as the term public is used.

### **3.3. Impure Public Goods and Services**

Between the public and private goods, there are some goods that either of the two characteristics of PGS. Such goods are termed quasi or impure PGS. Impure PGS will have just one of the two characteristics of a pure PGS-non-rivalry and non-exclusion. Impure PGS are those goods that combine the properties of both public and private goods i.e. they are either excludable and non-rivalry (club goods such as road toll fees) or rivalry and non-excludable (common resources such as community grazing land). However, in the real world, there may be no such thing as an absolutely

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non-rivalled and non-excludable good; but economists think that some goods approximate the concept closely enough for the analysis to be economically useful.

### 3.3.1. Common Resources

The economic school of thought perceived common resources as also a category of free goods i.e. resources abundant in supply by nature to meet the needs of all. Common pool resources are those own by a group of people with a given community or area. The management of such resources are by the members of the society. Aristotle observation of the relationship between property and resource proves that resources in common use are prone to rapid depletion (Cole 1999). However, as result of competition and either over exploitation such goods are now considered as common goods because of rivalry (the consumption of one person diminishes the amount available to the other consumer) in consumption though excludability is difficult. In most cases, common resources yields social benefit to the great number of consumer but has the least care given on it. This is the situation often referred in most literatures as the “Tragedy of the Commons”. This concept is applied in cases of environmental goods which in rare cases are in the hands of private individuals.

### 3.3.2. Club Goods

It is another category of an impure PGS whereby it is possible to exclude consumers who cannot offer to pay for the good but there is no rivalry in consumption. In this regard, all those who can afford the good can consume as much as they can without diminishing the amount available for the other consumers. Example of such good is road toll fees.

**Table 2 Different Categories of Goods and Services**

	<b>Excludable</b>	<b>Non-excludable</b>
<b>Rivalry</b>	<b><u>Private goods</u></b> Examples such as; Shoes, clothes, TV sets, mobile telephones etc.	<b><u>Common Resources</u></b> Example such as; Community grazing land Community forest, farmland
<b>Non-rivalry</b>	<b><u>club (Quasi) PGS</u></b> Example such as; Road toll fee, touristic sites	<b><u>PGS</u></b> Examples such; Dykes for flood defense National highway roads, railways, airports etc.

### 3.4. Free Goods

Economic resources are usually very scarce or limited in supply. They have opportunity cost; i.e. the cost of using them in the production of a given good forbids using them in producing another good. However, there are few exceptions. There are some goods which are abundant in supply and meet the needs of all. Example includes water in the sea, sand in the desert and air. These goods are termed free goods.

Free goods are goods usually needed by the society and they are abundant in supply. In economics, it refers to goods that are not scarce. They are goods with zero opportunity to the society or to the individual and are provided by nature in most cases. Also, they are goods which do not adversely affect an agent's working capacity and initial constraint.



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A zero price good is different from a free good. This is because some goods can be produced as by-products of another good. E.g., a super market may offer a free car parking space for its clients. This does not mean that such lands are free goods. The super market incurs cost in providing parking space available for their clients. Typical example of free goods are air, water etc. The market fails to include the value of free goods.

### **3.5. Public Goods and Services and Externalities**

In capitalist or market economy, optimal resource allocation is through the market forces. When economic resources become scarce, they are reflected by high market prices. The markets through the price mechanism lead to Pareto optimal allocation resources in an economy. Through the market consumers reveals their preferences for good or service they value and are willing to buy at the given market price. It is therefore difficult for every member in the society to benefit from market activities directly. In theory, the market is assumed to affect solely the participants in the market. In real world situations, market actions results in spill over effects which affect people not directly involved in the market. E.g., an individual may create a street leading to his house. The cost of the street may be incurred by him but the other people leaving around his house will also benefit from the street. The claim is that the private individual is responsible for all of the costs but only partially compensated for providing the benefits to other users. Therefore an addition unit of expenditure will yield a higher return to investment (were all remuneration to be measured) than it would in another use.

#### **3.5.1. Definition of Externalities**

In economic theory, costs and benefits that are not included in the production or consumption costs but directed to third parties are referred to as externalities (Dorner et al 2008). An externality will also arise when production or any economic undertaking an agent interferes into the welfare or production option of another agent without reward or consent of the agent.

Externalities can also be defined as the actions of one or more economic agents that may result in uncompensated physical and actual economic effects for others not involved in the process (Arild and Daniel 1996). Unlike PGS, the concepts of externality had also undergone many policy discussions. Since its inception by Marshall (Arild and Daniel 1996), it has also influenced the stability of the economy and ended with different definitions. In the context of this research, externality is defined as the spill over effects of production or consumption which yields cost or benefit to a third party which is not taken into consideration by the economic agent undertaking the activity (activities). E.g., the cost of water pollution as a result of a land use upstream of a river is usually not included in the cost of production of the upstream land owner or land user.

The concept of externality is strongly associated with PGS. The main disparity being that; scholars view externalities from the negative and positive side. On the other hand, PGS are viewed from just the positive perspective while ignoring the concept of “Public beds”. There are similarities between externalities and PGS. There are activities that have impacts on third party. The impacts are not often taken into consideration by the economic agent(s). Example can be the realisation of public (goods) facilities. On one hand enhances the market value of the nearby lands due to its accessibility. On the other hand, the land value will fall if the facilities to be realised is nearby an airport or motorways due to noise. Externality can be positive or negative.



### **3.5.2. Positive Externalities**

Positive externality arises when the activity (activities) of an economic agent(s) result to benefit a third party who has not contributed to the realisation of the activity. Example road construction results in positive externalities. A road construction project may be associated with many benefits such as increase in the land value along the road, cheap, quick and reduced transport cost. When such road projects are realised by the public or private sector, it will be difficult to charge citizens for all the accrued benefits associated with the road. If such a project was realised by private firm, it can charge tolls to road users. However, the private company cannot charge for the increase in land value, cheap means transport to the citizens along the road. If realised by the public sector, they can charge for the increases in land value through increase real property value.

### **3.5.3. Negative Externalities**

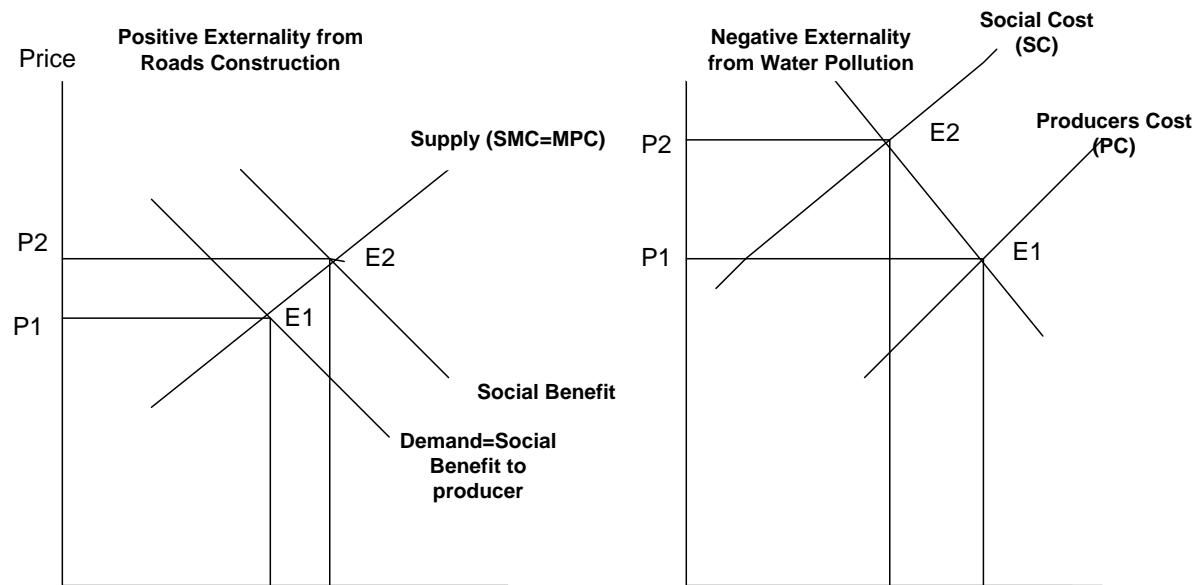
This is when the action(s) or individual(s) engages in an activity that adversely affects the wellbeing of another person not involved in the activity without reward or the consent of the affected person. E.g., a negative externality can arise when a land owner applies fertilizer to boost agricultural production. When this fertilizer dissolves, it can run-off into streams causing water pollution in other ecosystems. In this case it clear that the immediate benefits of fertilizer would be to the landholder, but the downstream consequences would not be charged to him due to spatial and temporal separation and the very diffuse nature of the effects. However, the cost of purification or compensation for damages is not taken into consideration in the cost of production of the land user upstream. Also, water pollution from industrial plants that discharge it waste in rivers is not taken in to consideration in cost of production of the firms.

It is worth noting that externality may result from both public and private activities. Public externalities can be easily internalised through public policy instrument. Externalities also exist in the form of spatial form. The fact that an activity takes place in a given area, its impact also has a spatial extent that can be felt. In addition, there is the existence of inter temporal externalities. Human or nature activities take place at a given time tends to affect future generation. E.g., the extinction of certain species of flora and fauna at a given time is not available for future generation. Generally, economic actors do not bear the entire cost or reap the all the benefits from their actions that impact on the welfare of the society. The effect of both a positive and negative externality is show on the diagram below;



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**Figure 3.1 Positive and Negative Extenality**



In the case of positive externality, the cost of constructing an additional length road (MPC) is the same as the price additional cost (MSC) paid by road users ( $MSC=MPC$ ). In this case, market equilibrium E1 is established. The efficient equilibrium would have been established at E2 if the benefit that accrued as a result of the road project were considered. Therefore, the benefits that accrues to the economic agent is less than that which goes to the society ( $MSB > MPB$ ) and the agent cannot charge for the benefit.

In the case of negative externality, the benefits of producing an additional unit of product (MPB) is the same additional benefit enjoyed by the society ( $MPB=MSB$ ) paid by road users. In this case, market equilibrium E1 is established. The efficient equilibrium would have been established at E2 if the cost result from the water pollution from the firm were considered. Therefore, the cost that results to the society for water purification is higher than that cost of production of the firm ( $MSC > MPC$ ) and the agent cannot be charged for the pollution.

### 3.6. Public Sector and Infrastructural Provision

The public sector plays an important role in the provision of different infrastructures. Public sector organisations are mostly responsible for infrastructural development (Rwelamila 2007). Infrastructures are provided by different public agents under different ministries in the government.

The public sector in providing PGS needs consider private citizens' rights especially those whose properties are affected. The perception of property rights is misinterpreted by the citizens. The misinterpretation arises from inaccessibility of the legislation. (Ghyoot 1998) states publication of legislations in many developing countries are deficient in respect in the way of publication, the way they are defined and the relationship between the state and citizens. Also, the way the legislations are translated from one language to the other in countries with more than one official language. E.g., in



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Cameroon, most of laws are written in French. The translations are misleading the original context of the laws.




The need for sustained growth and development is a force for government's commitment to investment in infrastructures and environmental developments. Private land use rarely considers that their activities generate externalities to the community and environment. The public sector aims at maximising the welfare of citizens. As stated in article 21 of Dutch constitution "*The state has the responsibility of ensuring that the living condition and environment are protected and improved*"(Needham 2007) [Pgs 122]. The state can intervene into private land use in different ways via different state agencies to provide PGS and spatially plan the best use and allocation of resources. Public involvement in the right and property market depends on the policy.

According to (Ghyoot 1998), the state intervenes into private land use through its agents at different administrative levels and ministries for the following reasons which vary from country to country.

- Provide PGS
- Externalities
- Conservation
- Equitable land distribution
- Effective land use
- Spatial planning (SP)

Generally, the state provision of PGS is often a result of market failures. Each level of administration and ministries are responsible for the provision of given PGS. E.g., the ministry of health allocates resources for hospitals provision; the ministry of public works is responsible for the provision of infrastructures such as roads and rail ways etc. All of such PGS require land. This may result in conflict of interest between the different public units. Through effective plans and SP, the state can integrate the various public interests and determine which PGS to produce on the available land.

**Table 3 Different Horizontal Public Demand for Land -Adapted from (Needham 2007)**

	Different public sector demand for land				
	Horizontal planning level				
	Land for agriculture	Land policy for transport	Land policy for conservation	Land policy for housing	Land policy for schools etc
<b>National level</b>					
<b>Provincial level</b>					
<b>Municipal level</b>					



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The table above shows the horizontal and hierarchical policy objectives in SP legislation with reference to levels of administration. The National Planning perspective at this tier of administration is in the form of general policy guidelines. The different administration and decision making levels play important roles in designing legislations within the sphere of SP. Direct public action in SP is done at the municipal level. SP policies are binding to all citizens.

At different institutional levels, SP are given provision in the legislation to ensure the most effective use of land to provide PGS. Land-use planning execution in the NL clearly focuses on the municipality (Needham 2006; Enemark 2009b) as well as in other at the EU member states.

The state influences land use activities to achieve its goals through planning. This is to ensure the functioning of the land market and to extend beyond regulation and planning to direct participation in land use activities. This is done through SP. Human activities influences what happens on land and space. To meet land demands of different public sectors, an integrated SP is inevitable (Needham 2007). SP cut across the policies of many sector. It guides the public sector on the allocation of resources for different PGS. Through SP, administrative conflicts on land use to provide PGS are resolved. The different public units reach a census when designing spatial plans at the national level. E.g. in the NL, (Needham 2007) states that the latest national SP document was adopted with agreement from different ministries including transport, public works and water management, agriculture, etc.

### **3.6.1. Categories of Land Based PGS (LBPGS)**

Some PGS require land in their provision while others do not. Those that require land were considered in this work as Land Based PGSs (LBPGS). Some of these PGS may require state land ownership, others may not. In this case, the state can impose restriction on land use or take responsibility by playing a supervisory role to ensure the PGS is produced.



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**Table 4 Categories of Land Base Public Goods and Services**

<b>Public works Department</b>	<b>Department of education and health</b>	<b>Agriculture &amp; nature protection</b>	<b>Water and flood protection</b>	<b>Energy and Communication</b>
<b>Transport</b>	<b>Public structures</b>	<b>Natural areas</b>	<b>Protection</b>	<b>Public Utilities</b>
Roads/Highways	Schools	Urban and rural parks, National park	Dykes	Powers lines
Railways	Hospital	Natural reserves	Embankments	Sewage
Airports	Public offices (police stations, Post office etc.)  Court houses	Environmental conservation Agricultural lands		Pipe lines  Telecommunication network
Seaports, water ways, canals	Museums			

PGS which are land based can be grouped into infrastructural PGS such as roads, railways (ministry of transport), schools (ministry of Education), hospitals (ministry of health), public offices, pipes and cable network (ministry of mine and power), dykes and embankment. Other PGS also includes; national reserves, urban and rural parks, environmental goods such natural habitat, nature conservation, green areas, agricultural lands (Ministry of nature protection) etc.

However, there is a wide range of PGS which are not direct related to land such as law and order, securities, and fire protection unit. Such PGS will not be considered in this research. The essence is to relate LA as it supports the provision of PGS. The table below shows the categories of LBPGS that will be used as examples of PGS.



## CHAPTER 4

# 4. SPATIAL MODELLING OF PUBLIC GOODS AND SERVICES

### 4.1. Spatial Modeling

Spatial primitives of GIS are used to conceptually model PGS object in the real world. It leads to the attainment of research objective two and provide answer research question two.

Geographic objects have a spatial dimension and location as they occur in space. Geographic Information System (GIS) is mostly used to model objects spatially. (de By, de By et al. 2004) [PGs 70] defines a GIS as a computer based system that provides the following four set of capabilities; data capture and preparation, data management (storage and maintenance), and data manipulation and analysis and data presentation to handle geo-referenced data. It can also be defined as a computer system based for input and entry, storage, management retrieval and output of information. The information in GIS relates to the characteristics for geographic locations or areas.

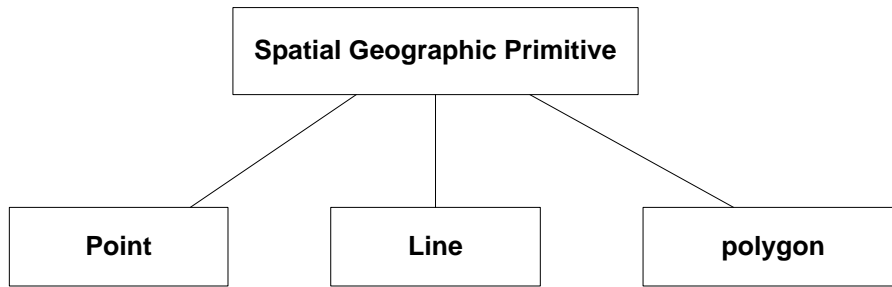
They are tools used to model features on the earth surface in a digital environment. The use of GIS in the allocation of PGS is important. It is utilises as an inventory and management tool to support adequate spatial distribution public facilities and resources for citizens' benefit. Areas prone to natural disasters such as tectonic volcanic active region, floods, earthquakes etc can be mapped easily using GIS It can provide public safety restricting development in such areas.

Given the variety of information that can be stored using a GIS, spatial information are represent in a GIS database using the raster and the vector data model. In creating a GIS application for use, real life elements are made straightforward that can be read, operated and understood by (digital) computers. The two data models; vector data model are used to denote discrete objects such as houses (point), roads (line) or locality (polygon), and the raster data model which is used to represent always continuous observable objects such as elevation, sea surface temperature or climate and also some images captured from remote sensing.

In Geo-information sciences (GIS), there are three spatial primitives that can be used to depict real world objects (both natural and human) in space or on the earth surface (Mandagere 2006). These three spatial representations are in the form of Point, Line and Polygon. They can used to represent PGS in space (on the earth surface). The spatial geographic primitives are as shown on the figure below.



**Figure 4.1 Spatial Geographic Primitives**



## **4.2. Spatial Objects**

Space and place are interrelated to each other. Everything economic activities occur in space, at a place. An understanding of the location where activities occur is important. The spatial effect of such an activity to the surrounding area and resources of the people guides the provision and utilization of resources. They are three ways in which objects can be spatially located in space.

### **4.2.1. Point Object**

A point has no dimension and is the basic representation of geographic object. It is a single coordinate pair  $(x, y)$  and  $(x, y, z)$  in the case of a two or a three dimensional representation respectively (de By, de By et al. 2004). It is also considered as the basic unit of resolution in any Geo-information system (Mandagere 2006). They give a discrete position of an object on the surface of the earth. A Point is use to describe objects with single location characteristics. Points might be used to signify houses, schools, hospital, public offices, wells or geodetic control points. However, the determination of an object as a point depends on the reason of the spatial application and the map scale. In a large-scale representation a building may be shown as an area, whereas it may only be a point if the scale is reduced. E.g., a touristic city map of a given place may show a museum and a park respectively as point and polygon.

In addition to coordinates used in defining a point, more attributes data can be stored in point object. E.g., points indicating houses have a list of attribute to describe the point such as location, house number, owner's name, the type of house, electricity and sanitary facilities etc.

### **4.2.2. Line Object**

A line defines a one dimensional object such as roads, railways canals, rivers, pipe and cables lines (de By, de By et al. 2004). It is a locus of points. The greater the number of points used in developing a line the more detail about the line. A line must contain at least two coordinate pair of elements (the start and end point) for each coordinate dimension. Again, the scale determines if an object is defined as a line.

### **4.2.3. Polygon (area) Object**

A polygon is a 2-dimensional object with properties of area. It is used in abstracting real life features such as cities, reserve areas, district planning zones etc. A polygon has at least three points and connecting lines. It is an enclosed area bounded by lines. The starting point must not necessarily be



the ending point. The physical dimension in consideration to the scale determines whether an object is shown as an area or by a point. These forms of geometric primitives only describe to an extent flat and unchanging reality. It does not include models describing objects in three-dimensional space.

### **4.3. Model of Public Goods and Services**

#### **4.3.1. Conceptual Modelling (UML)**

Conceptual modelling is a technique used for capturing real world data and represents them in a simplified form. A conceptual model represents objects and the relationships between the objects. Models assist users to handle complex real world phenomena conceptually, to find appropriate solutions as well as the relationships between the objects. It tries to clarify the understanding of a vague term and give a unique meaning and clear understanding of the phenomena.

Model can be used as starting point for depicting real objects by making simplified assumption of real world complexities. When the core concepts of a phenomenon have been modelled, the model develops into a constant foundation for later applications in that line of thought. A conceptual model can be represented using different notations such the Unified Model Language (UML) for object modelling.

In UML object oriented model, classes represent objects. The abstract object is represented in a class known as the super class. The lower objects are represented in sub-classes. The super class contain some of the attributes that can be found in the subclasses. One way to model objects using a UML model is representing objects in classes. The class correspond to a given object and its relationship with other object(s). In the context of this study, the UML will be use to model three objects. It will capture- the good object, the location object and the consumer area object.

#### **4.3.2. Class Model**

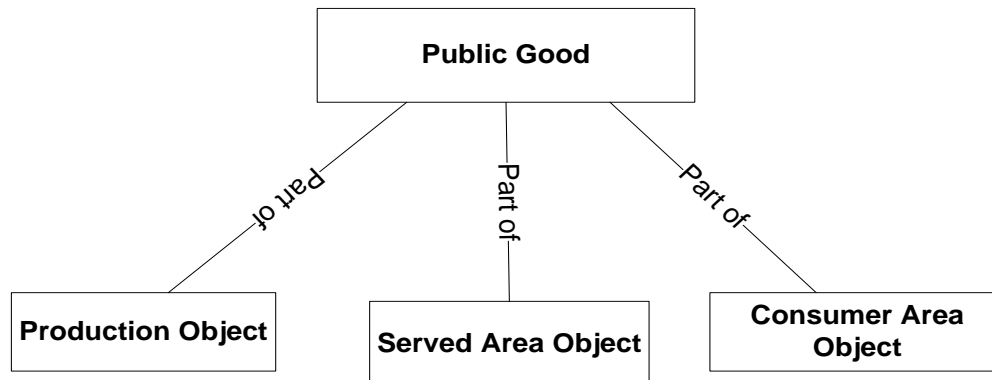
A class model illustrate fixed class object in a system and the relationships that exist between the objects. Two important features of class modelling are simplification of the relationships and aggregation (from whole to parts). Other details like the attributes of an object can be included in a class

A model is as an abstraction of real world phenomena. It is a simplified way of representing real world in the form of maps and reports (Bernhardsen 2001). There is no generic way of abstracting reality for the understanding of all users. E.g., a line drawn on a map may be interpreted differently depended on the professional background of the user. A surveyor may look at the line as a boundary between two parcels; a driver may view it as a highway while a network official may look at it as a road needing maintenance. GIS combine a database of attributes with geographical coordinates, where the attributes refer to points, lines, or areas defined by the coordinates

Models use of assumptions to facilitate the study of a real world by reducing the difficulty involved. Models only make meaning when realised in a database. Unlike humans, computers cannot learn objects. Computers can only manipulate geometric objects which are used in data models. Objects are used to convey information in data models. Objects in space are represented as three distinct spatial elements (Points, Lines and Polygons). These three spatial elements are used to depict real world features and attach locational information to them.



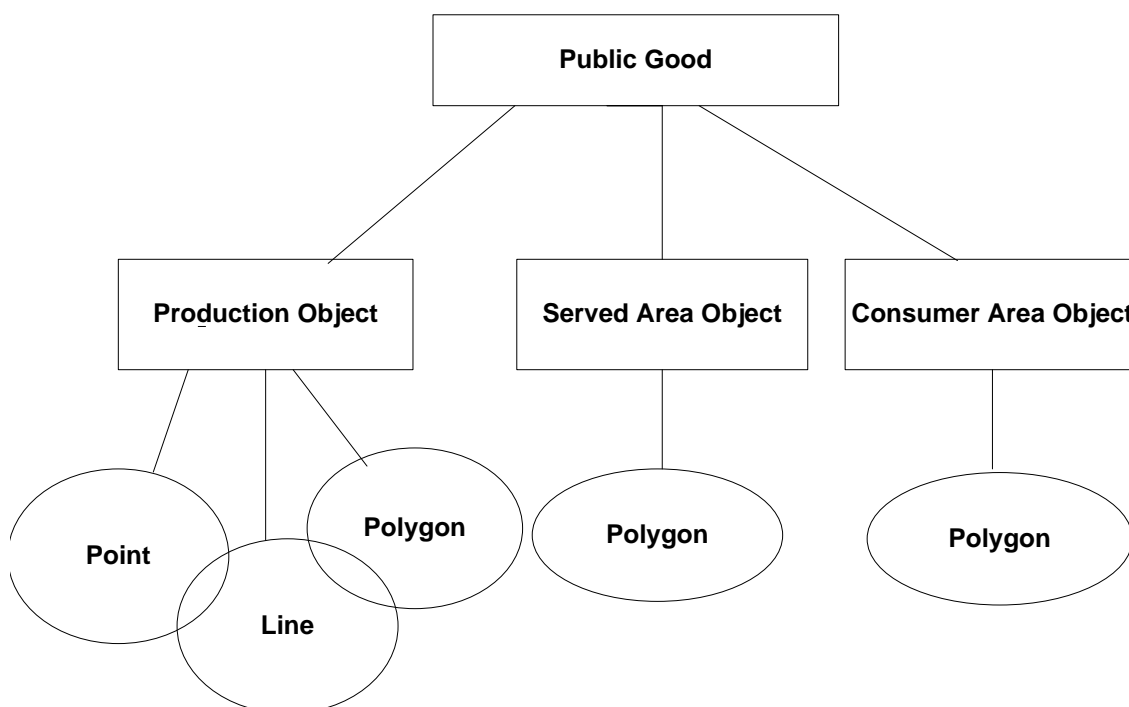
Figure 4.2 Conceptual Modelling of Public Goods and Services



#### 4.3.3. Modelling Public Goods and Services

The PGS object is a high level abstraction of the PGS - the super class. The super class is an aggregation of objects (type of PGS and the public) that constitute the sub-classes: Production Object, Serve Area Object (SAO) and Consumer Area Object (CAO). The subclasses have some of the attributes of the super class.

Figure 4.3 Modelling Public Good Object



**Public Good Object;** this is an abstract class which includes all forms of PGS that can be represented spatially. It is the super class when modelled conceptually. It is composed of three sub-classes; production object, Served area object and the consumer area object.



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**Production Object;** It is the physical infrastructure. The production object generates benefits to the public.

**Served Area Object;** It is a normative object based on value judgement. The served area object is assumed by the planning as the area that benefit from the PGS. The area stands for the intended public. This is the area that benefits from the good at low cost. The area is mostly planned to have “short distance” to the good (e.g. walking distance to schools). It is represented as a polygon.

**Consumer Area Object;** This is the area that benefits from the good at different costs. The cost of enjoying the benefit from the good depends on the distance of the consumers to the good. It is a polygon. The area stand for the Public as that really consumes the good.

### 4.4. Categories of Spatial Public Goods and Services

The table below shows the different types of PGS were presented for which the UML modelling will be further elaborated.

**Table 5 Spatial Categorisation of Public Goods**

Points	Lines			Polygons
Court houses	Pure-lines	Point-lines	Line-protection	Urban parks
Schools, post offices	Network of streets	Railway and railway stations	Dykes	Natural reserves cemetery
Hospital	Power network	Highway with Entry-exits point	Noise protection walls	Environmental conservation Wildlife reserves
Public offices	Pipe lines		Embankments	Agricultural landscapes

### 4.5. Modelling of Public Goods and Services Using Spatial Primitives

#### 4.5.1. Point Public Goods and Services (PPGS)

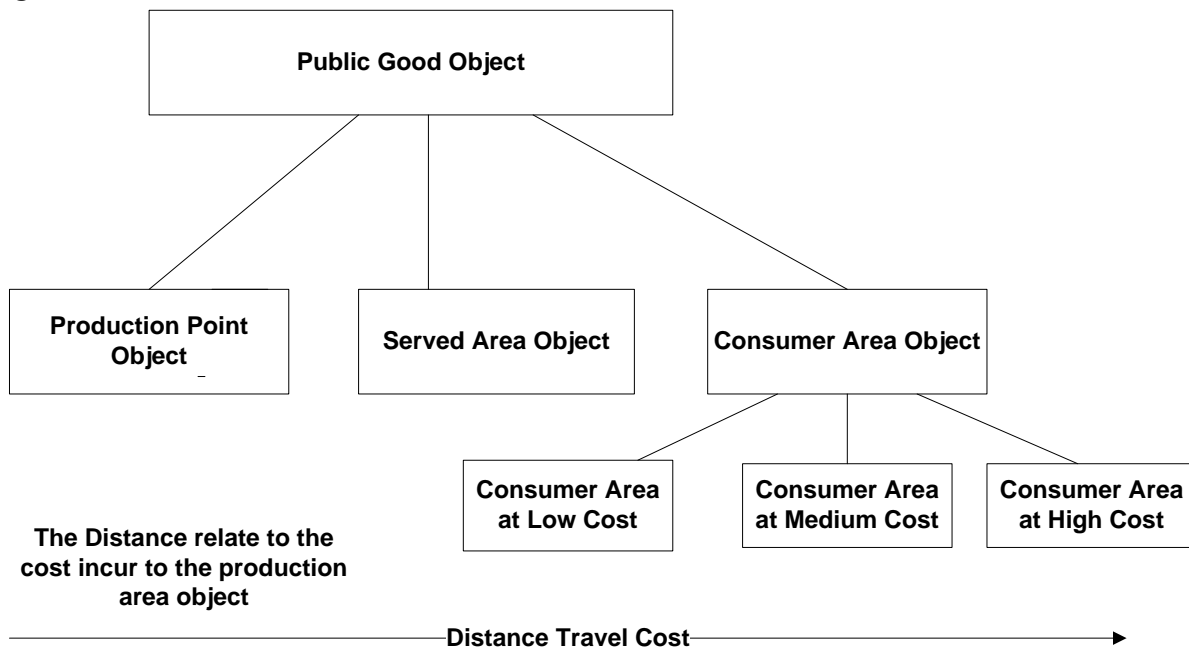
These are PGS that can be modelled conceptually as points. In the modelling of such goods, it is assumed that the public infrastructure requires only a few land parcels land. These goods are immovable properties that are provided for the interest of the public. Examples of such PGS include schools, hospitals, police stations, post offices, court houses etc. A point PGS is designed to serve a given area. This area is in the planning at a given radius (e.g. a walking distance) around the good. This area is assumed to be the public which the PGS is supposed to be served- the Served Area (SA). Apart from the served area object there is the consumer area object. It is the area where other consumers of the good come. These consumers enjoy the PGS at a cost. The cost varies with the



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consumer's distance to the good. A PGS should not be located in an area where there is no public to consume the services. (Church and ReVelle 1974) states that for a given PGS location, distance which any user would have to travel should be low. This is shown in the figure below.

**Figure 4.4 Point Public Goods and Services**

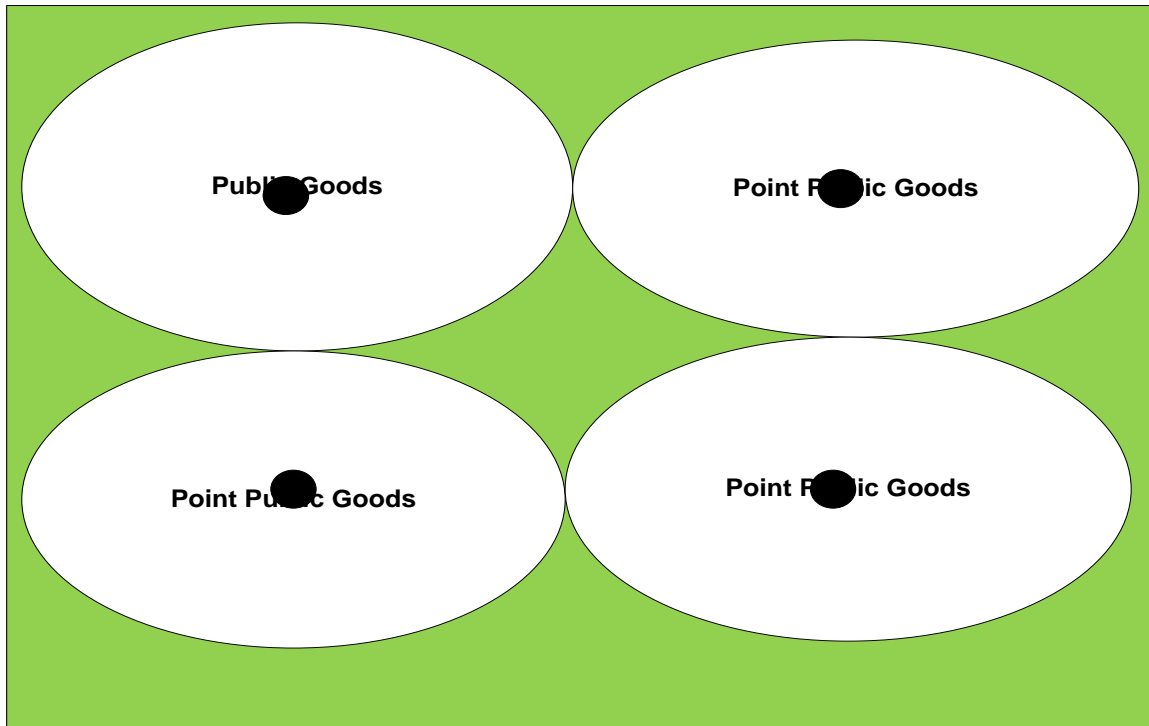


The PGS generates benefits over a range of distances. With PGS, it is possible to establish different cost in consumer areas with the distance to the good. The public which constitute the consumer area object varies with their location to the good. Some are close to good and consumes the good at low cost, others are at medium distance and consume the good at a medium cost while others further away can benefit from the PGS at a high cost. The public sector with its obligation to serve the entire public will strive to locate the PGS in such a way that few people lie outside the desired service distance. This is the problem of the spatial distribution of PGS. This is typically an area in which GIS can be used. It is not further considered in this study.



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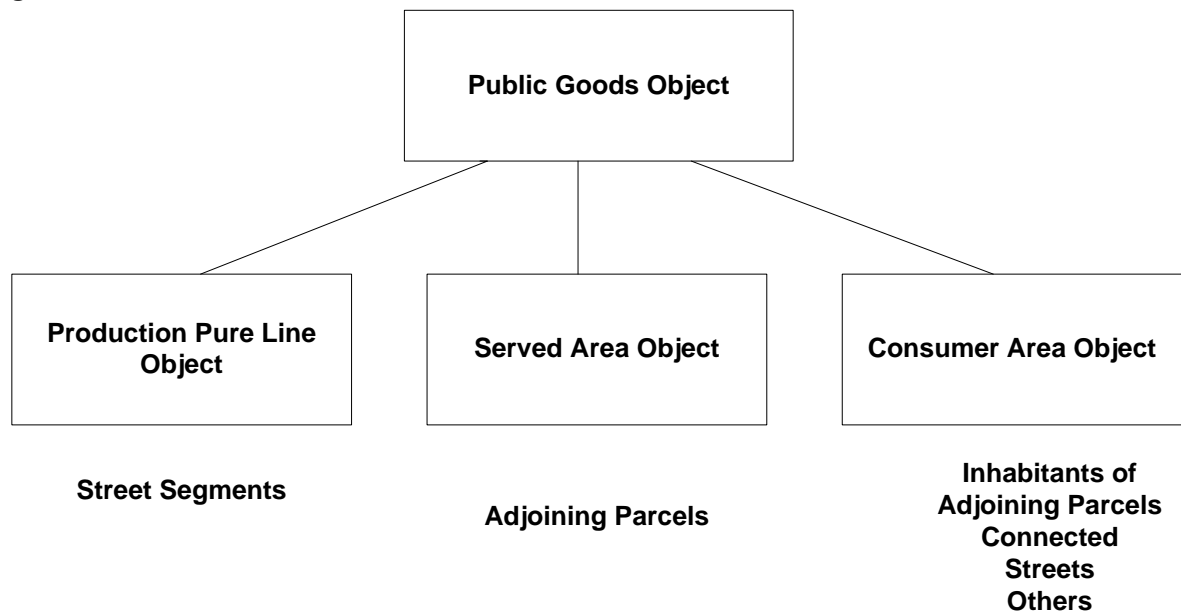
**Figure 4.5 Spatial Coverage (Fair Distribution) of Public Goods and Services**



### **4.5.2. Line Public Goods and Services (LPGS)**

PGS such as transport roads, cables and pipelines are typically line objects. To build them one needs a series of land parcels. The objects serve adjoining land parcels. In reality it is difficult to think of a pure line PGS without nodes. An urban street is possibly the best example of a pure line (production) object.

**Figure 4.6 Model of Pure Line Public Goods and Services**

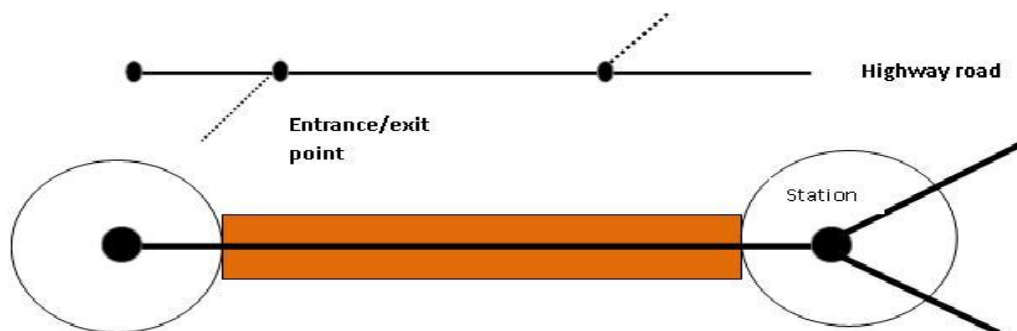




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Almost other line objects need service points (which become a separate type of point object) as will be discussed below. The figure shows how a point line PGS can be represented.

**Figure 4.7 Representation of Point-Line Public Goods and Services**



### ***Point-line Public Goods and Services (complementary PGS)***

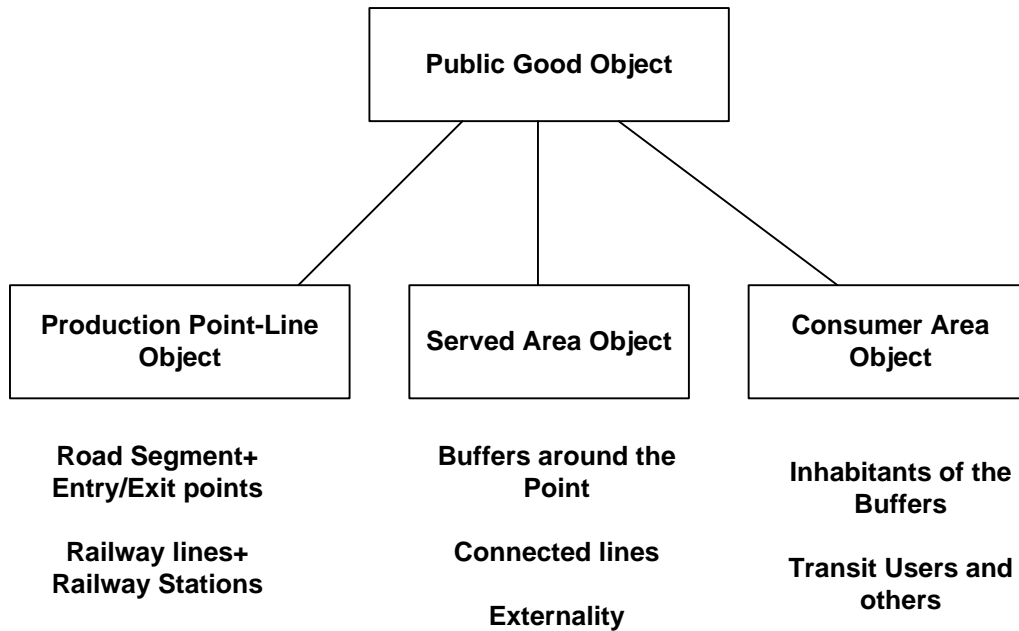
Line infrastructures (Line PGS) such as roads, railway, pipes and cable lines are important public infrastructure in most countries. These infrastructures facilitate the movements of economic resources. Most line PGS have nodes along the lines. The node is an essential element to be able to use the line object. Examples are highways with exit/entry points and railways with railway stations. The lines constitute the road, railway and the points are the stations

The number of nodes along a highway or railway determines the type of the road. High speed roads or railways have few nodes. The figure below shows a model of point-line PGS (See figure above). This is can be model as shown below.

**Figure 4.8 Point-Line Public Goods and Services**



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Along the route network, externalities are generated. They can be positive as well as negative externalities. Negative externality can arise in the form of noise to the public along the network. Positive externality can be an increase in land value along the network and increased mobility of goods and services and reduction in transport cost.

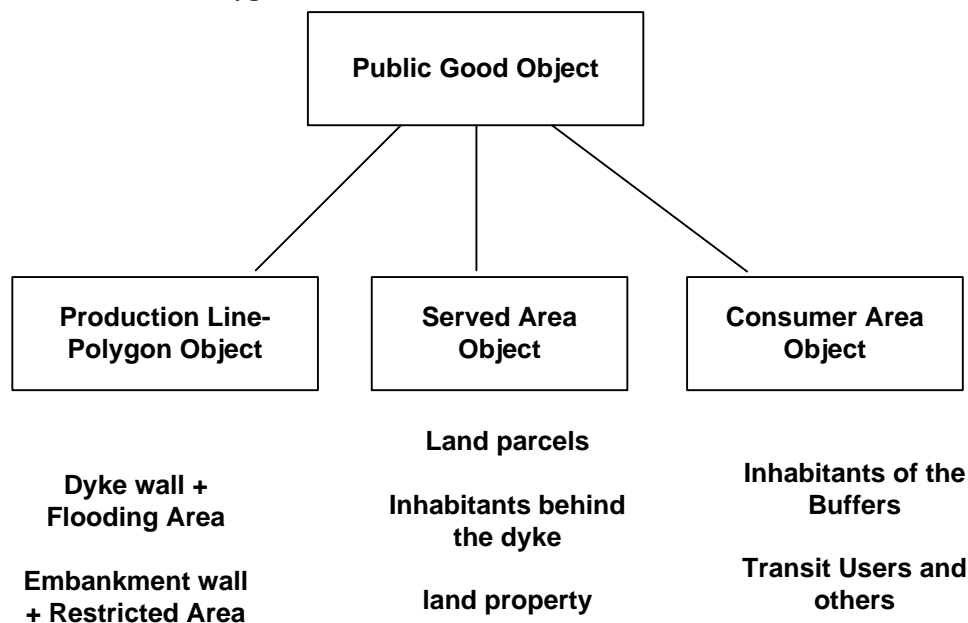
### ***Line –polygon Public Goods and Services***

Line Polygon PGS are largely to protect against hazards such as flooding. A dike along a river needs an area which can be flooded when water levels are rising. The Dutch policy “ruimte voor water” – which allows space for water, is an example of the creation of a public good- flood protection, whereby dikes (lines) are combined with large areas (polygon) for flooding. The line and polygon together provide safety. The consumer area and served area are in this case equal. This can be represented conceptually as shown in the diagram below.



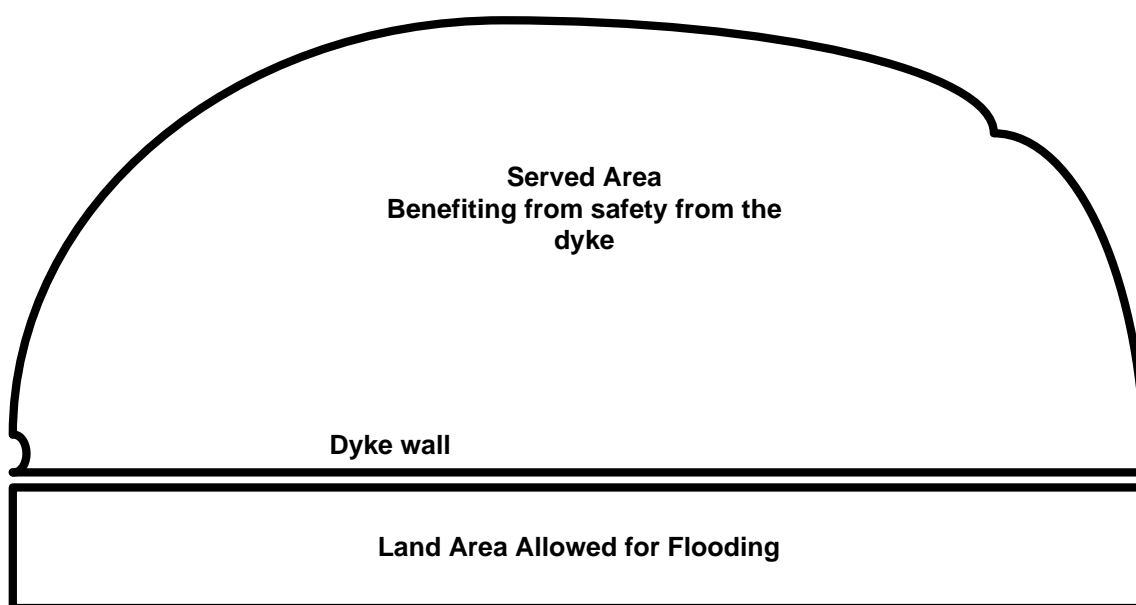
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**Figure 4.9 Model of Line-Polygon Goods and Services**



The area served is the land behind the dike. Inhabitants of that area have the benefit of the PGS in the form of reduced hazard. The public will include those who visit or work within the area that benefit from the LPGS (safety or flood protection) but are living out of the served area. Another example can be an embankment wall to protect a community living on the foot of a hill or slope. Externality can be an increase in land value as a result of an increase in safety within the area which encourages investments.

**Figure 4.10 Representation of line-Polygon Public Goods and Services**

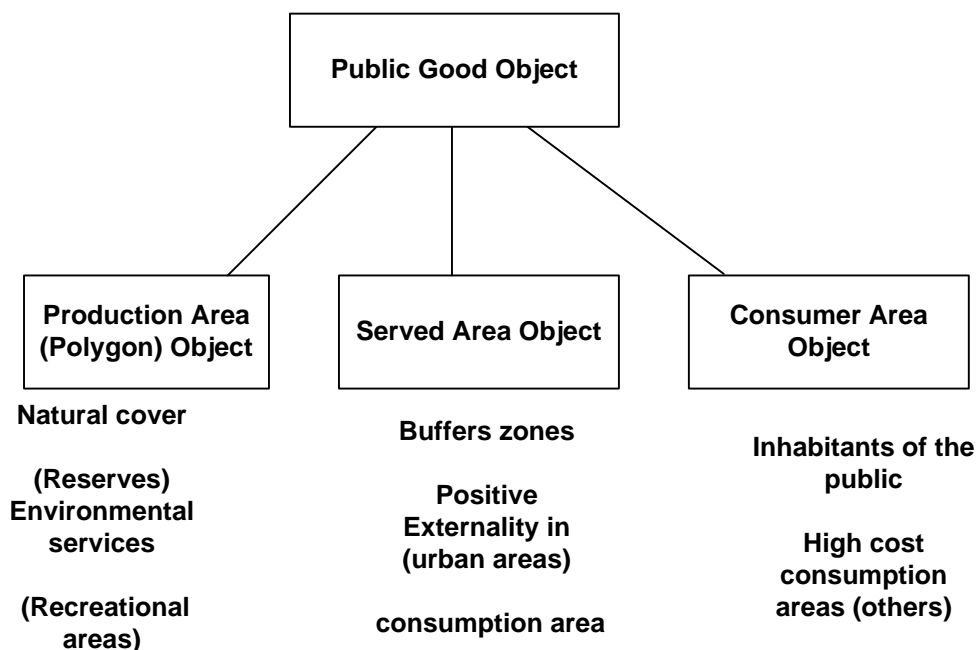




#### 4.5.3. Polygon (area) Public Goods and Services

A polygon PGS will covers a (large) area. Examples of polygon (area) PGS are national parks, game reserve, environmental conservation areas, green areas etc.

Figure 4.11 Polygon (Area) Public Goods and Services



The served area object can cover a large area. Such goods can be of importance to the entire nation. The citizen can consume the product at lower or higher cost depending on the distance to the reserve. Game reserves will have a wider public even beyond the national frontier as it can be a great site of attractiveness to tourists.

To enjoy the good one has to enter the area. With this type of PGS, there are usually regulations controlling entry and exit into and out of the area. However, residents close to such production area (goods) can enjoy benefits through viewing from their residence (e.g. urban parks)

#### 4.6. Conclusion

The state provides PGS for the welfare of people. Some of the PGS and services will need land for their provision. Then the state will have to acquire the land before making the goods. In other cases, the state may have to impose restrictions on private land use or ensure responsibilities to make sure the PGS are provided.

However, land is an important factor of production whose supply is relatively limited. Demand for land both by the private and public sector can be very high. Diverse economic activities compete for a



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given land parcel. E.g., the same parcel land can be for agriculture, industry, residential area and other infrastructural development.

The essence of using the spatial representation makes explicit the spatial dimension of PGS and its impact on land and Land administration. The degree of the spatial impact of the PGS guides the state on the right it can hold or has to deprive in the bundle of rights of others. In addition, LA will assist in providing information about the land value for fair compensation. This implies the RRR associated to the land used to provide the different types of PGS. The type of PGS provided will influence the extent of state rights on the land. Thus, the government can decide whether to own the land, imposes restrictions on the land used to provide the PGS or just sensitizing the public of the importance of the good. Bringing these two concepts [PGS and Space (Land)] will enhance economic knowledge of PGS which did not look into the location (land) component.



## CHAPTER 5

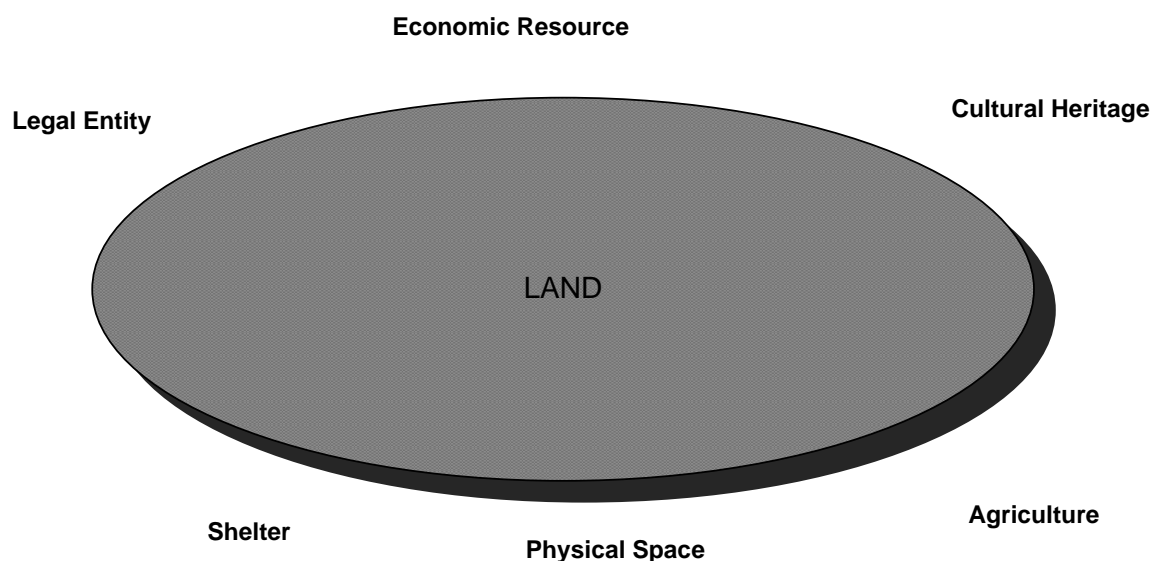
### 5. LAND ADMINISTRATION AND PUBLIC GOODS AND SERVICES CREATION

#### 5.1. Land in Different Perspective

Land is one of the most invaluable natural resource of any nation. (Molen 2005) defines land as the surface of the earth including the materials below and above the surface and everything attached to the earth surface. It includes property and natural resources and should be seen beyond the surface build up areas. Thus, the term land is not restricted to the surface.

Land possesses two distinct characteristics. It is immovable and cannot be created nor destroyed. It is relatively fixed in supply. Land can be seen as a physical commodity and an abstract concept (UN/ECE 1996). The rights related to land are perceived by owners or users. The rights are firmly attached to the land like objects attached to the soil. As a resource, it has different values depending on the use. It can be a physical space, shelter, economic resource, legal entity, cultural heritages etc.

**Figure 5.1 Different perspective of Land**



As an economic resource, land is a factor of production. It is endowed with raw materials used in the production of goods and services. Land is a tradable commodity with value in the land market



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(United Nations 2004). It is a source of revenue to both their owners and for the government through taxation.

Land is seen as physical space. It provides space for almost all forms of economic activities. It provides habitats for all terrestrial creatures. Looking at land from the point to include surface of the earth including the water bodies, then, it is a dwelling place for both terrestrial and aquatic lives.

Land is held also as a source of pride and cultural heritage. In most developing countries people strive to secure lands as a sign of preserving culture. This might lead to crisis due different interest. (United Nations 2004) state that land has been a major source of conflict between nations, tribe and individuals. This leads to economic instability, poverty.

Land can also be seen as a legal entity. Legally, land has an abstract set of property rights. The legislation provides security of tenure that governs land used and how dealings in land are transacted (United Nations 2004). A piece of land has a bundle of rights with extension downwards below the surface of the earth and upwards into the sky. Each stick in the bundle rights can be held by different individuals on the same parcel. According to (Grover 2009), a physical space with defined geo-coordinates may have a number of rights over it, which is exercised at any one time simultaneously by different parties.

Land is resource that requires management for the present and future generation. Such management is attained with the existence of good LAS supported with a well functioning legal system. According to (UN/ECE 2005) a good LAS meets the need of all land owners and provides security of tenure monitors land markets and facilitate the management of State-owned land; improve planning and PGS provision.

### **5.2. The Scope of Land Administration System**

LA is defined as the processes of recording and disseminating information about the ownership, value and land use and its associated resources when implementing land management policies (UN/ECE 1996). This definition amongst others has proved as a guiding tool for policy, academic and research programs. It also captures the fundamentals concepts of ownership (tenure), use and value. These concepts are strongly related to land.

LAS have enormous functions to perform in society including register, updating and keeping cadastral records, providing information to support spatial planning, land value, protecting the rights of the vulnerable group, poverty reduction etc. LAS are concern with the management of rights related to land and other real properties.

LAS are the basis for conceptualizing RRR related to people, policies and places. LA is basically about people, politics, and places (Enemark 2009a; Enemark 2009c; Enemark 2009d) . People relates to land via the land rights. It is a source of wealth to the right holders. Good governance and policies relates land to politics. They are concerned with LAS is with the social, legal, economic and technical framework. Effective LA and management operate better with good political support while Places relate to land as a source of shelter, rural and urban space as well as a natural resource.

Governments are increasing their concerned to sustainable a LAS because it corrects the imperfections in land and property markets. These require intervention and regulation, principally, but



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not exclusively by the state (Grover 2009). The functions of LAS are not an end but a means to an end. The smooth functioning of LAS relies on various government policy instruments to assist them attain and implement land policies. All of such functions cannot be effectively done in the land market. The land market cannot allocate land for PGS, common property resources and cannot handle the problems of externalities. As a result, LAS have an exclusive position to assist the state in regulating the imperfections in the land and property markets.

LAS support the state to provide PGS as it protects property rights. It provides security to all right holders. In addition tenure security, it also increases access to credit, greater investment, and improvements in labour productivity (Deininger 2003). LAS protect the rights of private land owners during expropriation by ensuring a fair compensation, efficient and orderly land and property market exists if there is good governance in LA (Grover 2009).

The LAS can support the provision of PGS in the case of development and control of land use. It provides the public sector with information about the various rights related to land. In a customary system where rights are not recorded, the identification landowner who merits compensation is difficult. The land owners view such state intervention as depriving them from their possession which is considered traditionally a legal object. With the effective and efficient LAS in place it is relative easy to identify property owners and the value of their property can be assessed for fair compensation. To the government, the LA system can provide information to support the provision of PGS such roads, railways, agriculture and other public infrastructures for public interest.

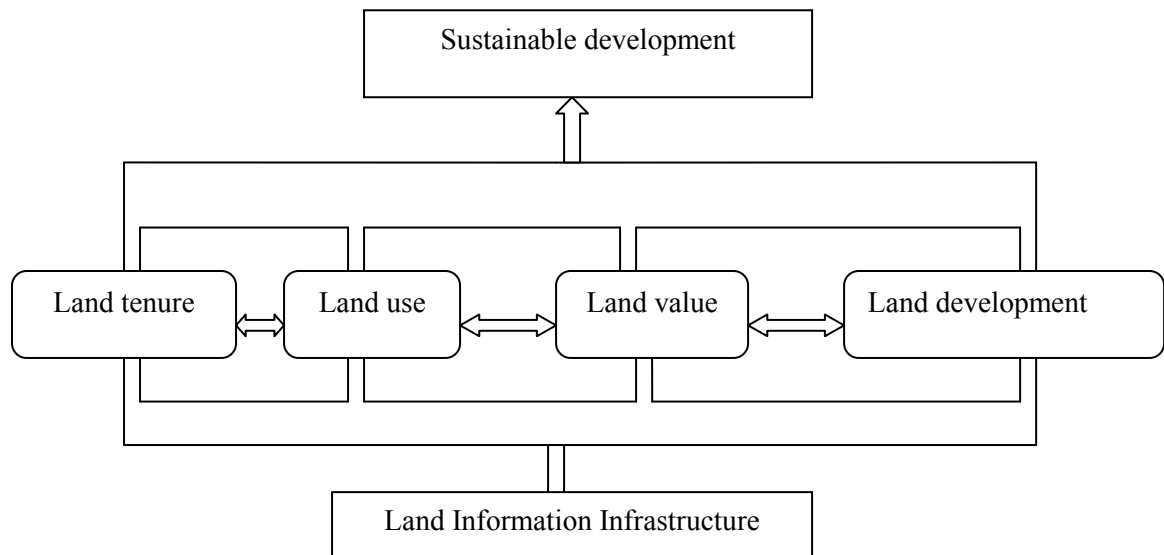
### **5.2.1. The Fundamentals Concepts of Land Administration**

Each country has got its way of instituting the LAS achieve and managing the four (4) main concepts of land tenure, land value, land use and land development. The LAS also performs a number of core tasks relating to land and real properties. This includes property right registration, provide access to information, maintenance or securing property rights, land markets as well as tasks related to land management for urban and rural development. It also provides information that assist in SP. Some countries have been able to combine these four concepts in a single conceptual model with the aid of Information and communication Technology (ICT) (Enemark 2005a; Enemark, Ian et al. 2005; Enemark 2009b). Where the LAS core concepts are treated independently, it creates inconsistency and incompatibility in spatial and non-spatial set of information on a single land parcel (e.g.ownership, location, bundles of rights, use and values). Countries with high human capacity and ICT development (e.g. NL, Denmark) have succeeded in integrating the core concepts into a single system. In an effort to attain sustainability, there must be an instrument for coordinating the management of ownership, land use development, environmental conservation and other forms of property regulation (Bennett, Wallace et al. 2005). The integration of LAS becomes significant. It will be better for land tenure, land valuation, land use and land development to be driven by a single sustainable land policy and supported by spatial information infrastructure that provides essential and reliable information sets. The diagram shows an integrated LAS supported by land information infrastructure to ensure sustainable development.



## INVESTIGATING THE RELATIONSHIPS BETWEEN LAND AND PUBLIC GOODS AND SERVICES (PGS)

**Figure 5.2 The fundamental Concepts of Land Administration –Adapted from (Enemark 2004)**



The concept of ‘land’ should be seen beyond the surface of the earth, as it also include materials below the surface, the air above the surface, and the things attached to the surface – i.e. land must be looked at as more than just the land as such. The fundamental concepts of LA are;

### **Land Tenure**

It is the sections of LAS that is concerned with securing rights on land. It is simply the way in which rights to land are held (Enemark, Ian et al. 2005). It shows that relation between land owners within any system (statutory, common or customary). It describes the way in which land rights are held and recognised. It makes land to be seen as a commodity where the land owner has the right to restrict all other citizen for undertaking any activity on the land.

### **Land Use**

Land use relates to the economic activity on land. It relates to the control landowners’ activities on land to meet with land use plan at a given administrative level of government. Land use plans are policies implemented at the local, provincial or national level. The realization of land use plans and regulations are disputed especially when the plan does not correspond with private interest. Land uses are regulated for public interest.

### **Land Value**

The value of land will vary with the context in which the land is considered. It can value relates to assessment of monetary or real value of land and property attached to the land. The method of valuation influences the land value. The value attributed to a given piece also related to the land use. Therefore, the land use and value are interrelated.

### **Land Development**



## INVESTIGATING THE RELATIONSHIPS BETWEEN LAND AND PUBLIC GOODS AND SERVICES (PGS)

It is related to the transformation of the earth's surface by putting up new infrastructures (buildings, roads) and well as implementing planning design for public projects through land acquisition, land consolidation, readjustments etc. Land development can also take the form of changes in land use from agriculture to commercial, industrial or residential land use. Development on a piece of land influences land use and value

The LAS is aimed at ensuring the delivery of land information regarding the RRR for sustainable economic, social and environmental development. From core concepts, ownership and tenure are related to property rights and restrictions in controlling land use of private and public lands. In the case of private ownership, the tenure system can impose restrictions on the desired land use. The economic and physical use of land influences the land value. Land values are also influenced through the anticipated future development, land use planning regulation. A good land tenure and land value system will create economic prosperity by levying suitable taxes on land during sales or transfer and fortifies development through greater security. Proper land use will reduce environmental depletion for the general interest of the community. This implies the core concepts are interrelated to each other which information for sustainable development.

### **5.3. Land Registration Systems and Cadastre**

The land registration system registers the abstract right related to land. It is the process of recording legally recognised right related to land either in the form of registered deeds, titles or other forms in which ownership is recognised. It provides tenure security to land owner whose lands are registered.

The cadastre is concerned with recording detailed information at the individual land parcel about the physical shape and size of the land. It is parcel and updated land information system that records interest in land (United Nations 2004).

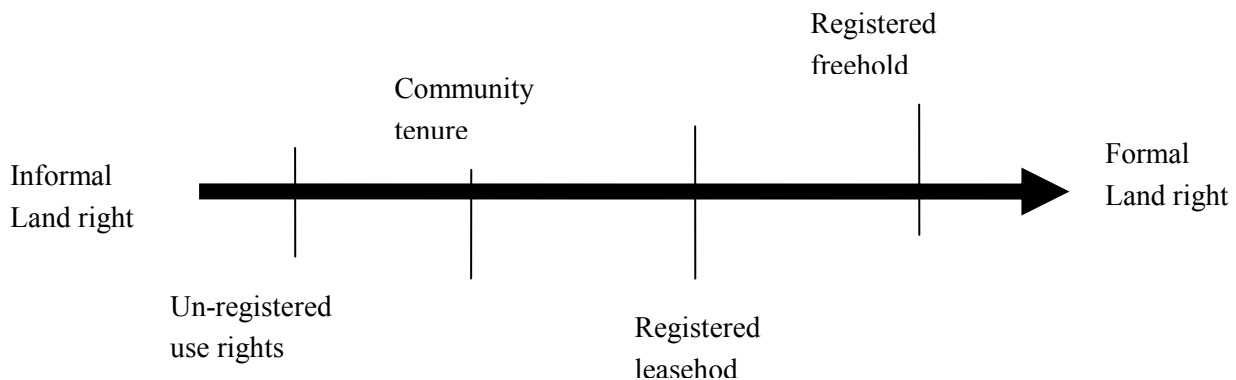
A complete cadastre system has been very instrumental in most developed countries. The land registration (cadastre system) as part of LAS registers RRR on land. This means with a complete and updated cadastre system, all lands in state, private or customary tenure can be identify (Williamson 2000). The strength of a cadastre is on its ability to secure and protect land rights. It should be independent of political influences and not prone to corruption practices. In addition, it is imperative for the cadastre register and protects the customary rights to guarantee fair compensation during public intervention. According to the (UN/ECE 2005), managing all this attributes of land requires a good land record. The efficient and effective management of public and private interest on land and the provision of open access to accurate information about land are important elements of economic growth, sustainable development and good governance (United Nations 2004).

In most countries, the full set of property rights is not documented (United Nations 2004). This formal systems do not serve the millions of people and unable to provide adequate tenure to the low income earners or respond timely to the rapid urbanisation. Thus, there is inadequate security to land under social, customary or tradition rights. According to (UN-HABITAT 2008) all rights can be best met when all interest on land, right are arranged in a continuum from the informal to formal while recognising the informal preliminary step to attain a formal right



## INVESTIGATING THE RELATIONSHIPS BETWEEN LAND AND PUBLIC GOODS AND SERVICES (PGS)

**Figure 5.3 Registering Land Right in a Continuum**



In developed countries, the value of land registration systems and cadastre has extended to an important source of information essential to support good governance and sustainable development. Land registration systems are increasingly evolving into a broader land information infrastructure which supports economic development, environmental management and social stability in both developed and developing countries (Williamson 2001). It provides the government (state planners) with information on where appropriate to locate public infrastructure and the various form of rights associated to land as well as identifies the landowners.

### **5.4. Managing Land Rights, Restrictions and Responsibilities**

#### **5.4.1. Public Land Right Management**

Public land is land which is owned by the state (Zimmermann 2008). The state have the power to exclude all other interest on public land (Bonti-Ankomah and Fox 2000). Land right under public includes freehold, leasehold, easement, usufruct and all other forms of right related to land. Only the state has absolute land right.

Public land management of throughout is poor particularly in the developing countries (Grover 2008). The result is waste and low level of productivity in land when the state is only action as regulatory agent. This has lead to the role of the state in the management of land and property rights under evaluation in most develop and developing countries. Emphases are on the role of the state to strengthen both private and public rights on land and property. Public concern about property right should be to regulate the way market transactions in the allocation and management of land are executed. Such interference will require good governance, well functioning LA and legal system.

A common feature of public land is that it is neither firm nor restricted (Zimmermann 2008). It is composed of a bundle of rights. It has also an active relationship between the public groups, private individuals. Land resources under state ownership in most countries are fully utilised. It is a fertile ground for corrupt practices for politician and economic elites.



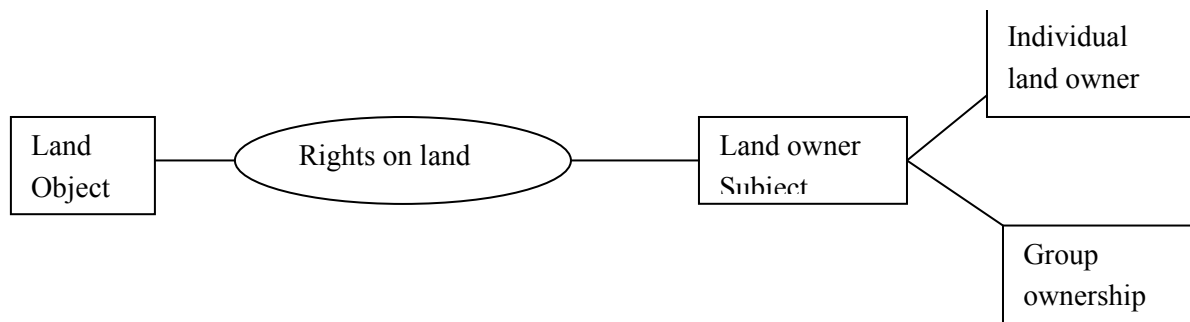
#### 5.4.2. The Three Principal Entities of Land

People have sensitive emotional attachments to land and property rights. Land and property right is closely related. In modern developed economies, the protection of land and property rights are well developed (Bennett, Wallace et al. 2005). Land owner are related to land through the rights

Rights are normally concerned with ownership and tenure (Enemark 2009c). It is the exclusive right of possessing, enjoying, and disposing a thing or the exclusive right to control an economic good (Omar and Wardaya 2009). According to (Bennett, Wallace et al. 2005) the term property to relate only to “real property” or defined with regard to particular legislation.

Rights can be owned by a single individual (natural person) or group of individuals (legal or non-natural person) and the state can also hold property rights. Property law deals with relationships between object (land) and the subject (person) bind by the rights with respect to rules on how these rights can be acquired, used or transferred.

**Figure 5.4 The Three Principal Entities (Object-Right-Subject)**



A piece of land can have one than one right associate with it. Some of the rights can be in the title owner and some such as easement, use may belong to others. Thus, all the rights to land are referred as the bundle of stick (bundle of rights) with each stick in the bundle relating to given right. The rights associated to a piece of land becomes more complex when there is fragmentation of the land to different individual or different rights held by different subjects on the same parcel.

#### 5.4.3. Land and Property Rights

Security of land rights are important and are associated to legal system. Land rights are not only protected in state laws (civil law), but they are also recognised by the customary and traditional systems. The land right legislation guides and protects private interest. The relevance of LAS in securing property is a springboard for economic development, social unity, environmental sustainability and management. An absolute land right without any restriction does not exist and the (Pu 2008). By ‘absolute’ it is means no other person has a better right to exclude, rent or transfer the land (United Nations 2004) than the person recognised in the land register. But this does not necessarily mean that the landowner has “absolute freedom” on the land or property. Rights are narrowed to a degree for environmental reasons and to a certain extent in the interest of good neighbourliness and public interest either at the local provincial or national level.



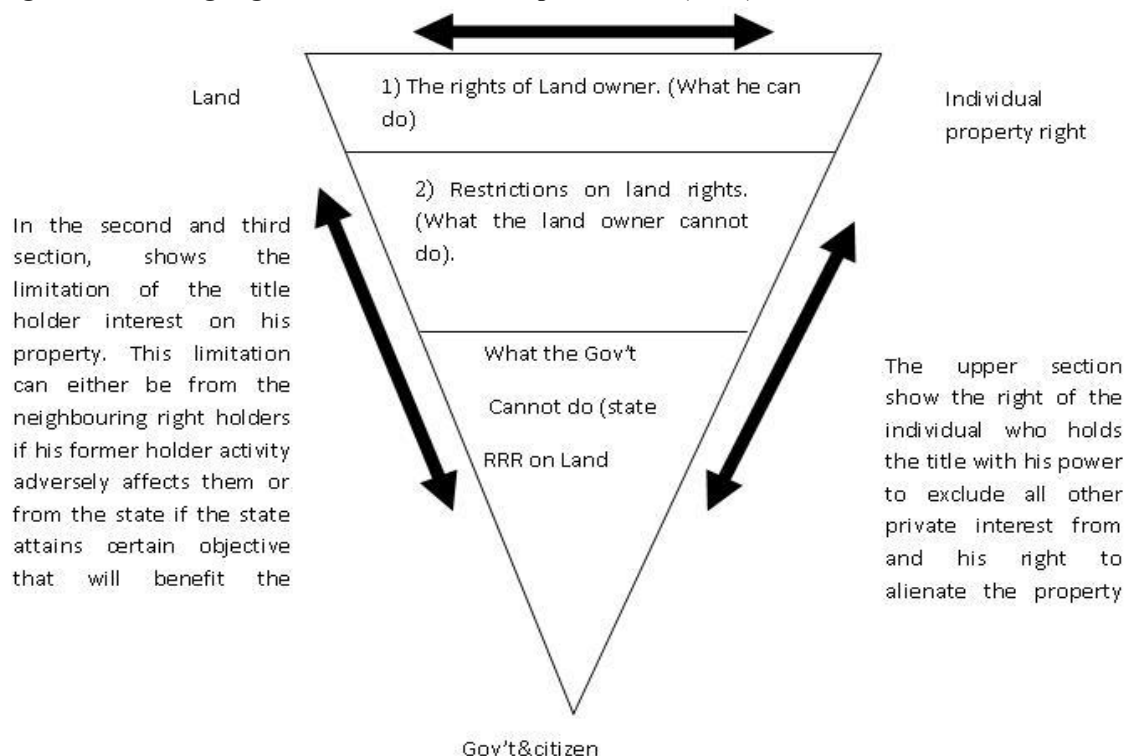
## INVESTIGATING THE RELATIONSHIPS BETWEEN LAND AND PUBLIC GOODS AND SERVICES (PGS)

The government can always interfere in private rights to attain public objective at the expense of the private interest. Such interventions should guarantee adequate compensation to land owners. When these rights are not maintained due poor legislative and administrative design, it results in confusion within the community and unfair penalties for individuals land owners (Bennett, Wallace et al. 2005). The preservation, allocation and land use as natural resources are significant in LA and land right management. The relationships between landowners and land is increasingly been influenced in diverse ways by the government.

### 5.4.4. Land and Property Restrictions

Restrictions land and property are often concerned with regulations use. The term 'land use' has a variety of meanings from the nature of the flora that is cultivated on land to the human actions that is related to the land (United Nations 2004). It is becoming increasingly important to for state to restrict as a means to ensure effective land management (Enemark 2009b; Enemark 2009c), for various reasons. The restriction on land use is imposed different administrative levels for the interest of the society. It restricts the activities of the right holder on what can and what cannot be done on the land at the different administrative level of the government. Like property right interest on land, the extent of the restriction and responsibilities on land are significantly different between the rural and urban areas.

**Figure 5.5 Relating Rights Restrictions and Responsibilities (RRR)**



From the figure above, restrictions can be imposed at different levels. Most of the restrictions impose by the government conveys the right of access and management to state enterprises (bodies) or private citizens.



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The state restrictions are challenged by private land and property owner when such restrictions are contrary to the private interest. In a market system, the property owners argue that there are compel to any regulation on their property since they have absolute (freehold) rights (Enemark 2009b; Enemark 2009c; Grover 2009). On the other hand, it is argue that for socio-economic reason and the welfare of the society, the state can intervene into private rights. In extreme cases, the state can exercise its powers of eminent domain on private right. Restriction in most cases is imposed to release designed plans.

The different interest on the use of land and property is resolved through the land policy of a country. The land policy ought to balance both interest to the state create a suitable public services to regulate sustainable growth which guarantees judicious management of private lands.

### **5.4.5. Land and Property Responsibility**

This relates to the social, ethical commitment and attitude towards land use for environmental sustainability. People use land to conserve and secure their culture(Enemark 2009c). Social responsibilities of land owners have a long heritage in Europe. The nature land use of people can be an identity to Individuals groups. Such use of land is also in conformity with legislation for sustainability. Beside private and cultural responsibility, the state also has to ensure effective implementations of the land policy and realise of design plans.

Citizens are becoming increasingly aware of the need to participate in protecting and conserving the environment. Public participation has become part of the peoples' activity in many areas of development (Khorshiddoust 2004). All levels of governments are progressively in quest of improving ways to execute their administrative function while constructively engaging the public in environmental decision-making. Most government has (e.g. Denmark, Sweden, Finland) improved concentration to value public role in environmental decision-making. Public involvement is critical to ensure that all relevant information is included (Beierle 1998). It synthesizes and addresses the way parties' concern and those who may be affected by a risk decision are sufficiently well informed and involved to participate meaningfully in the decision.

### **5.5. Public Goods and Services and State Restriction of Land Use Rights**

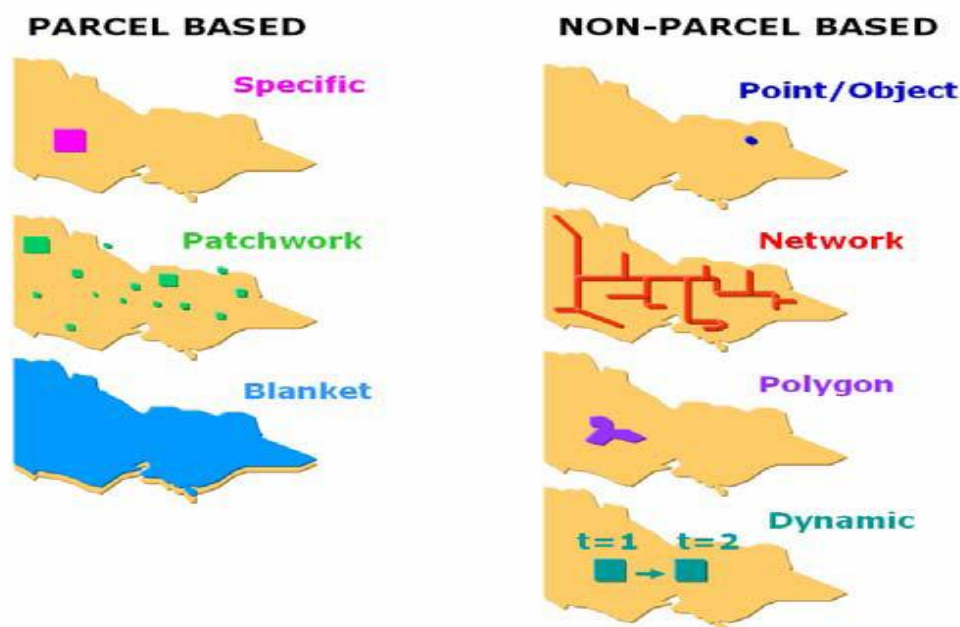
Governments have different way of restricting private land use through legislation. Land management cut across many different departments and statutory authorities (Bennett, Wallace et al. 2005). Such restrictions can be in the form of blanket restriction (which applies to all parcel e.g. land acquisition), single parcel (the restriction impose on a particular parcel e.g. the government may impose restriction on a particular parcel to be used only for agriculture or pre-emptive right), patchwork (may not be to a given parcel e.g. utility infrastructure such as cable, pipe lines). Usually, moves toward environmental regulation (such as anti pollution) by governments depends on standard mechanisms required for meeting environmental quality goals. Such approaches can be viewed as allocating restrictions on environmental property rights between land owner (land users) and those who suffer adversely from the land use activity. As such, land uses are regulated internalise cost inflict on environment and society. On the other hand, the society is not also allowed to restrict or influence



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land use activities without compensation for losses (costs) that result from that restriction. Knowing who owns RRR on areas of significant environmental impact and location needed PGS when imposing restrictions are important. It is worth noting that restriction have a spatial influence as it significance can be felt in an entire community. The figure below shows the different forms of RRR the state can impose on land.

**Figure 5.6 Various Forms of Public Intervention in the RRR**



### **5.6. Public Goods and Services provision through land acquisition (Absolute state ownership)**

PGS are for the general interest of the community. Such goods are often provided by the public sector due to market failure. Most literatures have accepted this assertion based on the external benefits and cost associated with PGS that does not accrue to the immediate producer(s) or consumer(s). The provision of PGS such as schools, hospitals roads, railways require land. The state can acquire land either through voluntarily, compulsory purchase, land consolidation, pre-emptive rights, land resumption etc.

Compulsory acquisition is the power of state to acquire private land without the willing consent of the owner or occupant in order to benefit society (Nelson 2003; FAO 2008). In the United state, it call eminent domain, in UK, Canada, Australia, it is expropriation etc. Compulsory land acquisition is different from land resumption. The latter is when all land is owned by the state. Land resumption is when the state reclaim land use rights from leaseholders for PP (Nelson 2003). This is typically the case of China where all land is vested in the state.

The land acquisition procedure is protected in the constitution of most countries stating the procedures and purpose for land expropriation. E.g. in Ghana, article 20(1)(Larbi, Adarkwah et al. 2004), in China-article 10 (Nelson 2003), US, it is included in the Fifth Amendment of the



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constitution (Pease 1998) stating conditions for expropriation. This has also been included in the First Protocol to the European Convention for the Protection of Human Rights and Fundamental Freedoms. Article 1 states that “Every natural or legal person is entitled to the peaceful enjoyment of his possession” (UN/ECE 1996; Viitanen 2004).

It is one of the methods used by the state to acquire land to provide PGS. Land acquisition is the primary means used by governments to meet increasing land demand driven by rapid economic and urban growth in China (Ding 2007). In China, this is actually referring to land resumption. Compulsory purchase is not the primary method for land acquisition, but presumes that the land acquisition has not been possible in any other way. Some state development projects can be realised only through this medium – taking over private land. The expropriation power can be executed at National, Provincial and municipal level. Land is acquired most for those PGS that can best be provided by government. Other means through which the state can acquire land for PP include consolidation, readjustment, pre-emption, and escheat.

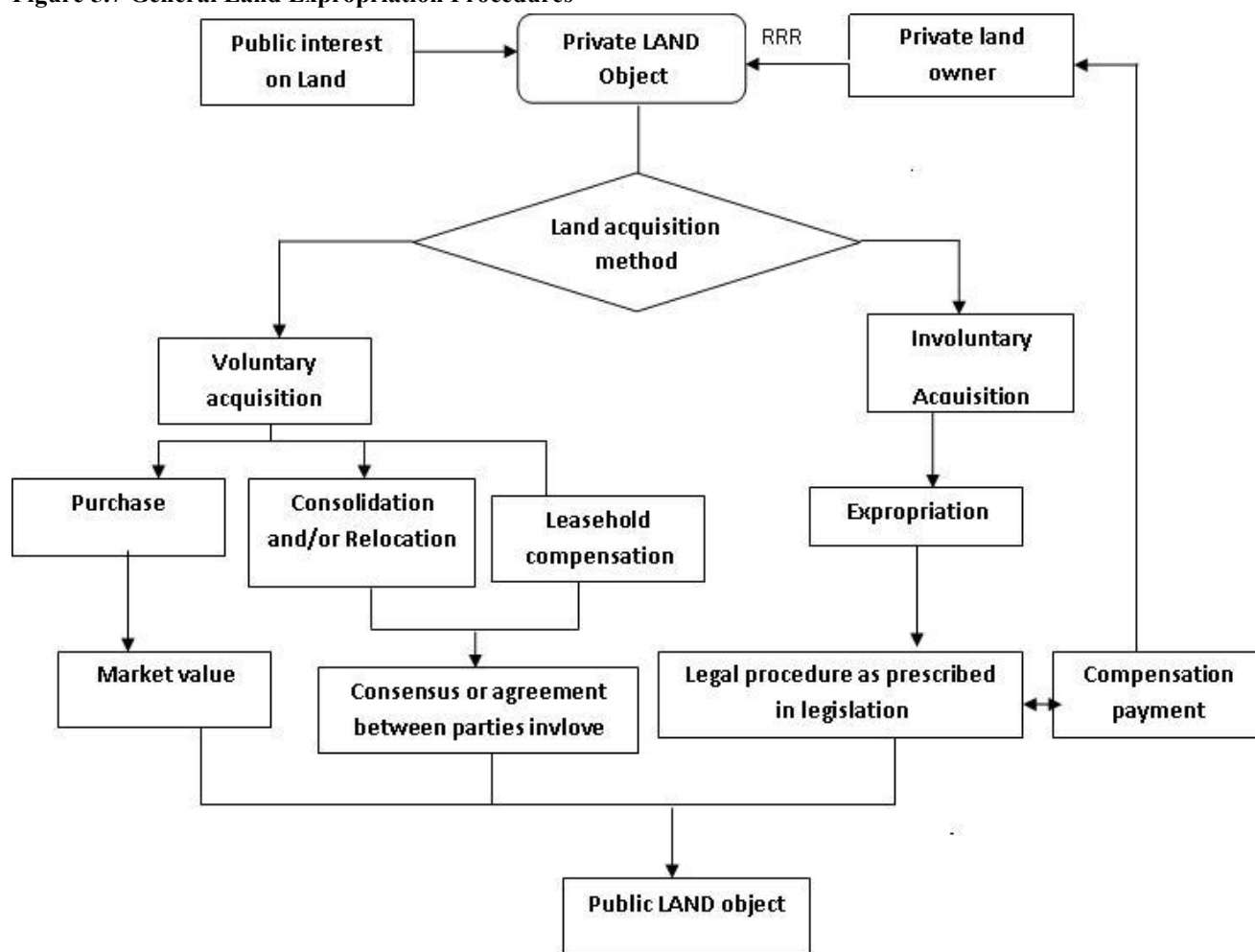
Government can as well as restrict land use when it seeks to provide a good to the public. The state can claim and impose restriction depending on the type of PGS or services it intends to provide. The powers to interfere with private rights are limited to the state. E.g., should the state need land for schools; the state can acquire private land for the purpose. The land can be acquired either voluntarily or compulsorily. There are laws that guide such procedures to ensure that landowner is adequately compensated and not left worse off.

The state can only compulsorily acquire land for PP. But no laws and rules exhaustively define the scope and standard of what constitutes public interest (People’s Republic of China Country Report 2007). In some countries -Poland (Belej and Walacik 2008) gave a list of PGS and projects considered to be for the PP. However, PP keeps changing. The land acquisition or land use restriction for PP is a policy argument given that PP is not adequately defined in law in most countries and most literatures (People’s Republic of China Country Report 2007), and land acquisition goes beyond the scope of “public interest”. There is probably no policy issue more controversial today than the land acquisition issue especially in rural areas since they are prone to urban encroachments. The figure below shows a common procedure through which the state can access land for PP.



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**Figure 5.7 General Land Expropriation Procedures**



Also, the following cuts across basic points to be considered for justifiable expropriation in most countries:

- The land acquired must be to serve a public interest
- The land owner is not willing to transfer owner right to the state
- Social or public benefit should exceed private benefit
- Private land owner should be fairly compensated
- No alternative means of acquiring land

In real world, legislation allows private land acquisition for public interest (school, hospitals roads) for other commercial projects such as mining. In some cases, the commercial project may as well benefit the community and bring economic development, increase public revenue through taxation. This issue is central for social equality and sustainable development reason. Some other acquired land are not used for the purpose of their acquisition (Larbi, Adarkwah et al. 2004). This is the case where LAS and legal systems are not well functioning. Giant private companies can acquire lands of the minority and less privileged due to their statue and political influence.

In the actual functioning of the economy, it is blurred to make a clear cut line between the private and the public sector. Thus, the two sectors can simultaneously function to promote economic



development and improvement in the welfare of citizens. The purpose of land acquire for the welfare of the society is policy decision.

### **5.7. Spatial Planning (SP) and Public Goods and Services (PGS) Creation**

The pressure on land and its related resources is increasing. Land is demanded for all forms of human activities such as grazing, forest, construction etc. The increasing pressure on land may lead to, exhaustion resources without appropriate land use and planning. Planning is on one of the major tool of government use to enhance the quality of life of citizens. It is a tool used in allocating resources in the right position to attain sustainability, environmental quality and suitable living atmosphere. The state design planning policies that allocate resources while ensuring the resources are also protected for the future.

Planning determines what activities are permitted to be undertaking in a give place. It investigates the relationship of different policies and practice across space, and sets the role of places in a wider context. Planning brings integrate policies for development and use of land with other policies and programs which influence the nature of places and how they function. This triggers planner to develop plans that fit the dynamic community to attain sustainable development.

Land and space are words that go alongside each other in planning and are used interchangeably used. On the one hand, only the market sector cannot operate in the allocation of resources, the limited supply of land will be in the hands of a few the private owners (Grover 2009). On the other hand, the public control of land use is indispensable for the protection of land as an asset and to achieve long-term objectives for human settlement, policies and strategies. The limited supply of land is a reason to subject land to public control. Increases in its value as a result of public decisions and investment should be captured for the benefit of society as a whole. Public sector regulation of land use is inevitable in protecting and control of land resources. The government uses policy intervention through SP is to shape development within an area. According to (RTPI 2008) SP is therefore a place-shaping and space mediating mechanism.

SP has gone beyond traditional land-use planning and sets out strategic framework to guide future development and policy interventions (RTPI 2008). It is the allocation of resources, including rights to land use to serve local, regional or national communities. At level, it is a set of laws and regulations that determine the permitted density, height and volume of buildings and regulate the size and type of land parcel subdivision. At another level, it is a process that tries to protect the long-term interests of the environment – hence, sustainability. SP therefore involves all forms planning including regional, environmental, national planning etc. To achieve the best allocation of resources, the state may interfere into private land right.

#### **5.7.1. Land and Spatial Planning (SP)**

An aggregation of all the resources makes life worth living in the respective domain of each individual and profession are from land. In this sense land includes all natural resource. Recognised and secured property ownership contributes to effective land development and a sign of identity to land owners(Enemark 2009b). In the Western world and developing countries, property rights are driver for development and economic growth. This is typically the case within most EU member states.



### 5.7.2. Property Rights and Spatial Planning

Local communities and the municipalities are involved with the operational of SP. They have much right to spatial management and planning within their territories. Property rights of individuals within communities of spatial development activities are under direct jurisdiction of the state which binds all citizens. A local community (e.g. NL) are charged with executing activities in the field of SP and management as it deals with property of its inhabitants, as well as planning pursuant to the adopted laws, standards, and criteria. Regional administrative levels in terms of SP ensure that the plans design at the national level is executed at the lower level. SP organisation and PGS provision is integrated at the National which sets that relation that shape people attitude on land use.

At the national level, the state is indirectly involved. While at the local or municipal level, the state is in active participation (Needham 2007). The legislations of the SP acts in the NL are restrictive in nature and the restriction on the individuals' property rights as land is under freehold. Property is any physical or intangible entity that is owned by a person or by a group of persons. With the freehold system, an owner of property has the right to consume, sell, rent, mortgage, transfer, exchange property, and/or to exclude others with interest on the property.

In SP, space and land are also interchangeably used. Absolute ownership is an exclusive right, but not restricted for PP. In the case of a sale of land, it is not the land that is transferred from one person to the other. It is a transfer of a 'bundle' rights from one person to another. SP will either interfere with a stick in the bundle to meet policy objectives.

### 5.7.3. Property Restriction and Spatial Planning

Public involvement via SP in property is often geared towards the social welfare of the society. The content of the SP in some countries shows that it has elements property RRR. In cases of interfering into property right, there is need for compensation. Valuation for compensation varies from country to country. Restrictions for SP can be done through the following;

- Effective land use through SP can be though land consolidation. It is not only restricted to the mere exchange and reallocation but it now associate with other socio-economic objective (FAO Land Tenure Studies 2003). Land consolidation is introduced and realise designed plans, curb land fragmentation and to attain local public objective.
- In case of expropriation base through SP, certain conditions need to be taken into consideration such as; the need for the land must be public, planning cannot realised via other means etc. The expropriated property owner and the state should reach a consensus based in the market value or the value in relation to the land use or location

NL that has gain worldwide recognition thanks to SP. SP in NL is an integrated effort has a Ministry of Housing, environment, agriculture, water protection (VROM (Needham and Verhage 2003; Needham 2006; Needham 2007), Denmark on the other has a ministry of environment that incorporate forestry and SP while Slovenia there has a Ministry of environment and SP. These ministries all have important task on economic development and implementation of planning legislations for the provision of PGS while securing individual's property right.



## **5.8. Land Policy**

Land policy stands at the central to the economic, social and environmental issues in all countries. The allocation of land resources between people has a remarkable impact on both fairness and productivity (EU Land Policy Guidelines 2004). Changes in demographic factors and the competition on limited land resources leads to the restructuring of physical and social characteristics of land rights and uses. These demographic changes can result in reduction in farm size holding, land fragmentation etc. In addition, the impact of the changes can be felt at different levels within a community (Tukahirwa 2002). The implementation of land policies and land use restriction can facilitate the adaptation to changes. In addition, land policy is fundamental for environmental sustainability as it motivates sustainable land use and environmental management. Land policy and land use restrictions are significant in influencing changes and reducing poverty in the rural and urban are in develop and transitional economies.

The perception of land policy is multifaceted. Land policies are geared towards achieving a set of stated objectives. Land policies verify who has legal rights of access and/or ownership to certain resources and under what conditions, and therefore how these dynamic assets are allocated among various stakeholders. significantly, all these activities rely on some form of land administration infrastructure concerned with RRR in land to be recognized, recorded and dealt with as a starting point for policy formulation and operation (Williamson 2001). It makes explicitly the political choices made concerning the distribution of power between the state, its citizens, and local systems of authority (EU Land Policy Guidelines 2004). The key ingredient of a policy is the connection between inputs, output, and policy outcomes and the measurable indicators.

### **5.8.1. Land Policy Regulation**

State regulation of private lands is common in many countries. Government regulation of private lands usually involves the establishment of policies (Bonti-Ankomah and Fox 2000). Land policy is part of a country's national policy on promoting objectives including development, social justice and equity, and political stability (Enemark 2005b). Land policies is coupled with security of tenure, land markets, real property taxation, sustainable management and control of land use, natural resources and the environment, make available land for the poor, tribal minorities and women, and instrument to thwart land speculation and handle land disputes

The aim of instituting land use policies is to discourage of contrary land uses. Land use is contrary or unsuitable when the activity undertaken by the land owner adversely affects owners of neighbouring or adjacent parcels. This is termed as externality in economic literature and it is a source of market failure. An example is when a dairy farmer locates ranch in a residential area. The ranch generates noise, odour, pollution that affects the residence of the neighbourhood. The action is not taken into consideration by the rancher.

Land policy regulations is an important concept cutting across issue in the fields of poverty reduction, political issues land use, planning, environmental conservation and natural resource management (Michael and Palmquist 2009). Land policies aid land owners, planners, real estate agents, conservationist and other public and private agents who deals with land in its legal. It also assesses the impact of the restriction on land.



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Land policy regulation can be any form of legal, administrative or physical mechanism implemented by the state or local governments to limit accessibility to private or public landed property or reduce hazards that may affect the society and its surrounding environment. The legislation can be imposed in various ways depending on the objective(s) the government strives to attain which can include conservation and management of green areas, open space, agriculture, zoning etc. Physical measures can be the construction of walls (embankment), dykes to avoid disasters such as land slide and flooding. Legal restrictions are the institutional limitations enforced on the rights of the land owner keeping him void of undertaking certain activities on the land. Such legislations are enforced to ensure sustainability in land use. Restrictions at the administrative level are to make sure legislation enacted are adopted at their respective levels (e.g. local land use plans). The issuance of land building permits and other are examples of administrative actions that can be used to realise land policy.

Policies and restrictions on land use have impacts on the value of the land. On the one hand, policy legislation restricting the nature of land use can adversely affect the land value. Such effects should be compensated. As cited by (Jaeger 2006) when a land use regulation has the effect of reducing the fair market value of a property, then either a payment must be made to landowners equal to the reduction in the fair market value, or a waiver must be granted from the regulation. Land use restriction can have negative or positive effects on the land value. Making payment that affects rights holders are subjected to legislation to ensure that claim is paid to the rightful person required a good LAS that records and identifies land owners. It can also augment environmental facilities that increase the land value. The positive impact of land use restrictions may offset slightly part of their negative effects. Therefore, to effectively evaluate the effect of land policy and land use restriction on land and property value will consider both sides of the coin.

### **5.8.2. The Effects of Land policy Regulation on Land Value**

Land policy regulations affect the land value. In reality, state land use regulations aim to increase property values through the provision of PGS and social amenities (protect environmental, open space and farmland, or to control conditions such as noise, congestion, and pollution). It can also negatively affect citizens through land scarcity when land is held idle as reserve areas (Jaeger 2006). This leads to an increase in land price. To existing land owners, the scarcity created by the land use restriction will be a positive effect while to investor or would-be land owners, it is a negative effect. The conception of restriction on land use is initially designed for the well-being of the community. Since most economic activities evolve around land, the restriction which was initially planned for the well-being of the people can generate further effects not perceived by the policy makers. Such effects can be undesirable thereby offsetting the gains the restriction(s) was (were) intended to achieve.

Land policy regulations have an effect on the market value of property in a range of ways. In theory, excessive land use restrictions can limit the supply of land for construction, infrastructural development and other related economic activities. This can skyrocket land prices and restrict the poor from having access to land. (Jaeger 2006) states that in particular, it has been assumed that land-use regulations invariably reduce property values when, in fact, they often have positive effects.

In conclusion therefore, governments should keep away from land-use interventions that cause a large deviation from free-market outcomes. Thus it should institute moderate involvements that serve to guide rather than rigorously constrain development.



### **5.8.3. Public Participation in Environmental Conservation**

One of the basic instruments of environmental planning is to protect the environment and other natural resources for sustainable development. This requires involvement of the public to attain the policy objective (Odette 2005). The public here refers to every member in the society. (Khorshiddoust 2004) defines public participation as the social communication process whereby individual citizens, Non Governmental Organizations' (NGOs), the private sector as well as environmentalists are interested to participate with the government at various levels to arrive at a decision of managing and conserving the environment. Alternatively, it can be considered as the public awareness of the adverse impact of environmental degradation on the community and the need for common initiative and participation to curb and sensitize on the need of good environmental conservation measures. Such conservation activities are of social interest.

This implies that the benefits of environmental conservations are goals which are valued as a result of the participatory process. This value exceeds the instant interests of participants in process. Such benefit includes sensitizing the public, incorporating public values and knowledge into decision-making, increase transparency, reducing conflict, and assuring cost-effective decision-making. This implies, giving every community a member a say in the decision-making process and measures taken to implement environmental conservation policies.

Environmental goods and services have not often been considered to have economic values since it is assumed freely provided by nature. They cannot be bought or sold in a market place. Public involvement in environmental protection and conservation could benefit the community and policy makers in many ways such as; gives policy makers a good insight of the environmental problems plaguing the community. (Odette 2005) points that citizens have immediate knowledge about their environment and their participation can provide more relevant information to the government when taking measures regarding their community. In addition, it reduces the chances of taking wrong decisions. People now have the knowledge that their actions do have a real impact on the environment and moral responsibility to act carefully in regards to the environment, on a global, domestic, and local scale.

To conclude, public involvement in the start of a decision making process may be time consuming but better than in the long run when even a small change will be both time consuming and costly.

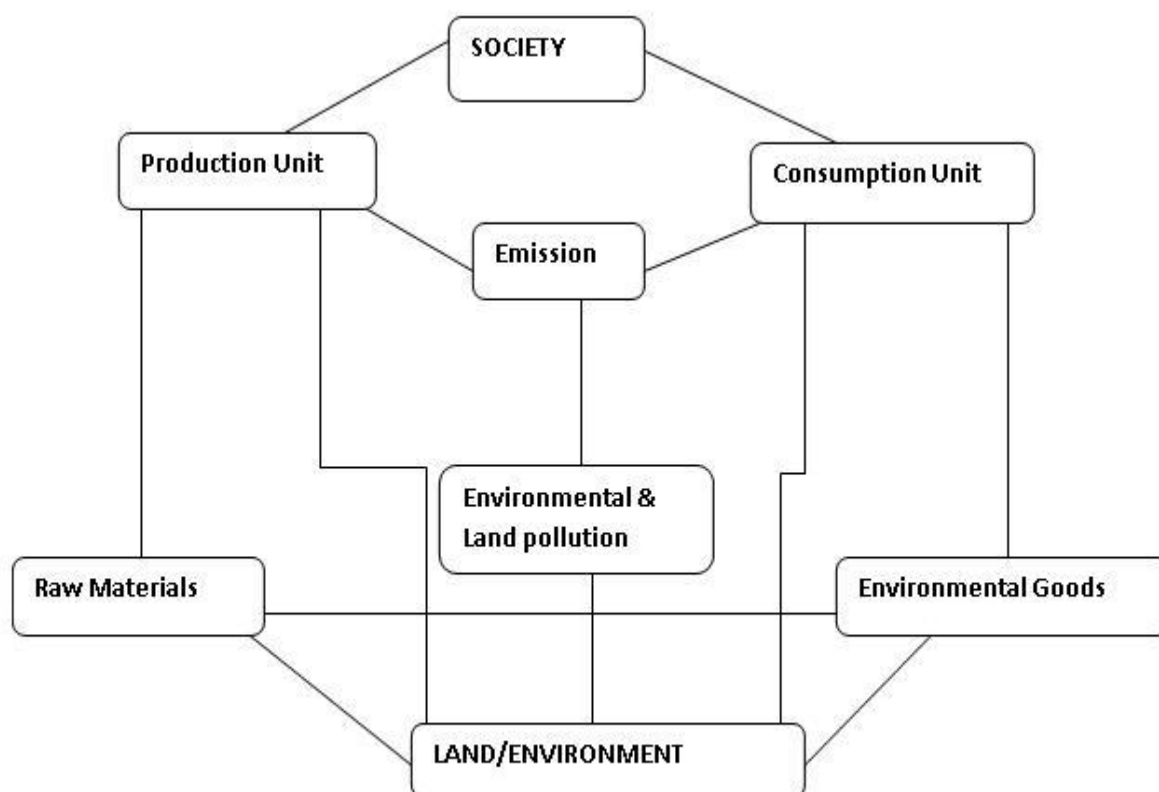
### **5.8.4. Societal and the Environment**

Land and natural resource degradation is a serious environmental issue. The degradation are often due to human actions within the society (Evans 2009). Avoiding this will require government action to regulate the activities of the property holders. The individual land owners do not interact with the environment in a manner to optimize environmental outcomes. Land users and owners attach significant value on the cost environmental goods or services that are not covered by their benefits. On the other, they do not consider the cost of their action inflicted to the environment or other users. The interaction of the society failing to consider cost and benefit on the environment does not imply the impacts are absent. The interaction between the society and the environment is can seen on the figure below



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**Figure 5.8 Societal Interaction with the Environment**



The environment (air, water, and land) provides consumable goods to the society in the form of clear air, drink water or land for recreational services. Most the benefit are generated to the society and not restricted to a given individual. It is difficult to exclude people from benefiting from the goods provided by the environment.

The environment also supports all forms of production either directly or indirectly. Land itself is a factor of production. It is richly endowed with varied form of raw materials used in the production of other goods and services.

The society is composed of production and consumption units. These two sectors emit waste from their action which ends up in the environment. Some of the waste are decomposed and recycle by the environment. The un-decomposed material forms pollutants to the environment

In this regard, strict government regulation are imposed to control environmental pollution and to internalize the externalities from the private action. Public intervention to intervention to encourage conservation and restrict the activities of land holders is imperative. The government intervention converts private cost to social cost.

### **5.8.5. The Importance of Environmental Conservation as Public Goods and Services**

An environment is a set of natural condition that defines the human living space. The set can be divided into air, water and land. The environment is considered as a good. The values of many products are determined in the market. For many others markets do not exist and so their true value is



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not properly recognized (European Landowners' Organization 2006). This is particularly important for the environmental and cultural landscape. It follows the pattern of other goods which can either falls within public or private goods. According to (Veblen 2005) the environment falls within those categories of goods that cannot be effectively provided by the market.

As a PGS, the stat enacts laws on environmental protection and sustainability that regulates land use. New Zealand has as a common principle for sustainability aimed at managing the natural resources and human resources (Knowles 2008). The public purpose, the state intervenes to provide strong incentives to land users\owners to contribute to environmental protection. One concern of such policies is to create and maintain a variety of valuable PGS (Bougherara, Denant-Boèmont et al. 2007). Land-use planning and restrictions are becoming increasingly important as a means to ensure effective protection of natural resources and improve environment to pursue sustainable development

Most countries hold their natural resources as a great economic asset that can enhances the welfare of their citizens from a judicious use and conservation of the natural resources. E.g., Australia's natural resources are among its greatest assets of the nation (Bougherara, Denant-Boèmont et al. 2007).

Like any normal public action, state intervention for conservation is for public interest. However, striking a balance between alternative individual land use and conservation is complex as a result of two conflicting points of view-the free market (individual) approach and the central planning (public) approach. The cost and the benefit of conservation from a private and public perspective are often viewed differently. Landholders can produce a publicly favourable environmental result when they do not face the drop benefits and costs of their alternative land use actions. However, restrictions usually control use and activities on land and responsibilities which is related more to a social, ethical commitment or attitude to environmental sustainability and good husbandry can be impose on land user and owners by the state for public interest.



## CHAPTER 6

# 6. DISCUSSION, CONCLUSION AND RECOMMENDATION

### 6.1. Introduction

This chapter give a rundown of the entire thesis. From the economic literatures, various theories on PGS and expenditure were put forth and studies. This section makes a summary and logical view of Chapter Three, Four and Five.

In this chapter, the various arguments raise for and against in the different discipline are discussed and tailor to suit the objective of this research. This section is being divided into four sub-sections.

#### 6.1.1. Discussion on Public Goods and Services (PGS)

The public and the private sector are the major sector in every economy. They all play a vital role in the provision of goods and services in the economy. The wellbeing of each economy depends on the function of these two sectors. An economy characterised with insecurity, political instability and violence is difficult to achieve economic development and growth. Thus, just as effective as the private sector is efficient in the allocation resources, the public sector is needed to compliment the private sector. In the absence of regulations, laws and legislations to control activities, citizens will be scare to invest and undertake other economic activities. The public sector is needed to provide PGS and services.

The study reveals PGS can be “Optimally provided” by the government. This is in line classical view with the assertion that the provision of PGS generates social benefits. The objective of the state is to provide basic goods and services that are needed by the society and cannot be provided effectively or provided insufficiently under market conditions.

According to (Arild and Daniel 1997) the state intervention in due to market failures in the management and allocation of resources that benefits the society. It also regulates market through taxation as a step to reduce externality and cost inflicted by individuals to the society.

PGS have two main characteristics i.e. non-rivalry and non excludability. There are private goods that possess similar characteristics. The study shows that the term PGS do not necessarily means good provided only by the state. (Block 1983; Holcombe 1997) points out that good such as software and TV broadcasting are private goods with PGS characteristics. The state can provide goods private goods to control prices and reduce exploitation of citizens from the private sector.

One of the reasons to justify government provision of PGS is based on the correction of externality. The government can undertake production private when it can be provided by the market but the



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market cannot internalise the externalities. When government activities generates negative, it can always strive to minimise the effect of their action either through taxation or direct compensation which are not offered by the market.

It is difficult to say with certainty which sector of the economy should produce PGS. Most of the privately produced PGS such as cable TV, computer software, radio broadcasting etc are not LBPGS. With the scope of this study being limited to PGS that directly deals with land, the state can optimally and efficiently provide land based PGS such as roads, railways, schools, hospitals, and even restrict land use pattern and institute ethical responsibility on land. This is because only the state has the power to acquire, restrict private property for PP. This has is stated in the constitution of many countries (Larbi, Adarkwah et al. 2004; Viitanen 2004; People's Republic of China Country Report 2007; Belej and Walacik 2008). The necessary and sufficient condition for state to expropriate land is that; it must be for a PP and land for the provision of the PGS cannot be acquired through other means. In addition, it must be subject to the payment of a fair compensation in accordance to the laws and method of valuation. In the case of disaster (like in Haiti) the state need land to provide public health service infrastructures, to resettle displaced people etc. All of such service cannot be effectively provided by the private sector.

A PGS is a good provided at varying quantity ranging from inadequate provision to optimal or over provision and the same amount is available to all consumers. The greatest debate between public and private arise from the strict economic definition of PGS. Despite the extensive literatures on PGS, it traditional characteristics of non-rivalry and non-excludability prevails (Kaul and Mendoza 2009). Economist has been myopic in the fact that no good by default is private or PGS. The public or private good niche is determined by the society. The (non) rivalry and (non)excludability characteristics for (public) private goods is designed by the society. The state through policies and political decision, for socio economic reasons and the attainment of some objectives reserves some activities to be provided by the state. The conclusion for which good be considered a public good and to be provided by the state is policy and societal decision.

The state provides a wide range of PGS and services. These good provides different forms of benefit to the public. Some of the goods yields benefit to an entire area whereas some yields benefit within their location and the periphery. PGS such and law and order do not have a spatial dimension. While others such as school have a spatial dimensions.

### 6.1.2. Discussion on Spatial Modelling of Public Goods and Services

Geographic primitives were used in Chapter Four to model conceptually the spatial dimensions of PGS. The Public Good Object was represented as a super class. It was an aggregation of the subclasses. The subclasses were; Production Area Object, Served Area Object and the Consumer Area Object. The subclasses had some of the attributes of the super class. In the modelling, vector was used to spatially represent PGS. It is use to represent discrete geographic objects in space. The different categories PGS with spatial dimension were conceptual model as;

- Point
- Line
  - ✓ Point-line
  - ✓ Line-Polygon
- Polygon



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PGS such as schools, Hospitals, policy post, public administrative buildings were model conceptually as point which have spatial dimension. Point PGS were assumed use only few land parcel in their provision. Line PGS include roads, railways, waterways etc. They required several adjoining parcels in a continuous sequence. Polygon PGS include natural areas, urban parks, national reserves, cemeteries. They require vast land in their provision. Within these conceptual categorise, there were also complimentary categorise (point line PGS) e.g. railways and railway stations. These goods have spatial dimension since by their planning design there provide services to a given community or public. From the model, it reveals that the spatial PGS had a production area Object (PAO), Served Area Object (SAO) and Consumer Area Object (CAO). The study also reveals that the SAO was a normative object which the PGS provided was intended to serve. The SAO and the CAO were in all cases represented as polygons.

### 6.1.2 Discussion on Land Administration

Public interest on land and property rights has provoked many governments to interfere with market transactions in the allocation land (Bonti-Ankomah and Fox 2000) to correct the weaknesses of the land and property market. Such interference involves the institution of plans that can allocate land for a given uses.

Governments have got ways to influence land and real property rights within the context of LA. The study reveals that the LAS supports the state in providing PGS while maintaining its triple line objective of economic, social and environmental sustainability and development. The LAS also relates the fundamental concepts of land use, value, and tenure to RRR. An integrated LA system combines these functions to provide land and property information to the state through the cadastre and land register. This information is a relevant infrastructure to the state when it seeks to acquire, restrict and/or ensure effective private and community land use. This is accompanied by compensation in situations of land use restriction and acquisition.

Securing RRR are functions of LAS and the legal systems in place. The LAS and the legal systems establish a functional relationship between ownership rights and tenure, restriction and land use regulation or control, as well as responsibility and to social and ethical attitude towards land (UN/ECE 1996). A well function land market is supported by LAS with security of tenure and efficient evaluation of land value. In the event of public expropriation, the land holders will be fairly compensated. This also relief the state from transaction cost during public land acquisition process as the land value and the land owner can be easily identified.

The diversity of LAS into cut across land policy which defines the legislation dealing with land. The LAS therefore provides benefits to the public and private sectors, businesses, real estate agents, individuals etc. This can be in the form of securing right, provide information on land value, use, planning as well as environmental conservation. A LAS is then a corner stone to good governance and Land information for decision maker and policy implementation.

The cadastre and the land registration as integral parts within the LA framework describes, identify parcels and registers rights and related interest on land. It supports valuation for fair taxation, which is a major source of revenue for the state to finance public expenditures. A well functioning cadastre system assists the state in the provision of land related services such as schools, roads and environmental goods.



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Land rights are only absolute between private citizens. In this case the right holder has the absolute right to exclude all private interest. Only the state for the paramount interest of the public has the right to intrude private rights through regulations and policies. In extreme cases, the state can completely deprive private owner from all interest. It also regulates and ensure sustainable land use to improve rural and urban environment, control pollution and for planning.

Under a free market system, state intervention is criticized (Enemark 2009b; Enemark 2009c; Grover 2009) even without consideration for the reason of the intervention. This is based on the premise that in a free market system, individual seek to maximise their interest. Contrary to the market view, the role of the state to control land use, carry out SP is inevitable. NL is a good example where the state regulates land use activities at all administrative levels. State intervention is accompanied by fair compensation for the loss in land value as a result of the intervention. Resolving such diverging view interest in land property right are design by a country's' land policy and an efficient LAS. Without such public interventions, environmental goods and other pubic goods with social benefit exceeding cost cannot be produced efficiently by a free market.

### **6.2. CONCLUSION**

The main objective of this research was “Investigating the relationships between Land and Public goods and Services (PGS)”. The main objective was divided into sub-objectives as seen section 1.4. To achieve the objective of this research, the following question were formulated (Section 1.5) contribute in achieving the research objective. This section presents summary answers to the research questions.

#### **6.2.1. Research Question 1: What are PGS/services and what are their characteristics?**

PGS are goods that are optimally provided by the state with non rivalry and non excludable in consumption. It is often assumed that the production of such goods will be adequately provided by the state. This is backed by the fact the market fails in the production of such goods. The social benefits exceed cost production. This has been long debated issue within economic literatures because no good by default is termed a public of private good. The niche of a public or private good is determined by the society and policy decisions. Examples of goods commonly referred to as PGS include schools, hospitals, Road, railways, environmental conservations etc.

The extensive literatures on PGS have recognised two features to distinguish-(non rivalry and non excludability) a PGS from a private good. By non rivalry, it means the same amount of the good is available to all consumers. Additional consumers will not affect the amount available to existing consumer. By non excludability, it implies a consumer cannot exclude another from consuming the good once it is produced. Therefore, even citizens who do not contribute to the production of such goods cannot be excluded from consumption.

#### **6.2.2. Research Question 2: How can PGS be represented as spatial objects?**

Some PGS yields benefit to an entire area whereas some yields benefit within their location and the periphery other yields within a given area. PGS such and law and order do not have a spatial dimension. While others such as school have a spatial dimensions.



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Geographic primitives were used in Chapter Four to model conceptually the spatial dimensions of PGS. In the modelling of PGS, vector model was used to spatially represent PGS. It is use to represent discrete geographic objects in space. The different categories PGS with spatial dimension were conceptual model as;

- Point
- Line
- Polygon

PGS such as schools, Hospitals, policy post, public administrative buildings Line PGS include roads, railways, waterways etc. Polygon PGS include natural areas, urban parks, national reserves, cemeteries. Within these conceptual categories, there was also point line PGS.

### **6.2.3. Research Question 3: What are the legal rights of that the state needs to acquire lands for the provisions of PGS?**

The state with it diversity of functions is often under pressure to provide basic infrastructures and services to citizens. The provisions of such services are in conflict interest with private rights to property. The state tries to establish a balance between the public interest of the society and the provision of tenure security to private land and property owners.

To attain economic growth and sustainable development while conserving its resources for the future, the state needs public infrastructures and facilities for education, transport health, environmental protection and restoration. Premier realisation of such state objectives requires suitable land. The LAS supports in the provision of such public infrastructure by providing information land tenure, rights and land use.

Some of the public projects may not require a specified location. One the one hand, the state may have alternatives land available or means to acquire land. On the other hand protection against some natural disasters such and floods and landslides requires given lands close to the threatening area. For state protection against this disaster, it needs the surrounding land parcels around the threatening landscape or river. Such lands can be obtained by compulsory purchase if all attempts to acquire the land in good faith under free market condition fail.

The power of the state to provide PGS from land through compulsory purchase for the general welfare of the society is known as Compulsory Land Acquisition. In some countries, it referred to as eminent domain, land expropriation, land resumption. Such deprivation of private interest is subject to fair compensation, legal proceeding, with the LAS and cadastre systems to determine the property value. This power is always execute as a last resort for societal, economic progress, natural resource conservation. Furthermore, land is compulsorily acquired for roads, railways, seaports, airports, and a host of public facilities that benefits the general public. Other means through which the state can acquire land for PP include consolidation, readjustment, pre-emption, and escheat. Relaying on market forces, such invaluable infrastructure cannot be provided.

### **6.2.4. Research Question 5: What is the Role of Land Administration System in the provision of Public Goods and Services?**

Land is a fixed resource subject to competing uses. A property rights system well recognised by law and registered in LAS reduces external and transaction costs. The high transaction costs may be delays land transfer process, delay in public execution. A clearly defined function of the LAS not



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prone to corruption becomes an important state instrument used in providing PGS. In most countries, LAS correct market failures in the land and property market. With properly defined property rights system, demand for land for various public uses interacts to determine price and compensation value.

It is costly establishing and maintaining effective LAS. On the other hand, the benefit to the government and the civil society significantly outnumber the cost. It becomes even more costly to governments without LAS. The LAS is not an end in itself, but only act as a means to an ends. It supports the state with data dealing with land value, use, ownership. It therefore provides the state with ample information for policy implementation, planning, taxation, and PGS provisions. The fact that a LAS possess the capacity to regulate land and property markets and does a number of tasks, including land registration, maintaining cadastral records, granting SP consents, real estate taxation, and valuation, it becomes a turning pro to the public sector. Where LAS suitably defined property rights and secure rights, it leads to efficient allocation of resources. LAS can only perform the function of ensuring that fair, efficient and orderly land and property markets exist where there is good governance in LA.

### 6.2.5. Concluding Remark

The objective of this study was “Investigating the Relationships between Land and PGS”. After a careful and thorough literature study, this study reveals that the relationship between land and PGS varies with the type of PGS. The study reveals that the niche of what is considered as PGS is a societal and policy decision. The research shows that there are certain categories of PGS which requires state ownership right before making provision for the PGS e.g. schools, roads. The two examples cited were conceptual model in as point and line PGS (**section 4.5.1 and 4.5.2**). With category of PGS, the state can go as far as acquiring land through compulsory purchase when all the other means of acquisition fails. Thus the state has absolute ownership (RRR). The research also reveals that there are some PGS that the state imposes restriction and regulate on land use to provide a public while the state also provides PGS by ensuring reasonable customary, moral obligation on land use under customary system. It also sensitizes on the adverse effect of poor land use. The state makes sure the society respects and implements the land policy. It worth nothing that the research also reveals that there exist complimentary PGS e.g. railways and railway stations.

**Table 6 The varying degree of state command (RRR) on the various types of Public Goods and Services**

<b>Degree State of command</b> <b>Spatial objects</b>	<b>RIGHTS RESTRICTION RESPONSIBILITY RRR</b>	<b>RIGHTS RESTRICTION RESPONSIBILITY RRR</b>	<b>RIGHTS RESTRICTION RESPONSIBILITY RRR</b>
<b>Points</b>	Schools, Hospitals, Public Police stations, railway stations, bus stations  Public Infrastructures		
<b>Lines</b>	Roads, Railways, Dyke, Embankments,	Cable and power line, sewage, water, gas	



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	streets	pipelines	
		Public utilities	
<b>Polygons</b>	Airports, Seaports, public parks	Environmental conservation, industrial zones, Residential areas, Agricultural lands	Pollution, Nature conservation, Cultural landscapes, Green areas, open space, cemeteries, National defence

### 6.3. RECOMMENDATION

The perception of PGS differs within different societies. The provision of public goods is sensitive when it interferes with land and property rights. In most developing countries, land was seen to be abundant. The provision of LBPGS was with little obstacles. With increase in population, land has become a scare commodity. The provision of basic public infrastructure faces stiff resistance from owners. The role of LAS and law to secure property right become very important.

In most developing countries (e.g. Ghana and Kenya) are still to enjoy the full benefit of LAS due to poor legal systems, corruption and political influence. In Cameroon, there local slogan which states “*Law is like a commodity which can be bought or sold to the highest bidder*” Government and policy makers should take into consideration the importance of the role of law to support the LAS in securing land right.

Most resistance for PGS provision has been due to mistrust to the government especially in the developing countries. Most of the land acquired initially for PP was deviated into private purpose. In some cases, excess lands were acquired than the amount needed for PP. Therefore, Policy makers and state real estate agents should do a well planned a project assessment to determine the required land needed and ensure the PP for which land is acquired is realised.

The LAS have been an important tool that supports PGS provision and contributed towards sustainable development of most countries. The LAS as a means to end secure rights, land value, use. In the western countries such as Australia, NL, Demark, LAS has been an indispensable tool for the government to support the provision of PGS. It will be necessary to conduct a time series study in a given country to measure the impact of LAS over time on the provision of PGS.

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