

Private Sector Participation in the Water Industry -

Who benefits and who loses?

Diego Brenes
e-mail: diego.brenes.745@student.lu.se

Supervisor: Tareq Emtairah
e-mail: tareq.emtairah@iiiee.lu.se

Lund University International Master's Programme
in Environmental Science
Graduation Thesis

19 November 2002

Abstract

Water provision is one of the critical problems for humanity. To date the efforts to provide solutions have been insufficient, as is proved by the fact that today, 1,2 billion people lack access to safe drinking water. Water provision is considered a government responsibility, but upon the failure of public organisations to provide the solutions, governments have begun to look at the possibilities of private firms to assist in this process. This thesis looks at the consequences of Private Sector Participation in the water industry and analyses the possibilities and limitations from an economic, social and environmentally sustainable point of view. The limitations and possibilities of public organisations to solve the problems without the participation of the private sector are also studied. This research is approached using a multi-criteria qualitative research method, which involves the discussion of the problem from a theoretical point of view and the use of three case studies. Data was collected through a review of literature of water issues from various disciplines, mainly political and economic. Using the multi-criteria approach, a framework for analysis was created from the theoretical discussions and applied to three case studies: the privatisation of the water companies of England and Wales; the failure of Dar es Salaam's (Tanzania) public water company in satisfying people's water needs; and the successful public water company of the city of Porto Alegre, Brazil. This thesis concludes that Private Sector Participation in the water industry presents more fundamental dilemmas than the current, more structural problems faced by public water companies.

Table of Contents

EXECUTIVE SUMMARY	3
I. INTRODUCTION	5
II. RESEARCH DESIGN	6
A. INTRODUCTION	6
B. THE RESEARCH PROCESS: METHODS AND DATA	6
III. WATER	8
A. A BASIC HUMAN RIGHT	8
B. A SOCIAL AND ECONOMIC GOOD	9
C. WATER PROPERTY RIGHTS	10
D. THE VALUE OF WATER	11
E. WATER SUPPLY - A NATURAL MONOPOLY	13
IV. PRIVATISATION AND PRIVATE SECTOR PARTICIPATION IN THE WATER INDUSTRY	15
A. INFRASTRUCTURE OWNERSHIP AND PRIVATE SECTOR PARTICIPATION MODELS	15
B. FUNDAMENTAL REASONING BEHIND PUBLIC AND PRIVATE OWNERSHIP	17
C. PUBLIC AND PRIVATE OBJECTIVES AND INCENTIVES	18
D. OWNERSHIP AND REGULATION	19
E. WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD) DISCUSSIONS ABOUT PRIVATISATION OF WATER.	21
V. SUSTAINABLE USE OF WATER	23
A. ECONOMIC DEVELOPMENT AND ECONOMIC SUSTAINABLE USE OF WATER	24
B. SOCIALLY SUSTAINABLE USE OF WATER	27
C. ENVIRONMENTALLY SUSTAINABLE USE OF WATER	30
VI. EXAMPLES OF PUBLIC AND PRIVATE OWNERSHIP OF WATER UTILITIES	33
A. ENGLAND AND WALES: A FULL DIVESTITURE EXAMPLE AND THE ROLE OF REGULATORS	33
B. DAR ES SALAAM, TANZANIA – A GOVERNMENT INCAPABLE OF DELIVERING WATER SERVICES 37	
C. PORTO ALEGRE, BRAZIL: A SUCCESS STORY OF PUBLIC WATER PROVISION	40
VII. FINAL DISCUSSION	45
VIII. CONCLUSIONS	47
IX. REFERENCES	48

Executive Summary

Water provision is one of the critical problems for humanity. To date the efforts to provide solutions have been insufficient, as is proved by the fact that 1,2 billion people lack access to safe drinking water. Water provision is considered a government responsibility, but upon the failure of public organisations to provide the solutions, governments have begun to look at the possibilities of private firms to assist in this process. This thesis looks at the consequences of Private Sector Participation in the water industry and analyses the possibilities and limitations from an economic, social and environmentally sustainable point of view. The limitations and possibilities of public organisations to solve the problems without the participation of the private sector are also studied.

This research is approached using a multi-criteria qualitative research method, which involves the discussion of the problem from a theoretical point of view and the use of three case studies. Data was collected through a review of literature of water issues from various disciplines, mainly political and economic. Using the multi-criteria approach, a framework for analysis was created from the theoretical discussions and applied to three case studies.

The first section of this research is a discussion of the water context, focusing on the characteristics of water that are relevant on the decision about the convenience of participating private firms in the ownership and management of water systems.

The first issue discussed is the importance of recognising water as a basic human right. To solve the current problems of water, it is important that all parties involved in the discussion and the provision of solutions recognise water as such. Water as a basic human right implies that it is at the same time a social good and has to be managed as such in order to solve the pervasive social problems as poverty and unhealthy environments. However water also has to be an economically sustainable resource, if proper management and long term objectives are to be accomplished.

For their specific objective of profit maximisation, private companies have been more focused mainly on the economic aspects of water. On the other hand, public organisations have focused more on the social considerations, although, often with little success. One of the main challenges of water management, independent of who the owners and/or managers of the water systems are, is how to manage water as both a social and economic good. This thesis argues that the objectives of private firms conflict with this need, while for public organisations, it is more feasible to overcome the limitations and problems that they have faced in the provision of solutions for water access.

This research also argues that property rights of water have to be defined but cannot be risked in the hands of private interests. The value of water has to be recognised and water cannot be provided as a free resource if its conservation and economic sustainability is to be secured. Another characteristic of water is that with the current technology and institutional framework, the water industry is a natural monopoly. Therefore, if private firms are to participate in the industry, they have to be subject to regulatory control. However, because of the complexity of the regulatory arrangements there are limitations to the extent to which private objectives can be combined with the public objectives of the water systems.

The objectives and incentives of private firms to participate in the water industry, as well as the reasons for governments to welcome the participation of private firms in the industry is analysed in another section of the thesis. It is emphasised that the main objective of private firms is profit maximisation, which differs from the public interest of governments. It is argued that, even if private firms can be regulated, the differing objectives and the incomplete information that a regulator has regarding the actions of the private firm, create a situation in which the public interest objectives are difficult to achieve.

In order to create a framework for analysis, the concept of sustainable development is discussed considering environmental, social and economic aspects of the water systems. A set of qualitative parameters was

chosen for the analysis of the impacts of water systems in each of the three areas. These parameters were later used to analyse three case studies. The first case study is the privatisation of the water industry in Wales and England. Successes and failures are highlighted in this example, however, it is pointed out that the main winners in this privatisation were the private firms who acquired the previous publicly owned water companies, and the consumers were the losers in general. This was due to the price of the sale and the later increase in water prices. The second case study is the publicly owned water company of Dar es Salaam, Tanzania. This is an example of a poorly performing water company incapable of managing the water system and providing solutions to the population. However, the case study provides information that creates doubt about the probability of private firm participation as a good solution to the problem, according to the model of Private Sector Participation that has been proposed. The third case study is the water company of the city of Porto Alegre, Brazil, which is an example of a well-managed and successful water system. This example intends to point out that public organisations are capable of successfully managing water systems.

The thesis concludes that Private Sector Participation is less likely to satisfy the needs of an economic, social and environmentally sustainable water system because of the profit orientation nature of the firms and the limitations of the regulatory system. Private water companies are more likely to take a larger share of the benefits of the water system, to the detriment of the public. In other words, under Private Sector Participation schemes, private firms are the main winners and the public are the losers. However, this thesis does not overlook the limitations and current incapability of many public organisations to provide for water needs, mainly due to a lack of resources and inefficiency. These limitations are not due to the fundamental objectives of the public sector, but to the way it is structured. It can thus be assumed that, if properly structured, water institutions can be successful in the economic, social and environmentally sustainable provision of water services.

This thesis is mainly based on theoretical data and examples of case studies are used to support this. It presents a qualitative analysis of data; therefore, generalisations cannot be made. However, it is possible to deduce certain general conclusions from the analysis and examples studied. The framework in this thesis can be developed further into a wider framework which with more empirical data can further explore the possibilities and limitations of both public and private participants in the water industry.

It is beyond the scope of the thesis to analyse the ways in which the limitations can be addressed and how to take advantage of possibilities. For example, new models of Private Sector Participation and regulatory schemes are not explored here. However, this does highlight a need for more research so that solutions can be provided to help achieve a good water supply system, defined in this thesis as having the following characteristics:

While trying to recover all costs, including provisions for investment and externalities, and working with the best allocative and operational efficiency possible, is capable of providing all the population the amount of safe drinking water that allows them to live a healthy, and culturally rich life; promotes the opportunities for work; focuses on the real needs of people and allows them to participate in the decision process being capable of understanding and influencing the actions of the administrators; and without compromising the perpetuity of the water resource and its quality, nor any service provided by it to the environment, humans, and other species.

I. Introduction

Today, nearly 1,2 billion people around the world have no access to safe drinking water. Around 2 million children die every year from water related diseases. These figures have become very important to the discussion about sustainable development and poverty reduction. At the World Summit on Sustainable Development held in Johannesburg, South Africa, in September 2002, leaders, governments and organisations made a commitment to reduce to half the amount of people without access to safe water and sanitation by 2015. It seems that there is strong agreement on this issue, however the tools for achieving this goal are far more controversial.

Many governments have not been successful in providing water and sanitation for all, especially in developing countries. Political decisions have affected the operation of water utilities. On the other hand, when private investors have participated in the provision of water, profit maximisation has conflicted with the social objectives of provision of water. Environmental issues have been overlooked in many instances in both private and public operated water utilities. There are many actors in the picture: communities, municipalities, central governments, political parties, labour unions, financial organisations, aid agencies and donors, private investors, etc.; all of them with particular interests. But what is the bottom line? People need water; water is a basic human right. However, water is as important for human needs as for all other non-human actors, ecosystems and geophysical processes. Therefore, water has to be provided equitably according to the different human needs without being detrimental to other systems and to the continuous balance of the water system itself.

Key contributors to the debate on water provision are the World Bank and the International Monetary Fund, who actively promote privatisation, and using their conditionality for disbursements coerce developing countries and economies in transition to embark on privatisation projects. Other actors such as certain NGOs and labour unions fiercely oppose any privatisation projects. In the centre of this discussion are the ones affected: communities, poor people, and in some instances, responsible municipalities and governments trying to represent in the best manner the interests of their communities or nations. And many times these actors, especially communities, are the ones least heard in the decision processes, and their considerations are overlooked in favour of particular interests that do not represent the social value of water.

This paper intends to explore both sides of the debate – pro-privatisation and pro-public provision of water-, trying to determine who are the winners and losers in each case, using as a reference the actors at the centre, especially the more under-represented and traditionally un-served. It is these actors who should ultimately be the core of the discussion, although the discussion tends to revolve around other less relevant issues. The environmental value of water for both the impact on humans and for its non-anthropocentric perspectives is considered as well.

The main objective of this research work is to identify and discuss links between the sustainability of the provision of water and water services and the nature of the ownership and/or the management of the water systems, specifically discussing different Private Sector Participation models versus the public provision of water and water services.

To address this objective the research aims to answer the following question:

**What are the goods and bads of Private Sector Participation (PSP) in the water industry?
And who benefits and who loses from PSP?**

In working towards the main research question, the following sub-questions will be considered:

- How is sustainability defined in relation to water supply systems?
- Does Private Sector Participation lead to more or less sustainability? and why?
- What are the limitations of public provision of water services?

II. Research Design

A. Introduction

Although the topic of ownership of infrastructure has been a source of constant debate in most modern societies, to the point of becoming one of the central criteria for the foundation, functioning and management of states, it is not until the late 1980s when private ownership became one of the main focuses of discussion around the world.

Extensive literature exists about privatisation, most of it written from the late 1980s onwards; and the debate continues, gathering force in the late 1990s with the privatisation of water utilities and many other infrastructures in developing countries. This literature is broad, covering philosophical, historical, theoretical, economical, and other perspectives as well as case studies of the experience of both public and private management of infrastructure.

In this thesis, I adopt a multi-criteria analysis framework for examining the issues of private sector participation in water industry within the context of sustainable development. Reference to multi-criteria analysis can be found in Munashinge (1995). This kind of analysis is useful when decisions are complex and cannot be taken considering economic, social, or environmental aspects independently, as happens in most policy decisions. In this type of analysis a tri-dimensional analysis is made where the trade-offs between each of the areas are considered in an attempt to find the best compromise scenario. Based on this approach I attempt to develop a logical framework and use it for the analysis of selected case studies. These case studies represent various models of ownership.

B. The Research Process: Methods and Data

The thesis involves an analysis of literature drawn mainly from the economics, public policy and legal writing on water. The research analysis covers three main themes essential for understanding the role of private sector participation in the water industry in the context of sustainable development. These include the nature of water as a good, models and theories of private sector participation and sustainable development challenges for water use.

Firstly, the research analyses the nature of water and its characterisation as a public/private good. It draws on various articles and books presenting different points of view that have emerged in the current debate about water provision. This understanding of the context in which water is situated as a *good* is important to understanding the dilemmas that ownership of water infrastructure present.

The second theme examined in this research is the question of private sector participation in the water industry. In this analysis, I review theoretical and case models of infrastructure ownership, explaining what has driven the use of some models over others, the incentives of public and private owners and the role of regulation in each case. To include the broader discussion that has been taking place on the issue, in most instances the term Private Sector Participation has been chosen over privatisation¹ as explained in Chapter IV - Privatisation and Private Sector Participation in the water industry. In this sense Private Sector Participation will include privatisation, and the term privatisation will be used to make specific reference to its narrower definition as addressed in Chapter IV.

¹ For contributing to the flow of the paper, the British English spelling of **Privatisation** will be used through the paper, even in quotations that have originally been spelled as **Privatization**, with exception of the reference list.

Third, the research analyses the sustainability challenges presented in water use. This analysis provides a review of the socio-economic and biophysical aspects of water use and the debates centred on these issues. Out of this data I construct my logical framework for analysis of *goods* and *bads* of private sector participation in water industry based on the multi-criteria analysis approach to be tested on empirical case studies.

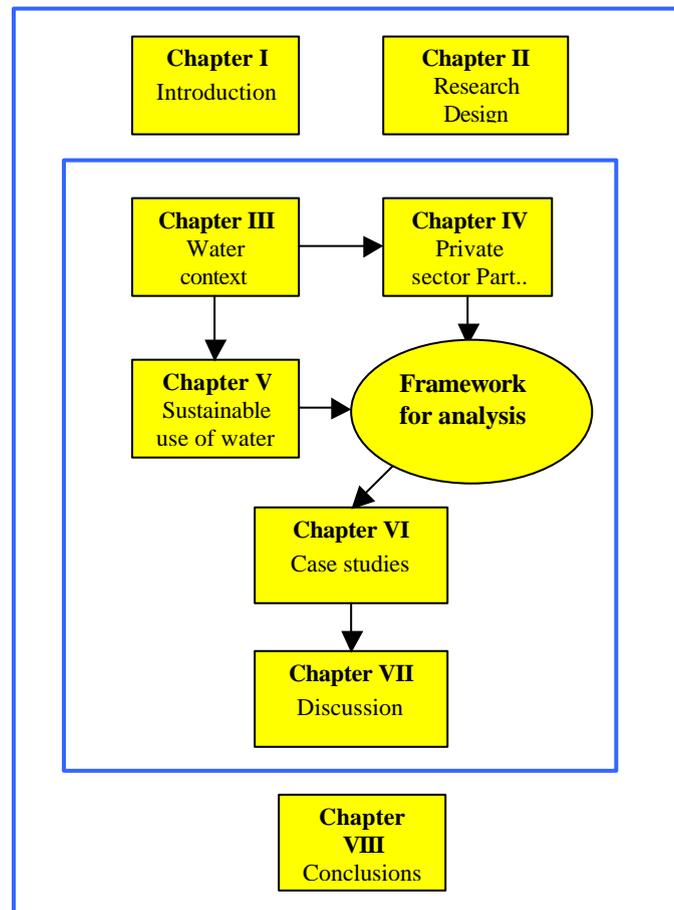
The empirical data for deploying the logical framework is drawn from three selected case studies of private sector participation. Each of the case studies presents a different situation. The first is full divestiture of assets of the water company, the case of England and Wales, where both positive and negative aspects in terms of results have been observed. The second case study is the city of Dar es Salaam, in Tanzania, where the Water Company owned and managed by the government has not been able to address social, environmental and economic needs. The third case study is the city of Porto Belo, in Brazil. This is an example of what has been widely considered a successful case of a public-owned water company (Hall *et al.*, 2002).

These particular case studies were chosen since each of them present one of the best situations of what I attempt to illustrate. The case of the England and Wales privatisation is perhaps the best-documented example, and the role of regulation in this privatisation is of special interest. The case of Porto Belo is considered one of the most successful publicly owned water utilities. Finally, the case of Dar es Salaam represents one well-documented situation of an un-operable water system. These situations are considered to answer part of the research question and the sub-questions stated in the introduction. They are not intended to represent any statistical sample, therefore, no generalisations are intended and trends cannot be observed. However, by deduction, some conclusions will be taken from these case studies that could be applicable for similar situations. Even though some comparisons are made, this case study analysis is not comparative and the indicators, elements or variables to analyse each are different in some cases. These case studies are rather used as a way to deploy and test to what extent the logical framework can help in assessing the *bads* and *goods* of private sector participation in water industry within a sustainable development context, therefore they are illustrative and not in depth case studies.

The multi-criteria analysis of the case studies is qualitative and descriptive in nature. This is combined with the multi-criteria analysis of sustainable development described before, which can be related to the methodology of multivariate data analysis (Tredoux and Pretorius, 1999, Chapter 9). However qualitative indicators will be used instead of the more common positivist and quantitative approach of multivariate data analysis. The fact that qualitative research is the core of this thesis, implies that generalisations cannot be made, but the objective of understanding certain aspects, causes and implications of the phenomena will be better achieved by using this methodology.

The structure of the thesis and relationship between various chapters is presented in Figure I.

Figure I.
Structure of the thesis



III. Water

Private Sector Participation in the water sector has frequently resulted in the ‘commodification’ of water. This means that water has been treated exclusively as an economic good or there is an attempt to leave it to the market forces. This chapter explains the very fundamental characteristics of water that conflict with the objectives of private sector firms. However due to the inability of governments to provide safe drinking water universally, private sector participation has come to be seen as both necessary and desirable.

A. A basic human right

“Access to safe water is a fundamental human need and, therefore, a basic human right. Contaminated water jeopardizes both the physical and social health of all people. It is an affront to human dignity” (Annan, 2001).

An adult human must consume at least 1 litre of water either by drinking or as an ingredient of food. A person will not survive on average for more than six days without water (Ward, 1997). The indispensability of water for human life is never argued. We need to drink water, clean our bodies, our belongings and

instruments of work. Water feeds our animals and plantations. Water contributes to health and provides us with amenities. Water represents life itself.

From an ethical point of view one can argue that anything that is indispensable for human life and its well-being has to be a human right. In 1948 the United Nations General Assembly approved the Universal Declaration of Human Rights and the article 22 (now article 25) says:

“Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing...” (United Nations General Assembly, 1948)

Even though water was not explicitly mentioned as a human right, as water is a fundamental for a standard of living adequate for the health of people, it can be assumed by the declaration that everyone has the right to water, that water is a Basic Human Right. But why was water not explicitly mentioned as a human right? Gleick (1999) argues that logic suggests that the people involved in creating the Universal Declaration of Human Rights considered water to be implicit in the declaration.

However, Gleick (1999) adds that it is important to explicitly declare water as a human right to encourage the international community and governments to renew efforts to provide their population with water to meet their basic needs; to translate the right into international and national legal obligations; to keep the deplorable state of water management in many parts of the world in the spotlight; to focus attention on solving international water conflicts; and finally to “set specific priorities in water policy”. Gleick (1999) also quotes Jolly from UNDP:

“To emphasize the human right of access to drinking water does more than emphasize its importance. It grounds the priority on the bedrock of social and economic rights, it emphasizes the obligations of states parties to ensure access, and it identifies the obligations of states parties to provide support internationally as well as nationally” (Jolly, 1998).

From 1970, several conferences and agreements on environment, water and development have discussed and addressed the issue of water as a basic human right. However as mentioned by Gleick (1999) the resultant documents do not have the same legal standing as the Universal Declaration of Human Rights (see Gleick, 1999 for a discussion of those documents).

At the World Summit in Johannesburg, water issues were discussed in the sixth plenary session held on 28 August 2002. Although water was recognised as a human right there were no explicit declarations regarding water however. (See World Summit on Sustainable Development, 2002, *Plenary Sixth Meeting (AM), 28 August 2002*)

In summary, explicitly considering water as a basic human right is of extreme importance for addressing the problems that water supply systems are facing and the immediate need to provide solutions to those lacking access to safe drinking water. That water is a basic human right implies that water has a considerable social dimension. However water also has very important economic dimensions. Traditionally, public sector management has emphasised the social character of water (not successfully), and private sector management focused on the economic characteristics. The following section explains both characteristics and as well as the recent efforts to make explicit both the economic and social values of water.

B. A social and economic good

Another aspect that has been of considerable debate is the characterisation of water as a social good and as an economic good. Social goods are those that have any significant spillover benefits or costs. Water is a social good under this definition since its availability improves individual and social well-being (Gleick *et al*, 2002). An economic good is “any good or service that has value to more than one person” (Gleick *et al*,

2002, 7). If a good has value to more than one person, it means that it can be traded and therefore it has economic value. Water also clearly fits into this definition. However as presented by Gleick *et al* (2002, 6) “treating water solely as a commodity” - only recognising its economic value and not its social value - “governed by the rules of the market implies that those who cannot afford clean water must suffer the many ills associated with its absence”. On the other hand, recognising just the social value of water, providing water for free or at subsidized prices can lead to inefficient use of water.

Agenda 21 recognises water as both a social and an economic good:

“Integrated water resources management is based on the perception of water as an integral part of ecosystem, a natural resource, and a social and economic good...” (United Nations Conference on Environment and Development, 1992, Agenda 21, Chapter 18.8)

At the closing session of the International Conference on Water and the Environment held in Dublin, Ireland in January 1992, the Conference adopted a four-principled statement known as the Dublin Statement. The fourth principle states:

“Principle No. 4 - Water has an economic value in all its competing uses and should be recognized as an economic good”.

“Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources.”

This principle has been the subject of much debate since it fails to address the social value of water.

Summarising, it seems that there is consensus about recognising water as a social and economic good. However, in practical terms there is a risk that participants will focus on just one of these characteristics of water. As mentioned before, private firms for its profit orientation have traditionally managed water mainly as an economic good. On the other hand, many public organisations have focused on the social side of water, and in the attempt they have failed to succeed due to financial and economic reasons. How to manage water as both a social and economic good and what are the limitations of public and private firms to do it, are part of the main question of this thesis and will be analysed in the following chapters. Other factor that have been of ample debate about the participation of private firms in the water industry, is the risk of losing the property rights of water under private control, which at the same time will risk social qualities of water.

C. Water Property Rights

“Because it is fixed and stable, land can be divided by edges and walls. Thus land has the potential to be held in common or to become, as it has done for many countries, the foundation of private property. By contrast, water has to be a communal asset because it will not stay still” (David Kinnersley in Ward, 1997, 1)

While the potential of land for either common or private property can be argued by many, that water is a communal asset is hardly arguable. The hydrologic cycle on which water state and movement depends is a complex dynamic system that affects and is affected by many other systems and invariably takes place in a larger region than one subject to private property arrangements. What is more, the vital and life-giving character of water means that no single party must control it or decide on a basis of its private interest. The fundamental and final criteria on deciding on the rights to water is of common interest. In many instances

water use has been controlled privately but this is not due to the nature of water but to land distribution issues or the unequal provision of clean water to people.

Unfortunately common ownership, while seeming like a good idea, tends not to work in practice. The common ownership of water has been taken further by most societies, who even with agreements on the sharing of water, have seen water as a free resource, on which anyone can depend at no cost more than what takes to move it from its source to the place where it is going to be used. This cost could range from as high as the work done by a woman taking the water from the well to her village, to as low as the cost that a public water company incurs for pumping the water up from an aquifer to the tap of city houses less the subsidies that policy-makers have considered appropriate – in many instances making it even zero.

In economic theory a public good is considered a market failure, which is defined by Hanley *et al* (2001) as a contradiction between social and private interests. A ‘public good’ is one whose consumption nobody can be excluded from, and the use by somebody will not reduce the use by others (Hanley, Shogren and White, 2001). Arce and Sadler (2002) point out that public good does not mean that it has to be provided by some type of government. Instead it means that the good has some degree of non-rivalry and not excludability. They emphasise the issue that who finances the good should not define the publicness of the good.

Based on the above discussion, water can be considered an impure public good, and specifically of the kind named Common Pool Resource, which implies that it has a relatively high cost of achieving physical excludability, but is rival since its consumption subtracts from the consumption by others (Ostrom, 1992). This is particularly true in the case of clean water. The high cost of non-excludability mentioned here should include the social cost of excluding certain people from the use of water.

The Coase theorem argues that in the absence of transaction costs, independent of who owns the property rights of a resource or good, an optimal allocation of resources or ‘Pareto optimality’² will be achieved through negotiation between parties if property rights exist. Therefore, the theorem argues that to correct the market failure of public goods property rights should be assigned. (Hanley, Shogren and White, 2001)

Although the Coase theorem is hypothetical, and low transaction cost situations are rare, the so called Coasian tradition (Turner *et al*, 1994) oppose government intervention and favour unregulated situations, arguing that “regardless of who holds the property rights, there is a tendency to approach the social optimum via bargaining” (Turner *et al*, 1994, 153).

However, as will be discussed in Chapter V, optimal allocation of resources does not consider distributional issues. In other words, the total output of the economy can be maximised, but the actor receiving the property right can end up receiving all or most of the benefits of such transaction. The private interests and profit orientation of private firms cannot be therefore trusted as good and fair guardians of the property rights of water even if the market benefits as a whole. Furthermore, high transaction costs and imperfect competition make inapplicable the Coase theorem. On the other hand, the absence of property rights that have been characteristic of public sector management has risked the conservation of the resource.

One of the failures of public sector in assigning property right has been observed in the absence of value that has been attributed to water. The following section explains the values of water as a social, economic and a third dimension, an environmental good (based on the environmental services provided by water).

D. The Value of Water

² Pareto optimality or efficiency means that resources can not be relocated to make one person better off without making at least one other person worse off (Parkin *et al*, 1997)

From an economic point of view Value is the maximum amount that a person is willing to pay for a good (Parking *et al*, 1997). Therefore, it can be assumed that a person will be willing to pay for water as much as she or he perceives a utility from it and the benefit from the additional unit of water is superior to the cost, or in economic terms, the marginal utility is bigger than the price.

There are several factors involved in the marginal utility theory. First is the ability to pay. If a person has less ability to pay than others then, for a given price, the former will consume less water. According to the marginal utility theory this will imply that water has less value for poorer people.

A second factor is the perceived value. The most common perceived values of water are alimentation, sanitation, production of food and goods, and amenity. However, the total amount of services goes beyond that. All the ecological services such as forest conservation, biodiversity maintenance, weather stability, and the general role of life support are not normally perceived as services of water. Even less perceived is the intrinsic value of water and the relation to the intrinsic value of ecosystems and organisms, which is the value of something because its existence. Therefore, value will be allocated based on perceived utility, and lack of information can lead to undervaluing water.

A third factor is that of 'free riding'. Even if someone recognises the total value of water, if they feel that they can benefit from its use without paying for it or paying less than they value it, many people will try do so.

According to Rogers *et al* (1998), for economic equilibrium the value of water should be equal to the full cost of water (full cost of water is explained in Chapter V). However this simply counts the economic value of water and not its social value, which according to Rogers *at al* (1998), should be adjusted in the use in households and agriculture for achieving social objectives as poverty alleviation, employment, and food security.

Egypt's Minister of Water Resources and Irrigation suggested at the Johannesburg Summit that the emphasis should be on cost recovery rather than water pricing, therefore, the cost of water should be identified, and its value recognised. Then the decisions should be taken on "how to recover full cost, part cost, or no cost according to the value for the different groups" (World Summit on Sustainable Development. 2002. *Plenary 6th Meeting (AM), 28 August 2002*).

Identifying the cost of water is not a simple matter however. We normally see the cost of drinking water as the cost to put the water in our taps. But the consumption of water affects all other systems related to fresh water, therefore, the cost should include the externalities created in those other activities and the cost of opportunity of not using it alternatively. But this has to be weighted with the great social value of safe drinking water for human consumption.

To exemplify the value of water, Table I. shows the services provided by rivers, lakes, aquifers and wetlands according to Postel and Carpenter (1997)

Table I
Services provided by rivers, lakes, aquifers and wetlands

Water supply

- Drinking, cooking, washing, and other household uses
- Manufacturing, thermoelectric power generation and other industrial uses
- Irrigation of crops, parks, golf courses, etc.
- Aquaculture

Supply of goods other than water

- Fish
- Waterfowl
- Clams and mussels
- Pelts

Non-extraction or instream benefits

- Flood control
- Transportation
- Recreational swimming, boating, etc.
- Pollution dilution and water quality protection
- Hydroelectric generation
- Bird and wildlife habitat
- Soil fertilisation
- Enhanced property values
- Non-user values

Neither Private Sector nor Public Sector have been successful in recognising the value of water and matching it to the cost. The Private sector has normally been interested in recovering their costs with a profit. In their effort to maximise profits, firms try to reduce costs to the minimum possible. However this cannot only be blamed on the private sector; the whole economic system fails to recognise externalities and the influence of water management on most of the services detailed in Table I. The public sector for different reasons has also failed to recognise value of water. The main reason is its emphasis on the social character of water denying both its economic and environmental values.

Moving to another issue, one of the reasons given to welcome Private Sector Participation in the Water industry has been the attempt to promote competition. Private firms are normally regulated by the market forces and competition. Alternatively, when operating in a monopolistic industry, they have to be regulated by the government in order to avoid abuse of their monopolistic power. However, even when regulated, as explained in Sections C and D of Chapter IV, Private Sector Participation in monopolies creates problems and dilemmas. The following section emphasises the characteristics of water as a natural monopoly.

E. Water supply - a natural monopoly

When the water system was privatised in England and Wales, one of the arguments to support the privatisation process was that it would promote competition. Instead, privatisation granted regional monopolies to ten private companies.

The argument about what can be considered a naturally monopolistic market or a competitive market has relevance in the decisions to either keep in public hands or privatise a public service (this argument was previously one of keeping in private hands or nationalising). If privatisation is the chosen option, then the questions is: should the market be left unregulated or regulated and to what extent?

A natural monopoly exists when one firm can supply the entire market at a lower price than two or more firms due to economies of scale. Economies of scale exist when long-term average cost decreases as output

increases (Parkin *et al*, 1997). The idea is to not duplicate fixed costs³ and this is especially relevant in infrastructure projects where the fixed cost is enormous.

Traditionally, natural monopolies have been left in the hands of public organisations, because the public character of the service and the objective of looking after the common interest make them suitable for that task. On the other hand, the private interest of private firms, and the profit maximisation goal make this kind of organisation unsuitable for administering public services and assets. However, when private firms are involved in such activities, regulation is considered the solution to prevent consumers suffering from the abuse of the monopolistic position of private firms.

There are two important aspects to point out in the issue of monopolistic enterprises. First, as discussed by Parker (1999) sometimes what has been considered and treated as monopolies were not natural monopolies. Parker (1999) argues that the extent of natural monopolies was often over-estimated and potentially competitive industries were often categorised and treated as monopolies. Vickers and Yarrow (1988) argue that conditions of demand and technology can change the characterisation of markets, and what was considered a monopolistic industry can become a competitive market industry. This is exemplified by water transmission systems owned publicly but water resources provided privately, similar to the current electricity grids where private companies provide a certain amount of power into the public grid according to the number of their customers. Here the users can choose their providers. Even though this is currently been discussed in the United Kingdom water industry, it is still not actually working anywhere in the world.

The second aspect is related to the concept of liberalisation. Liberalisation means the opening of an industry to competitive forces, independent of who the owner is. Therefore, public companies can compete in the market, and with competitive threats, some argue, performance can be improved. However, the water industry is a very particular case. In the first place, where large economies of scale exist as in the case of water infrastructure, under a competitive regime they would be sacrificed, therefore the total consumer/producer surplus or social welfare would be reduced. Also, with competition, the public sector would lose the possibility of creating cross-subsidies (defined in Chapter V) since competing private operators would probably be providing the wealthiest consumers and most profitable sectors of the market.

This chapter has presented some of the most important characteristics of water. In summary, water is a 'Basic Human Right' and therefore it is important to recognise it as a social good. However, in order to properly manage the supply of water it is also important to recognise it as an economic good. This means that all the values of water, including the environmental values should be present in its price, while taking the necessary provisions for satisfying the needs of all, including those who cannot pay for it (the practical implications of this as well as the suitability of public or private sides to accomplish this objective will be discussed in the following chapters). Also, to protect the social value of water, it is important that property rights are assigned to it, and the beneficiaries should be the public in general, without implying that they can make use of water services as a free resource. Finally, it is important to recognise the monopolistic characteristics of the water industry, and the conflicts of private firms to operate in this kind of market. This will be analysed in the following chapter when the incentives of private firms and the limitations of regulation of monopolistic industries are discussed.

To better understand the meaning of Private Sector Participation, a contextual framework, considering the nature of ownership of the issue, will be presented in the next chapter as well as several models of ownership of infrastructure and Private Sector Participation. The chapter will explore the motives that have induced governments to welcome privatisation and Private Sector Participation in the water industry as it is important to analyse if those motives and the essential objectives of water provision are consistent. Also the incentives of public organisations and private firms will be discussed in order to further analyse the compatibility of needs with the objectives of both sectors. Finally, due to the importance of regulating the participation of private firms in a monopolistic industry, a section will be dedicated to the regulation issues.

³ Fixed costs are those that are independent of the output level

IV. Privatisation and Private Sector Participation in the water industry

The term privatisation has been extensively defined. According to Barnekov *et al* (1989, 125), the term privatisation has been used to refer to several types of policy initiatives, including “disengagement or withdrawal of government from specific responsibilities” transferring them to private organisations, “the shift from public to private provision of goods and services while maintaining public financing, and the sale of public assets”. Many of the definitions specifically address the sale of public assets or “the partial or total transfer of an enterprise from public to private ownership (Bös, 1991).

In the 1980s, with the government of Ronald Reagan in the United States and Margaret Thatcher in Britain, a large divestiture of assets took place in those countries followed by similar actions in many other countries. In England and Wales water companies were privatised under the model of full divestiture. However, this model is no longer followed and even the water companies that once were supporting it now agree that the purchase of assets is not the right strategy. “Asset ownership proved to be a drain rather than a boost of profits” (Green, DRAFT, 10). Besides England, only Belize and some cities in Poland have seen a full divestiture of assets.

In all other countries where the private sector is participating in the provision of water, different types of models are in place and the private sector has been contracted to provide some services. This kind of arrangement is referred as “Private Sector Participation” (PSP). Therefore the current dialogue on provision of public services has now turned to the broader concept of Private Sector Participation.

To understand where Private Sector Participation stands in terms of different models of infrastructure provision, several of these models will be described in the next section, ranging from ‘totally public’ to ‘totally private’.

A. Infrastructure Ownership and Private Sector Participation models

Water represents one of the most important areas relevant to the provision of infrastructure. The term infrastructure refers normally to two elements: social infrastructure and physical infrastructure. The first includes services such as education and health care facilities. The second includes water supply, sanitation, drainage, roads, solid waste disposal facilities, etc (Choguill, 1996).

Historically, the ways in which infrastructure has been provided have been very diverse, varying through time and locality. This includes different modes of ownership, financing and operation (Jacobson and Tar, 1995). In general, government ownership has been predominant, but many infrastructures have also been owned by private firms, for example telephones and telegraphs in United States.

The provision of infrastructure by a central or local government, also called the traditional model of infrastructure provision, rests on the philosophy that as the benefits of the infrastructure are shared by the community where it operates only the government is in a position to collect the revenues generated through such infrastructure. Also, behind this model is the argument that the government should be responsible for providing the community with the benefits of the infrastructure.

Another model is the private supply of infrastructure under governmental regulation. Monopoly franchises were granted to firms in specific geographical areas in USA and the prices charged were controlled either by the state or federal government, or independent commissions appointed by the state.

Choguill (1996) defines two other models of infrastructure provision as ‘on-site self provided facilities’ and ‘progressive improvement’. The first is the case of localities where people have not been served by public infrastructure, and then they opt for solving their own problems, for example water wells or septic tanks constructed by the community or the user itself. In the second case mainly poor people or people in rural

areas start with the self-provision of infrastructure and progressively improve towards a more developed infrastructure that can be town systems or other systems provided by a municipality (Choguill, 1996). 'Town systems' are systems of infrastructure that have been developed within the central areas of cities, in areas of high density of population or areas where high-income residents are located (Choguill, 1996).

Other models of provision of infrastructure involve a partnership between governments and private companies; the characteristics of this type of model vary mainly depending on who the controlling partner is. In some cases the government keeps a majority of the votes, therefore it controls most of the decisions taken by the partnership company. In other cases it is the private company who has the voting majority. In these cases the government can opt for maintaining a *golden* share to veto some of the decisions of the private partner. The reasoning for the creation of these partnerships is normally to involve a private party in the management and operation of the companies with the expectation of improving efficiency while maintaining either government control or at least vigilance. Economic and budgetary issues can be the reason of these partnerships.

The British model is what has normally been called privatisation, which involved a large-scale full divestiture of assets. Assets and water sources rights were transferred to the private sector. Another popular model is the so-called French model that involves a variety of public-private partnerships. In this model, assets and water rights were not transferred. Mainly management and construction works were contracted to the private sector under this model. There is a third model called the Dutch model that was adopted by several countries (Netherlands, Chile, Poland and the Philippines) where the water companies were corporatised and made to work with the same incentives of private companies and were oriented to profits. (Gutierrez and PSP Project Team, 2001)

Other models involve the public ownership of the infrastructure with the management provided by a private company with different types of contracts. In some cases the ownership can belong to the private party with an arrangement of transfer of the assets or enterprise in a predetermined lapse of time, normally called concessions. Concessions are normally called by acronyms that describe their function. Some common examples are Built-Operate-Transfer (BOT), Built-Operate-Train-Transfer (BOTT), Built-Own-Operate-Transfer (BOOT), Rehabilitate-Operate-Transfer (ROT) and Built-Operate-Own (BOO) (Hallmans and Stemberg, 1999).

The models of provision of infrastructure also can vary depending on the way they are financed. For example, in the 'cost sharing approach', all users, both existing and new, share the cost of incremental infrastructure. USA cities have traditionally used this model acquiring funds through emission of bonds with interest payment shared among all taxpayers (Brueckner, 1997). Another model involves new residents paying the cost of incremental infrastructure. One specific model of this type is called 'land exactions' where the infrastructure can be provided in cash or in kind by the developers, for example, they can be asked to build streets, water mains, etc (Brueckner, 1997).

It is not simply the debate about public versus private provision of water infrastructure that is the issue; it is important to understand the benefits and limitations presented by each alternative, and the way in which each is structured. However, the specific analysis of each model is beyond the scope of this work and each is simply introduced in order to give a sense of a picture with many dimensions.

The next section presents some of the arguments and reasoning that have traditionally supported the use of public or private ownership, or alternatively, when it involves a shift of ownership, privatisation or nationalisation.

B. Fundamental reasoning behind public and private ownership

In their literature review about ownership, Shirley and Walsh (2000) point out that a trend supporting State Owned Enterprises emerged in industrialised countries in the 1930's to 1950's as a solution for market failures (i.e. Monopolies and Externalities). In developing countries the same trend emerged in the post-war period based on more control over economic planning and development.

Bös (1991) identifies three main groups of reasons for the consideration of privatisation: (a) political and ideological reasoning (b) economic reasoning and (c) government budget reasoning. According to Bös (1991), the political-ideological reasoning is based on the changes of distribution of power within a society, and the attitudes to privatisation of individuals depend on their political position. For example, the influence of trade unions will normally be reduced by privatisation. "Decisions are taken out of the scope of the public bureaucrats and policy makers" (Bös, 1991). Then, the distribution of power between public and private sector is redefined.

"In the hands of the market and the market lords, decisions are of a different nature. Socialist ways of thinking are replaced by capitalist ones" (Bös, 1991, p2)

The economic reasoning is divided by Bös (1991) into three categories: (a) efficiency arguments, (b) distributional arguments and (c) stabilisation arguments. In terms of efficiency, it is commonly believed that private firms are more efficient than public ones. However, as discussed by Bös (1991) there are studies that both support and oppose this view. Also, Vickers and Yarrow (1988) argue that efficiency has normally been measured through indicators such as profitability and unit cost, which are biased in favour of private firms.

In the distributional argument, there are two main issues to discuss. One is that in privatisation, there is a transformation of government capital into private capital (Bös, 1991). As discussed by Bös (1991), ideological arguments of 'people's capitalism' would see widespread ownership as a good redistributive policy, however he argues that normally those who acquire shares are not the poor, a situation that negatively affects the distribution of income. The second issue is that government tax or pricing policies can work more favourably in terms of distribution.

Finally, in the stabilisation argument, the supporters of Nationalisation or Public ownership stand on the basis that public enterprises can be used as an economic tool for stabilisation policies. On the other hand, those who favour privatisation say that too much stabilisation policy cannot be combined with the successful management of firms.

The government budget reasoning can be related to the economic reasons, since government fiscal deficit and surplus will have a direct impact on the economy. However, the budget reasoning is also related with the responsibility of governments to look for financing for infrastructure projects (Bös, 1991). In fact, privatisation is viewed as a way of financing the projects, but with the responsibilities and structures of power shifted to the private sector.

Public organisations and private firms are normally driven by different sets of objectives and incentives. These objectives and incentives have a direct impact on the behaviour and performance of both parties, and therefore the definition of who benefits, and in many cases who loses. This is especially relevant for socially sensitive goods such as water. The next section is dedicated to analyse these incentives and objectives.

C. Public and Private objectives and incentives

The strength of the idea of private enterprise lies in its terrifying simplicity. It suggests that the totality of life can be reduced to one aspect – profits. The businessman, as a private individual, may still be interested in other aspects of life – perhaps even in goodness, truth and beauty – but as a businessman he concerns himself only with profits. (Schumacher E.F., 1973)

As discussed by Vickers and Yarrow “a transfer from the public to the private sector (or vice versa) of entitlements to the residual profits from operating an enterprise necessarily implies a change in the relations between those responsible for the firm’s decisions and the beneficiaries of its profits flows” and they conclude that “allocation of property rights does matter because it determines the objectives of the ‘owners’ of the firm (public or private) and the system of monitoring managerial performance”. (Vickers and Yarrow, 1988, p3)

This can be explained by the Principal-Agent theory that rests on the following problem (the agency problem) (Vickers and Yarrow, 1988):

- There exists a Principal who seeks to establish incentives for an Agent (the owner firm) whose decisions affect the Principal (the manager of the firm).
- The Principal and the Agent do not share the same objectives.
- The Principal tries to induce the Agent to act in his interests, but he does not have complete information about the actions of the Agent, therefore a monitoring problem exists, which prevents the Principal from telling the Agent how to act.

The Principal wants the Agent actions to depend on circumstances that only the Agent can observe. Therefore, the Principal-Agent theory deals with the necessary incentives to address the agency problem. In establishing an appropriate incentive scheme, the Principal must observe that: (a) the Agent will act in his own interest and (b) the incentive scheme must be attractive enough to make the Agent act in the way that the Principal expects.

In the water context, the Agent will be the management of the company and the Principal will be the shareholder in the case of private ownership or the department of the government to which the Agent is responsible in the case of public ownership. Further, in the case of public ownership, the government department is the Agent for the people (or voters) who are the final Principals. (Vickers and Yarrow, 1988)

As a consequence of privatisation, then, the objectives of the principal are changed. From a welfare maximisation and public interest, the objectives will shift to profit maximisation. However, Vickers and Yarrow (1988), argue that even though the emphasis of a private firm is profit maximisation, the analysis of changes is more complex and not straightforward.

In both public and private ownership, there are two sets of incentives; the incentive of the owners that in the first case is welfare maximisation and in the latter is profit maximisation, and the incentives of the Agents. For the public ownership case, the incentives of the Agent are broad, and include maintaining their jobs and benefits, however they are rarely linked to performance. In the case of private ownership the incentives can be in cash or share options and are generally related to performance.

Another important aspect is that depending on ownership the relation between the Principal and the Agent is changed. This is mainly due to the different types of incentives that each kind of ownership establishes. For example, in a privately owned company, even though the problem of monitoring Agent actions still persist, at least the output of Agent actions is observable through a more simple formula: the profits of the company, or more specifically, the profit per share and rate of return. On the other hand, with public ownership, the impact of Agent actions on the broader public interest is far more complex to observe. As stated by Vickers

and Yarrow (1988), believing that the concept of social welfare maximisation can be concentrated in one simple formula is “rather heroic”.

In the Water context, nonetheless, under private ownership just considering water solely as an economic good the Principal would remain just the shareholders. But considering water as an economic and social good, there are other Principal-Agent relations involved in the picture. The company is the Agent to the regulatory organisation in order to comply with the social objectives. And finally, the regulatory organisation is the Agent to the public. This extends the concept of Principal to a multi stakeholder approach.

In terms of the difference in incentives for the Agent (management) to perform well, Vickers and Yarrow (1988) say that in public ownership principals are not normally seeking to maximise profit and threats of bankruptcy and risk of take over are not normally present.

Summarising, in the case of the Public company, the welfare maximising objective of the Principal is in line with the social aspect of water. However, the lack of incentives for the management (the Agent) to perform well, the complexity of the criteria to define social welfare, the political constraints and the insufficient capital resources hinder the social welfare maximisation. On the other hand, the Private Company has the incentives for the management to perform well, the capital resources (but only if there are enough incentives in terms of return over investment), and a relatively simple criterion to define profitability; but the profit maximisation criteria is conflictive with the social welfare maximisation.

In a non-competitive market like the water industry, regulation is of critical importance in order to avoid private firm’s abuse of their monopolistic power as well as to make public firms accountable for their actions and performance. The next section analyses the role of regulation in the water industry and its importance and limitations in case of Private Sector Participation.

D. Ownership and regulation

The reason for regulation of private firms in monopolistic markets is clear-cut. Private firms are profit oriented. If there is just one firm providing a good or service in a monopolistic situation, the firm will fix their prices and control their costs in such a way that maximise their profit independently of other interests.

In such scenario, the utility of the firm will depend on the elasticity of the good to the price, that is if changes in price will produce greater or smaller changes in demand. Water is essential for life, and there are no substitutes for it. Therefore, especially in the range of what can be considered the use of water for satisfying human needs, if prices change people will try to maintain consumption as far as their ability to pay allows. The alternatives to safe drinking water provided by a utility are few and sub-optimal: water that requires strenuous effort to obtain (for example distant wells), unsafe sources of water, or illegal connections or ways to obtain water. These characteristics of water make it an inelastic good to price, or in other words, if prices increase the demand is reduced but in a smaller proportion than the increase in price. As a result, monopolistic firms will have an incentive to increase price until this relation changes and/or their marginal utility is zero. The inelasticity of water demand to prices is well reflected in the high prices that poor households unconnected to the water system are paying for water distributed by water vendors (see case of Dar es Salaam below).

But regulation is not only important to control prices, it is also important to control quality of the water and of service, level of investment and equitability of provision of the water. In other words, regulation is important to reduce or eliminate the constraints of profit and is oriented towards social welfare maximisation. As Vickers and Yarrow (1988, 8) say: “it has often been claimed that the privatisation of firms with market power tends to improve internal efficiency, but at the risk of allocative efficiency unless some of the effects of profit seeking behaviour are held in check by sufficiently rigorous competitive and/or regulatory constraints”.

Parker (1999, 225) defines the objectives of regulation as follows:

- “Promoting and protecting the consumer interest”
- “Securing that regulated companies are able to finance their legitimate operation”
- “Promoting efficiency and economy in service delivery”
- “Social and environmental concerns”
- “Promoting competition”

Some of the more important problems that can arise if regulation is not in place are, as mentioned in the previous paragraph, investment, quality of the water and of the service, and equitability of provision.

Investment and the other factors mentioned imply an increase in the fixed and variable costs to the firm (construction and maintenance of water treatment plants, extension of infrastructure to un-serviced areas, etc.). Then, more investment, unless it has a rate of return over the cost of capital, represents a reduction of utility to the shareholders. Private companies will try to take the decisions of investment based only on their profitability and not on social welfare maximisation. Regulation tries to solve this problem by creating investment schedules and obligations; however, where regulation organisations and regulation contracts are not strong enough, investment needs can seriously be jeopardised. For example in Latin America several concessions have invested amounts considerably below the agreed ones. (Hall and Lobina, 2002, 11).

But regulation has its limitations. Returning to the Principal-Agent theory explained in section IV-C above, the role of regulation faces an Agency problem. The Principal (the Regulator) and the Agent (the private firm) have different objectives, maximising social welfare in the first case and maximising profit in the second. Besides, the Regulator has imperfect information about the actions of the firm. The system of regulation then, can be regarded as the incentive used by the regulator to make the firm perform in the expected way (Vickers and Yarrow, 1988). Therefore choosing the right incentives or method of regulation is important to achieve the objective of social welfare maximisation.

Another limitation of regulation is that the complexity of the arrangements may overlook important issues or fail to assign clear rights and responsibilities. For example, arrangements can lack dispute resolution and/ or public participation mechanisms (Gleick *et al*, 2002).

Vickers and Yarrow (1988) present the difficulties of regulating private firms due to the agency problem as follows:

“Profit-maximizing monopolists may engage in a variety of business practices that run counter to the public interest, and while it may be feasible to limit such behaviour via the provisions of competition or regulatory policies, the complexities of this type of exercise in conditions of asymmetric information may render public ownership the preferred framework in which to tackle the problems” (Vickers and Yarrow, 1988, p28).

The Agency problem is not only relevant to privately owned firms, but also to public ones. The Agent in publicly owned water companies is the management, and they often have different objectives than the Principal (the Board of Directors or the government organisations or department in charge of controlling/regulating the water utility). For example, labour unions and individual civil servants can have interests that differ from the broad public interest of welfare maximisation.

The Agency problem observed in the case of private operated monopolies brings to light a question regarding the best models to regulate the private firms. One model is based on giving firms a fixed profit and another on setting a fixed price of the good. One complexity presented in both cases, is that the regulator (Principal) has less information than the firm (Agent) about costs. Some problems are attributed to each model. In the fixed profit model, as the private firm is given a fixed margin over cost, the firm has no

incentive to increase efficiency. In the fixed price model, the firm has an incentive to reduce cost (improve internal efficiency) but the benefits are not transferred to the consumer (Vickers and Yarrow, 1988).⁴

To conclude this chapter and put into context the current debate about private sector participation, a summary of the discussion on the matter that took place at the World Summit on Sustainable Development (WSSD) in August 2002 is presented in the next section.

E. World Summit on Sustainable Development (WSSD) discussions about privatisation of water.

“Water resources in many countries remain fragile, more due to poor resource management than to actual water scarcity. Measures promoting sustainable use of water are less than satisfactory. About 1.2 billion people still have no access to safe drinking water, and 2.4 billion do not have adequate sanitation services. Some 2 million children die every year from water-related diseases. In the poorest countries, one in five children dies before the age of five mainly from water-related infectious diseases arising from insufficient water availability, in both quantity and quality. At any one time, half of the world’s hospital beds are occupied by patients suffering from water-borne diseases. Diarrhoeal diseases, a result of lack of adequate water and sanitation services, in the past 10 years have killed more children than all people lost to armed conflict since the Second World War. Thus provision of safe drinking water and sanitation services to more than 1 billion people over the next decade remains one of the most critical challenges humanity is facing today.” (World Summit on Sustainable Development, 2002, Water, Energy, Health, Agriculture and Biodiversity)

Between 26 August and 4 September 2002 the World Summit on Sustainable Development was held in Johannesburg, South Africa. The Johannesburg conference (also referred to as Rio +10) was celebrated on the tenth anniversary of the Earth Summit in Rio de Janeiro, Brazil where Agenda 21 was adopted. [According to the Official United Nations website for the Johannesburg Summit 2002] “...the Johannesburg Summit presents an exciting opportunity for today’s leaders to adopt concrete steps and identify quantifiable targets for better implementing Agenda 21”

Five major thematic areas were discussed as key elements for the implementation of an international sustainable development agenda. These areas are water, energy, health, agriculture and biodiversity, also referred to as the WEHAB initiative. During the conference, providing water and sanitation for more than one billion people over the next decade was considered one of “humanity’s most critical challenges” (World Summit on Sustainable Development, 2002, *Plenary Sixth Meeting (AM)*, 28 August 2002).

In the preparations for the WSSD water was discussed at the intergovernmental level during the sixth session of the Commission on Sustainable Development in 1999. International water meetings were held at The Hague in 2000 (Second World Water Forum) and in Bonn 2001 (International Conference on Fresh Water). (World Summit on Sustainable Development, 2002, Water, Energy, Health, Agriculture and Biodiversity).

The major target related to water and sanitation established in the Johannesburg Summit was “to halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water (as outlined in the Millennium Declaration) and the proportion of people who do not have access to basic sanitation...” (World Summit on Sustainable Development, 2002, Plan of Implementation, Paragraph 7)

Other important outcomes from the Summit related to water were

- “Develop integrated water resources management and water efficiency plans by 2005”

⁴ To further explore the many complexities, which are beyond the scope of this study, involved in the regulation of private monopolies see Vickers and Yarrow (Vickers and Yarrow, 1988, Chapter 4) and Bös (Bös, 1991, Chapter 7).

- “The United States announced \$970 million in investments over the next three years on water and sanitation projects.”
- “The European Union announced the ‘Water for Life’ initiative that seeks to engage partners to meet goals for water and sanitation, primarily in Africa and Central Asia.”
- “The Asia Development Bank provided a \$5 million grant to UN Habitat and \$500 million in fast-track credit for the Water for Asian Cities Programme.”
- “The UN has received 21 other water and sanitation initiatives with at least \$20 million in extra resources.”

The issue of Private Sector Participation in the provision of water was only briefly discussed during the sixth plenary meeting. The representative of the non-governmental-organisations stressed that corporate partners should participate only “when enforceable and functional standards for corporate accountability were in place”. The representative of the Trade Unions claimed that experience has shown the failure of the private sector for providing basic needs for its profit orientation. The representative of the business sector opposed this argument and remarked on the issue that the poor were willing to pay and that in fact, they pay more. “The poorer you were, the more you had to pay for water” one can assume makes reference to the highly priced informal provision by water vendors. The representatives of the indigenous people and local communities pointed out the rights to water, in the first case regarding the ancestral rights to the resource and the need for price differentiation between poor and rich, and in the second, regarding water as a human right and the inappropriateness of making a profit on the provision of water for communities. The representative of the farmers said that farmers were willing to pay for “more efficient mechanisms of water usage” but they were not prepared to pay for water. (World Summit on Sustainable Development, 2002, *Plenary Sixth Meeting (AM)*, 28 August 2002).

Other relevant contributions included that of the Minister of Environment of Burkina Faso who addressed the problems of indebtedness that has required privatisation of water and as consequence its sale as a commodity. This reflects that governments have been forced to be preoccupied with privatisation of water, and although it may be seen as a bad solution there is a lack of alternatives.

The Special Rapporteur outlined the problems of privatisation of water: profit-making and cost recovery overemphasis; vulnerable groups not always been considered; and the questionable accountability of private operators (World Summit on Sustainable Development, 2002, *Plenary Sixth Meeting (AM)*, 28 August 2002).

One important issues that he raised was that “once privatisation was implemented, it was difficult to go back” (World Summit on Sustainable Development, 2002, *Plenary Sixth Meeting (AM)*, 28 August 2002). It is important to note that despite its relevance to the discussion for its strong support and influence on privatisation and private sector participation, especially in developing countries, the World Bank did not participate in this session.

In conclusion, the debate about privatisation of water was brief and not all the relevant parties involved were present. The issue of private sector privatisation presents very delicate aspects that deserve to be discussed in a specific session and not as part of a broad session about water with no relevant point on the agenda.

This Chapter has presented several key aspects related to the Private Sector Participation in the Water industry in order to clarify the terms Private Sector Participation and privatisation, as well as some of the variables that may affect the result in terms of who are the winners and the losers in the processes.

The next chapter introduces and discusses the methodological framework for the analysis of the research question. Although the framework is based on the term Sustainable Development and Sustainability, these terms will not be used in a generic manner according to the most popular definitions. An understanding of the terms in the context of water will be developed according to the discussions presented in this paper.

V. Sustainable use of water

In considering the concept of sustainable development from a contextual point of view, it is important to take into account what sustainability in that specific context means, or what the objective to be achieved is. In the context of water, one of the most important human needs, one can easily jump to the conclusion that sustainability of water has to be addressed mainly from an anthropocentric point of view and argue that what is most important is to satisfy human needs. Without detracting any merit from the importance of addressing human needs as one of the main priorities in the water sustainability dialogue, however, it is important to recognise the value of water from a broader point of view. Water represents life for all species in the planet, be they animal, vegetable, or microscopic. But this is not all; weather is a function of the water cycles, and the shaping of the earth crust is largely influenced by the water movements. All these services provided by water are interrelated; therefore, although prioritisation of needs may be important for difficult issues such as regional water scarcity, none of the 'water services' can be neglected without disrupting a balance that keeps the whole environment functioning.

One important aspect to bear in mind is that even when, from a holistic point of view, human beings are not the only consideration in water sustainability, it is human beings that most greatly affect the sustainable use of water. In other words, we cannot expect that animals, vegetables, geological processes or climatic conditions on their own will make good or sustainable use of water. It is only humans, with the use of reason and consciousness who can be appointed with the task of making or facilitating sustainable use of water.

In view of what has been said, anything that affects positively the maintenance, subsistence, preservation, and well-being of all elements of nature and its interaction, and anything that sustains a balance between those interactions can be considered sustainable. But this definition is not without any faults and complexities. There are contradictions, divergence of needs and relations that we may not understand which make it difficult to create an 'All win scenario'.

Therefore we have to opt for practical solutions. Our definitions of sustainability must come from the best balance that we with our ingenuity and limited by -but not justifying with- our ignorance can devise. It is here where the current dialogue on defined concepts as sustainable development intervenes. Though this dialogue might be flooded with private interests, it is these interests who can speak and create a dynamic theory of what is sustainable and what is not. So, it is through extended participation and recognition of the needs of nature, ecosystems, species, and the well-being of all humans, using the best of understandings in any kind of phenomena and always trying to increase that understanding that we will be walking towards sustainability.

One common framework for analysing sustainability is the multi-criteria analysis. This kind of analysis is especially relevant when complex decisions are influenced by multiple objectives. These kinds of decisions are normally faced with trade-offs, when the achievement of certain objectives negate or diminish the achievement of others. In the multi-criteria analysis three main groups of objectives are considered: economic objectives, social objectives and environmental objectives (Munashinge, 1995). One of the problems with defining a theoretical framework and empirical set of tools for this kind of analysis relates to the current controversies about what sustainability is in each of the three fields. One example of these controversies is the debate over the concept of economic growth as a sustainable path. There is a generalized view that economic development implies economic growth, however authors like Herman Daly (1992) argue in favour of a 'steady-state economy' where development is considered more a qualitative change than a quantitative change and simple economic growth is considered undesirable.

The three following sections will highlight several key aspects in the definition of sustainable use in each of the three areas of the multi-criteria analysis: economic, social and environmental. There may be other important aspects of sustainability of water use that are not considered here and can be brought into the discussion for expanding this framework for analysis, but the ones presented here were considered the more fundamental and to some extent group or summarise other more specific criteria.

A. Economic development and economic sustainable use of water

Traditionally, economic development is associated with three main objectives: economic growth, economic efficiency and economic stability (Parking *et al*, 1997). The concept of sustainable development has broadened this view, allowing social and environmental objectives to enter into the analysis of development. However, the traditional economic analysis is very much in practice and when conflicting with sustainable development objectives the best compromise solution is sought but no further analysis of the fundamental reasoning of economic theory is pursued.

Both public and private firms in the productive sector have always looked for growth, the former with the intention of improving the economy by providing more jobs, to increase Gross Development Product, exports, etc; and the latter to increase sales and profits. However, the case of water is a particular one, and public firms, in order to reduce their capital requirements, usually try to reduce consumption per capita. On the other hand, private firms, following their criteria of profit maximisation can be interested in increasing sales and therefore water consumption when enough water resources are available and when additional investments have a positive net present value (a rate of return greater than the cost of capital).

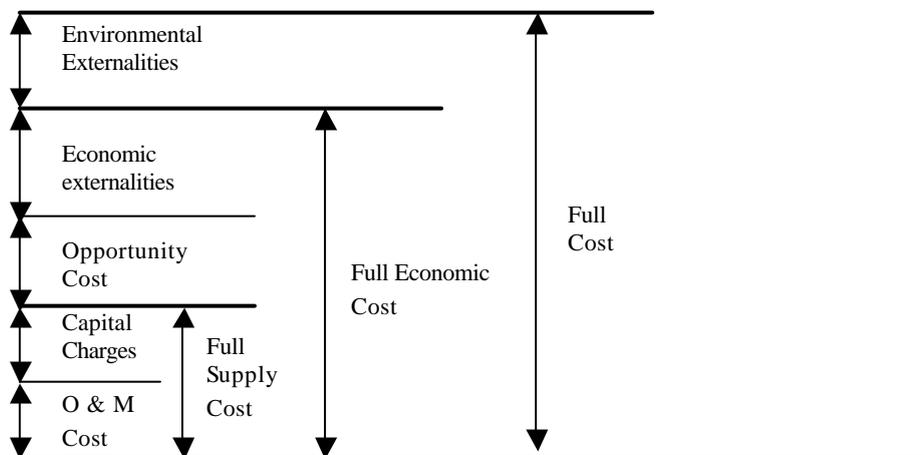
The previous criteria mostly refer to macroeconomic development, which cannot be unlinked from any analysis of sustainable development. However, it is important to recognise the nature of water as a basic human need and right, as well as its non-substitutability. This creates a situation where the emphasis should be completely on the water context itself. For example, the production system of a country can be utilised as a mean for creating economic stability or any other macroeconomic objective. However, water itself and the well-being of people as well as all other natural beings and systems that are relevant to and dependent on water are a final purpose, and they cannot be used as a tool to satisfy other purposes. Of course the provision of water has to be done in the manner that best satisfies society's objectives, including economic aspects. One example to explain this is the economic pressure that governments experience in financing water systems. Ideally, water systems should be self-sufficient in their financing, for example, by full cost recovery policies. However, when this is not an option, like in very poor areas of developing countries when people's ability to pay is not sufficient to cover their basic needs, governments must consider subsidies or social policies to address that situation. In this instance, the provision of water becomes more important than the macroeconomic policies for stability or the policy of austerity of the government. This is normally limited by the actual capacity of governments for providing such subsidies or social policies, by institutional failure or by political or ideological reasons.

Referring to the more specific concept of economic sustainable use of water, all the above arguments have relevance in the discussion, but there are a few elements that are central to the analysis of the concept and therefore will be highlighted in the analysis of sustainable use of water that is made here. The reason for their relevance is the way that these elements interact with other elements of the economic sustainable development as well as social and environmental sustainable development. These elements will be treated independently here and will form part of the framework for analysis of the research question proposed in this thesis. The following elements will be discussed:

- Cost recovery;
- Efficiency (allocative and operational); and
- Investment.

Cost recovery: For understanding what cost recovery means in the context of water, it is important to first explore the components of the cost of water. According to Rogers *et al* (1998) the full cost of water is the sum of the full supply cost, plus the opportunity cost of using water in alternative activities than the actual use, plus externalities, both environmental and economic. The full supply cost is composed of operation and maintenance costs and the capital charges. Figure II represents graphically the composition of the full cost of water.

Figure II (Taken from Rogers *et al*, 1997)



Pierce and Van DeVeer (1995) argue that the market is a good instrument for setting prices but “lousy” for recognising cost. In this argument they are referring to the full cost of goods that include externalities. What they highlight is that goods are many times undervalued and some parts of the cost are not recognised due to lack of information.

The issue of cost recovery in the water industry has been highly controversial. As discussed in a previous section, water is an economic and a social good. If treated solely as a social good, the value of water and the cost to supply it is ignored. On the other hand, if treated solely as an economic good, water’s importance as a basic human right is denied.

By denying water’s economic value, two main problems are created. The first is of a financial nature. When water is provided for free or a price below its cost, the deficit created in the provision of water has to be financed by government’s budget. This creates fiscal pressures, increases in debt, reduction of available funds for other social activities and in general, macroeconomic instability. The second is a resource problem. By having a lower price than its full cost - a cost that includes social and environmental externalities and opportunity cost – the demand of water may exceed the amount of water that can be used in an ecologically sustainable manner, and in many water-stressed regions even the amount of water necessary to properly provide for the entire population.

Therefore treating water as a social and an economic good presents conflicts on each side of the coin. To put it simply, if we give water for free or below its full cost, we will face resource conservation and direct environmental problems, as well as economic problems coming from the financial and fiscal pressures posed on the state. If we charge the full cost, some people may not be able to pay for the water, creating social problems and indirect poverty driven environmental problems, especially in developing countries.

The most common solution to find a mid-point where water is recognised as a social and an economic good is through the use of subsidies and cross-subsidies. Subsidies are direct benefits given to a certain group of people in order to achieve certain social or economic objectives. A cross-subsidy is the transfer of benefits from one group of people to another. In the case of water, for example, a direct subsidy to the poor involves the use of resources from the government budget to cover their water bills. A cross-subsidy to the poor is to charge the richer users more than the poorer ones. In other words, there is a redistribution of wealth.

Some of the methods used to apply cross-subsidies are stepped tariffs, solidarity charges, and tax-based charging. The stepped tariff is a method where a certain amount of water is provided at a low price,

normally below cost or even free, and the additional amounts are charged at cost or more than cost to cover the deficit produced by the provision of the first 'block' of water. The solidarity charge is a method where the richer users pay more than the poorer users. The tax-based charge is a method where water is charged according to property values instead of consumption. This method has the disadvantage of not providing incentives for water conservation. (Hall, 2001)

Private water companies work on the basis of full-supply cost-recovery. Their interest is both to recover costs and create a profit. Therefore, in areas where they cannot achieve this objective, there is no incentive to participate. For this reason, the poorest sectors of society are often considered by private firms to be non-profitable investments. If private firms provide water in areas where profit can be generated, leaving to the government the social responsibility of providing impoverished and non-profitable areas, this will result in public companies with large increasing deficits, and governments would not be able to apply cross-subsidy or other socially oriented policies.

Efficiency: The most common definition of efficiency is the Pareto criterion (after the economist and sociologist Vilfredo Pareto). This criterion states that an efficient situation is one in which resources cannot be relocated without making at least one person worse off (Pierce and VanDeVeer, 1995). Economists argue that to determine if a party is better or worse off the proper way is to "solicit judgment to the parties themselves" (Pierce and VanDeVeer, 1995). Economists then assume that voluntary participation in the market is the correct way to know if participants are better off. However, as argued by Pierce and VanDeVeer (1995), voluntary participation does not always reflect situations in which the participant is better off since there are many situations involving lack of information, self-deception, ambivalence, weakness of will, subconscious motivation, and so on.

Furthermore, not everyone has the willingness and/or ability to participate in the markets. For example, the extremely poor population of the world normally do not have access to the market mechanisms and cannot properly "cast their votes" (Pierce and VanDeVeer, 1995). Also, efficiency parameters do not include any thought of distribution. Therefore the concept of efficiency by itself can be irrelevant for the analysis of social welfare. But when analysed with other variables, given that those other variables remain constant, efficiency can be a good indicator of performance. It is critical in the analysis of efficiency that the different parameters are prioritised and the interrelation between efficiency and those other parameters is considered. It can be assumed though, that given an invariable situation of other considerations (*ceteris paribus*), the maximisation of efficiency indicators is a good performance measure.

Allocative Efficiency: Allocative efficiency can be defined as the maximisation of consumer/producer surplus. From a social welfare point of view, it is important to take note of who are the beneficiaries of such maximisation. For example, if a policy increases the total output of the economy by increasing the surplus of the producer by two units and reducing the surplus of the consumer by one unit (a net increase of one unit), that would maximise allocative efficiency but would be a socially undesirable policy.

Private firms are normally focused on the maximisation of producer surplus. For example, if costs are reduced, most of the time the beneficiary will be the producer through increase in profits and not the consumer through price reduction. Therefore public water companies, at least in theory will be better suited to observe the distribution elements of allocative efficiency.

Operational efficiency: From a company's point of view efficiency is normally called operational efficiency and measured by specific indicators. For example the World Bank, when reviewing performance of privatised companies, uses the sales efficiency ratio (real sales per employee) and net income efficiency ratio (net income per employee) (For examples see Boubakri and Cosset, 1998; Megginson, Nash and van Randenborgh, 1996). This measurement involves two main variables: one is sales and the other is cost. Then these variables are considered against the number of employees in the company. In the water context this can lead to situations that conflict with the concept of sustainable development.

Firstly, if sales are increased, other things being equal, then efficiency is increased. Sales can be increased by three means. One is to increase demand per capita, which conflicts with the sustainable objective of water conservation. The other is to increase water prices, which depending on other factors can be sustainable to a certain point or unsustainable. For example, the increase of the price of water as an incentive for less wasteful consumption of water can be considered beneficial for environmental sustainability, however, the increase of prices to an extent that makes water inaccessible to poor people is socially unsustainable. Finally, the increase of sales by increasing access of piped water to unconnected neighbourhoods or rural areas is a socially desirable objective.

Secondly, if costs are reduced, other things being equal, efficiency is increased. This does not have a straightforward response within sustainability issues. For example, cost can be reduced by decreasing water quality controls and measures. This can create socially and environmentally unsustainable situations. But also cost can be reduced by implementing good management and production practices, for example, increase in the productivity of employees or the use of energy saving technologies.

Finally, if the number of employees is reduced, other things being equal, efficiency is increased. This is another situation with no straightforward answers. For example, as mentioned in the previous paragraph, the number of employees can be reduced by increasing their individual productivity. On the other hand, a situation where employees are forced to work more hours without additional compensation, assuming that their motivation allows maintaining the same productivity per hour, and if this is found to be exploitative, is a socially undesirable situation. Also, when in order to increase efficiency, even when the overstaffing and recognised low productivity allow for it, the dismissing of high numbers of employees without providing them with other options or at least a dynamic job market creates both macroeconomic and social problems.

Investment: One of the main problems with the provision of water has been the lack of investment. Water infrastructure is extremely capital intensive. Water systems include dams, boreholes, transmission pipes, treatment works, etc. Lack of investment has meant that entire communities remain unconnected or even without accessibility to safe drinking water. Also, lack of investment has provoked the decay of the existing water systems through lack of maintenance. This has created obvious social, health and environmental problems.

Public water companies, especially in developing countries have normally been incapable of accomplishing the investment schedules to satisfy their customers' needs. This can be attributed to a combination of bad management and an absolute incapacity of securing the financial resources.

Private sector participants usually have access to bigger capital markets, and they will be willing to invest if the investments have a rate of return higher than the cost of capital and compensate for the level of risk. However, when the rate of return, according to their policies, does not compensate for the level of risk, they will be reluctant to make investments. Investment obligations can be scheduled by regulation, based on the premise that profitable investments have to be balanced with the non-profitable ones, but still providing an average 'fair' rate of return. If regulation is weak, or there is lack of accountability, this generates a social problem, since in the water sector it is common that the wealthiest areas are profitable while the poorest are not.

B. Socially sustainable use of water

One has to recall the nature of water as a basic human right to stress the importance of recognising water as a social good. The implications of a failing water provision system are huge: lack of water is one of the major components of poverty; lack of water kills two million children annually; cholera, malaria, and many other disease vectors are provoked by inappropriate water resources for people; food production systems depend on water and in many regions water scarcity has spread death and famine.

Several elements considered relevant to this paper, for the analysis of the socially sustainable use of water will now be explored. These include:

- Universal access to water;
- Human health and quality of water;
- Accountability;
- Extended participation and recognition of needs;
- Employment;
- Fair wages at all organisational levels;
- Wealth distribution; and
- Cultural value of water.

Universal access to water: Currently almost 1,2 billion people have no access to safe drinking water. Water is a Basic Human Right; therefore from any point of view it is unacceptable that these people remain without access to water. Of course there are many factors creating this problem and the solutions are not straightforward. For example, water resources are unequally distributed throughout the world. Also, many countries do not have the economic capacity to provide the infrastructure for serving their entire populations with water.

Treating water only as an economic good, as private firms do, means that there is likely to be little ethical consideration of providing water to everybody, including people who are not able to pay for it. Therefore, if profitability is not sufficient for a private company, unless they are obliged to, they will not provide water.

Human health and quality of water: Nearly 2 million children die every year from water-related diseases. Water availability and water quality are basic issues for human health. One of the main concerns of private sector participation in the water industry is its focus on profit maximisation; therefore health and water quality will only be addressed through regulation. When regulation fails for lack of institutional capacity or weakness and complexity of the regulatory contracts, the objectives of water availability and quality will be relegated. Another problem is the possible insufficient investment in the poorest communities, which are not profitable for the private companies. This will force those communities to depend on unsafe and polluted sources of water creating serious health problems. This was the case in South Africa, where a vector of cholera was recently spread due to the lack of adequate and safe water.

But these problems are not exclusive to private sector participation; they also exist in the public management of water companies, though for different reasons. The major reasons are lack of financial capacity to invest, inefficiency, and economic pressure to recover costs, therefore disconnection policies have been applied. In many cases the pressure to achieve cost-recovery comes from international financial organisations like the World Bank as a conditional clause for loan disbursement. As reviewed in the section on cost recovery above, it is important to recognise the value of water and include it in the cost and price; however this cannot be done without considering the social implications and has to be managed with appropriate tools for mitigation of social impacts.

Accountability: For achieving the objectives of sustainable development, it is important that they are not only well defined, but also that the people in charge of providing the solutions (the Agents) are accountable for their actions. According to the Principal-Agent theory, for the Agent to perform and achieve the objectives of the Principal, the right amount of incentives has to be established. Accountability can be considered as part of the incentives to perform well. In a private firm, the Agent is accountable to the shareholders in terms of profitability of the firm. In a regulated monopoly, the firm must be accountable to the regulator, however the imperfect information especially about costs creates a complex situation as discussed above in section IV-B. In public organisations, the Agent should be accountable to the public and consumers of the service.

Accountability implies both disclosure of information and responsibility for actions. That is to say, the Principal must have access to information about the actions of the Agent, and the Agent has to have an incentive to perform well. These incentives can include maintaining the job, monetary incentives, and even avoiding legal prosecution for acts against the public benefit.

Normally, Private Sector Participation implies less accountability than Public management in two ways. Firstly, once a firm obtains a contract, it is usually a long-term one, which implies that the firm has the legal rights to manage and/or own the water system for the term of the contract and therefore is not affected by public opinion. On the other hand, public organisations as part of the government and political systems are accountable to the public for the governing party to obtain the votes for re-election. Although the contract of private firms stipulates obligations for the firm, the complexity of the contracts, of the regulatory system and the irreversibility (in terms of cost, technology and 'know how') of concessions, have provoked that even if not accountable and bad performing, private firms maintain their contracts with no penalty or at least at high cost to society. Lastly, the hierarchic structures of public organisations and the way that information is managed through different regulatory mechanisms, makes information more available for public scrutiny, than in the case of private firms.

Extended participation and recognition of needs: Almost all decisions about water provision in most countries have remained out of the reach of the affected people. Therefore, in most cases the real needs of people are not represented in the solutions. This is a two-faced problem. Firstly, those underrepresented and with less voice in the market and/or the political system, mainly the poor, cannot make their needs heard or satisfied. Secondly, decisions are in the hands of bureaucrats or private interests groups, which may not be aware of or interested in those needs, therefore the solutions provided are often not the most appropriate, and can, for example, use inappropriate technology.

Therefore, in most cases, both public and private participants fail to recognise the needs of the users and the only solution is a truly participatory decision system. However, due to more accountability and a public benefit interest, public companies are more suited to recognise those needs if the proper instruments are established. Private firms will be more interested in satisfying their own needs.

Employment: When analysing the impact of privatisations on employment, there has been an emphasis on considering only the changes in number of employees of the water companies. Certainly this is an important issue to analyse since water companies are important employers in any nation, and the dismissal of large numbers of workers has a big social impact as well as an impact on the economy. However, there are far more important issues about water and employment that are generally overlooked. For example, in many poor countries women spend several hours per day collecting water, which has a big impact on the quality of life of women. This represents a cost of opportunity in terms of hours that those women could use in other activities. Also, health problems can represent a serious impairment for productive work.

Fair wages at all organisational levels: Traditionally public organisations have had lower salaries than their private counterparts. Improvement of salaries due to competition and improvement in competition can be considered a positive social impact, however this has to be analysed in terms of distribution, both at an internal level and a national level. If the employees at the high level positions are the ones most benefited, this can be considered a distributional inequality (assuming that they were not proportionally less compensated in terms of their responsibilities than lower positions). Also if all salaries of a privatised company are increased beyond the average of public organisations for similar kinds of jobs, this can create an elite that increases inequality, especially if the number of employees is reduced.

Wealth distribution: From a social point of view, policies that benefit the poorest sectors of society more than the wealthiest ones are called progressive policies, and the opposite are regressive policies. In terms of water, for example, the solidarity charge pricing is a progressive scheme. Also the stepped tariffs scheme can be considered progressive, if it accounts for the needs of poor people to be covered with an initial subsidised amount of water. Also the distribution of property rights and entitlements of the benefits of water

has a large impact on wealth distribution. For example, if water companies are privatised and the entitlements of the residual profit allocated to the shareholders, who normally do not include the poorest people, this can have a negative distributional effect.

Cultural value of water: Through history, humans have settled near rivers and water bodies recognising the importance of this element for their existence. The relation of humans with nature, and specifically with water has been represented in many cultures not only through worship and traditional ceremonies but also in the way of interaction with water. Water is often important for people to be able to maintain traditional lifestyles. For example, when a rural community surviving from agriculture is forced to look for alternatives due to water problems, their whole cultural system is altered.

Governments have usually overlooked this element of water. Fundamentally, public companies are better suited to make obvious the cultural value of water, but considering that they have not been successful even in recognising the more basic aspects of water, it cannot be assumed that in practice they will be successful in this issue. However, due to the profit orientation of private firms, even considering the government's limitations and track record so far, private firms would be less likely to consider the cultural value of water.

As mentioned at the beginning of this chapter, despite the importance of addressing human needs as one of the main priorities in the water sustainability dialogue, the environmental aspects of water cannot be neglected. The next section discusses the main parameters to consider for the environmentally sustainable use of water.

C. Environmentally sustainable use of water

Almost any human activity creates an impact on the environment. Water is taken mostly from rivers, lakes and aquifers. The extraction of water alters the functioning of these systems. At low levels of extraction, the changes generated can be sustained by the renewable capacity of water and the dynamic process of the water cycle.

However, as we start demanding more and more water, the changes become more evident, although sometimes these changes are not considered negative or significant. Initially, when we start pumping water out of a river, the downstream flow is not significantly affected. At some point though, the changes become detrimental. Changing the course of the river may be a consequence, for example, of building artificial water reservoirs.

In order to continue with the multi-criteria analysis presented above, the following criteria will be considered in the analysis of the environmentally sustainable use of water of both public and private participants:

- Extraction at lower rates than replenishment and water conservation;
- Non-pollution of ecosystems and water bodies; and
- Recognition and protection of other environmental services provided by water.

Extraction at lower rates than replenishment and water conservation: The benefits of water conservation are many. First of all, if less water is used, less water will be polluted. Before water is returned to the environment water should be treated. Although in most countries, especially in the developing world, this is not happening. Therefore reducing water consumption will reduce pollution of the environment and the water bodies themselves.

Using water in an environmentally sustainable manner means using water at a rate that does not diminish the quality of ecosystems both by altering the natural flows and state of water bodies (for example, reduction of the water table in aquifers), or at a rate that does not exceed the capacity of available infrastructure for water treatment plus the capacity of nature to restore water to a natural level of cleanliness.

Water conservation has links with the other three criteria of the multi-criteria analysis. From an economic point of view, if less water is used, less infrastructure is needed both for providing the water to people as well as for cleaning the polluted water. Then the budgetary pressure of the government to invest in infrastructure and the corresponding operation and maintenance costs is reduced. From a social point of view, water conservation implies more capacity of government to provide a bigger population with water services, which normally implies more access to the poor. Water conservation is of special importance, for obvious reasons, in water-scarce regions or countries, in which again, the most commonly affected are the poor.

As mentioned above, for financial reasons private companies might not be interested in water conservation policies. If more water sales can produce an attractive rate of return, they will have an incentive to promote more water use. Governments, on the other hand, with their limited capital resources capacity are normally trying to promote water conservation and reduce their investment needs.

Non-pollution of ecosystems and water bodies: Wastewater and sewage is often released untreated into rivers, lakes and oceans. Thousand of pollutants invade those environments as well as the aquifers by filtration and pollution of recharge basins. This creates serious health problems for humans, especially those living near those systems or those directly dependent on the use of water from those bodies. A serious problem is also created in such ecosystems. Habitats for many species are highly polluted by the effects of toxic substances or phenomena such as eutrophication. Biodiversity is rapidly decreasing, especially aquatic biodiversity due to water pollution and other related effects. In water management this is a very important problem that needs addressing.

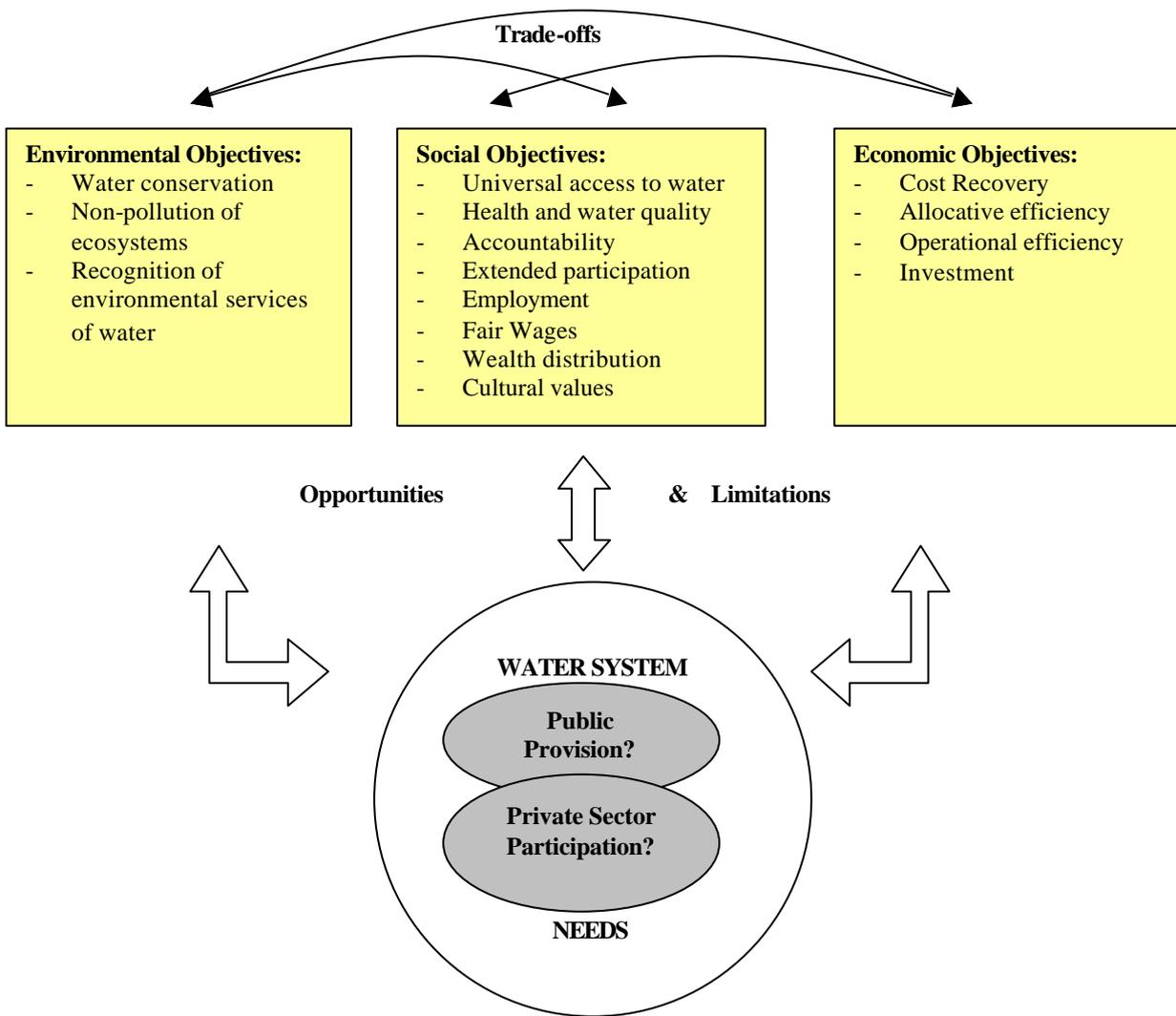
Again, if this represents higher costs and private companies can avoid these with no repercussion (that could include image), they will opt for the lower cost and higher profitability. In the case of public utilities, the emphasis on ecosystem protection will be dependent on the environmental policy and the awareness for environmental responsibility.

Recognition and protection of other environmental services provided by water: Perhaps some of the most important values of water are its environmental services, for example, pollution dilution and provision of habitats (See Table I on page 13). Therefore, sustainable use of water means not altering the water systems in a manner that risks the provision of those services. Normally, water conservation and non-pollution of ecosystem measures have direct positive impacts in these environmental services, which, however, can be impacted by not only the extraction of water, but by the way this is done. For example, the way in which infrastructure works are constructed is important for the protection of the environment. Therefore, recognition of the environmental services that water provides is important in broadening the view in which other aspects of water should be protected. The same aspects of private and public impact discussed in the previous paragraph about ecosystem protection also apply here.

To put into context the framework presented here, three examples will be taken from case studies in which water management and ownership, both public and private, have important features to highlight who are the winners and losers in each case, and what the main limitations for the two different types of ownership and management are. One of the cases represents a private ownership and management of the water companies. This is the case of England and Wales. The other two case studies are examples of publicly owned water companies (Dar es Salaam and Porto Alegre).

Figure III diagrams the way in which the three sets of objectives will be integrated for creating the framework for analysis:

Figure III
Diagram for analytical framework



VI. Examples of public and private ownership of water utilities

A. England and Wales: A full divestiture example and the role of regulators

1. Description of the case

Since the nineteenth century, the water systems of England and Wales were administered by local authorities, combining different models that included municipal, inter-municipal, and a few private operators. In 1974 the UK water industry was re-organised in ten regional water authorities (RWA) covering different river basins and responsible for water quality, water supply, and sanitation in each area (Lobina and Hall, 2001). In 1989 the ten RWA were privatised by issuing shares in the stock market. Twelve years have passed since privatisation and continuous critique has been generated.

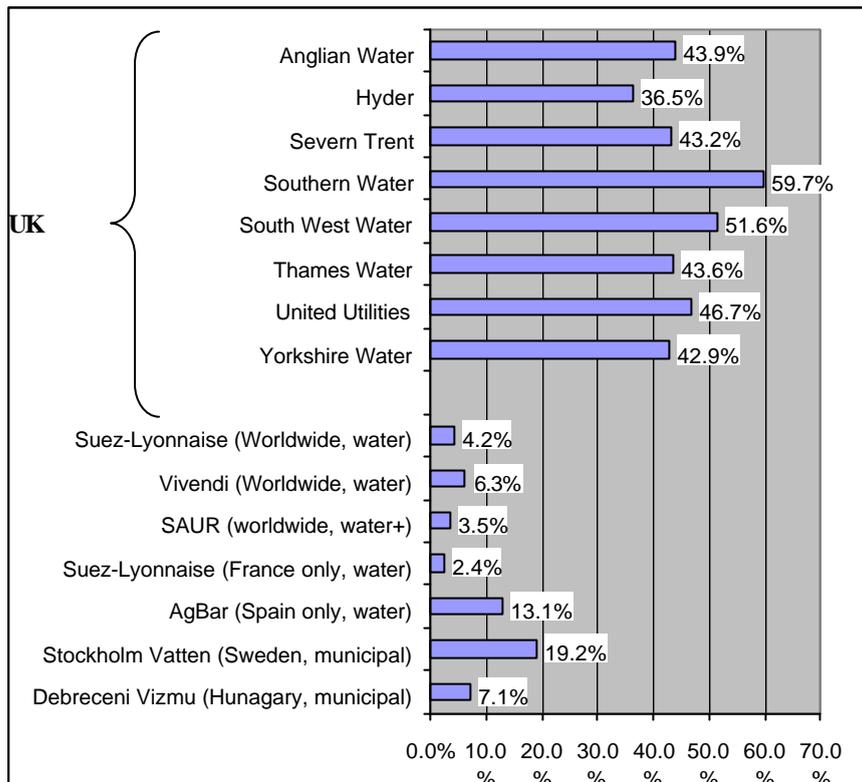
The main arguments given to support privatisation of water companies in England and Wales focused on increasing efficiency, the capability of private companies to finance large investments and the promotion of competition. However, as discussed by Lobina and Hall (2001), the more fundamental reason was the neo-liberal economic policy of the Thatcher government that aimed to reduce the role of the state and public sector borrowing.

However, as discussed by Green (DRAFT), although the stated purpose of the government to privatise was to spread ownership of shares and to reduce financial pressure to the treasury, civil servants involved in the privatisation process admitted later that the main reason was to release the government from the responsibility of finding money for the investments needed. Also, privatisation did not create competition since the companies were given regional monopolies for 25 years (Lobina and Hall, 2001).

One of the main issues that arose after privatisation was the price at which the companies were sold. Even though they were valued at £35 billion, the companies were actually sold for £3,6 billion (Green, DRAFT). The reason given by the government to justify such discount was the required large investment required by the new private companies. However, members of a parliamentary committee that were investigating the sale argued that in order to finance infrastructure prices had already been raised. (Green, DRAFT) Not only did customers lose in the sale of the company but also they had to finance the building of new infrastructure through price increases. Sir Patrick Brown, the civil servant who was in charge of water privatisation said in an interview to the BBC that the customers 'lost out' when the water companies were privatised (BBC News, 1998).

According to a study by Lobina and Hall (2001) prepared for the Public Services International Research Unit of the University of Greenwich, the price increase given to the private companies after privatisation was "extremely generous". Prices rose by an average of 50% during the first four years after privatisation and the accumulated first 9 years showed an increase in real terms – adjusted for inflation – of 46%. This allowed the ten sewage and water companies to increase its pre-tax profits by 147% between 1990 and 1997. (Lobina and Hall, 2001) Operating profit has been the major component of the increase in price of the customer water bills and has nearly doubled since 1991. Also the profits of UK water companies exceed by far the international standards, in both public and private companies. Figure IV shows the comparative profit margins of several water companies in different countries and the average for multinational companies operating in various regions.

Figure IV
Comparative profit margins, water and sewerage companies, 1998

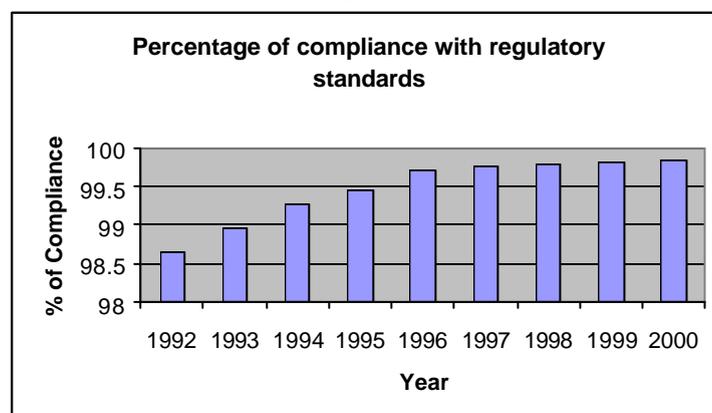


Source: Lobina and Hall, 2001

During privatisation three regulator organisations were created. The Drinking and Water Inspectorate (DWI) is the regulator in charge of monitoring water quality, the National Rivers Authority which became afterwards the Environment Agency (EA) is concerned with monitoring river and environmental pollution, and the Office of Water (OFWAT) is the organisation responsible for setting the prices regimes. (Lobina and Hall, 2001)

The regulatory system has created some successes, mainly in the quality of services and water and in environmental improvement. Figure V shows the percentage of compliance of total tests with the water standards required by OFWAT and an increase in the water quality observed since 1992.

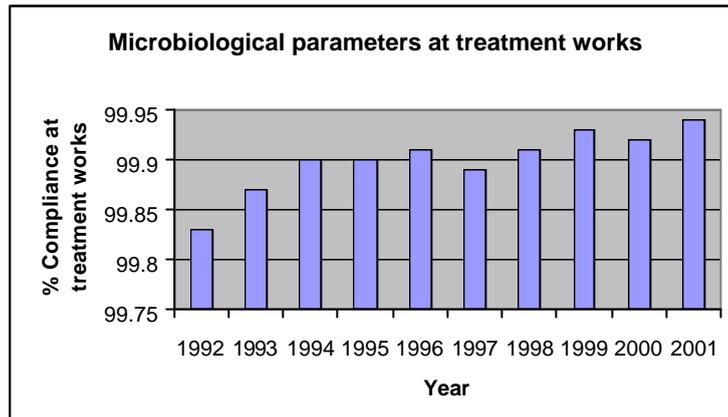
Figure V



Source: OFWAT, 2001

As an indicator of environmental improvement, Figure VI shows an improvement since 1992 in terms of the compliance with the regulations, which measure the presence of coliform and faecal coliform (microbiological parameters) in water leaving treatment works. However, the standards were already good (above 99% compliance) by 1992. In total there are 55 parameters that the Inspectorate of Drinking Water monitors and they are categorised as Aesthetic Parameters, Metals Parameters, Organic Parameters, Ionic Parameters and All other Parameters. All the parameters have shown a consistent improvement from 1992 to 2001.

FIGURE VI



Source: OFWAT, 2001

Nonetheless, in UK the regulators have been criticised, according to Nwankwo and Richardson (1996) on the basis of failing to provide customer accountability and effectively playing the role of consumer advocacy. Some of the reasons for this criticism are the price increases detailed above, the 'fat salaries' of executives and the insecurity of demand.

In the case of the executives, the payments to the highest paid director increased fourfold to £201,000 between 1889 and 1995 (Parker, 1999). However, Cragg (1999) argues that upon privatisation managers were hired from the same labour market as publicly traded companies⁵, therefore water companies were forced to offer competitive salary packages.

2. Analysis of results

The experience of UK water industry privatisation is unlikely to be replicated in other parts of the world since the model of full divestiture is today largely considered anachronistic (Green, DRAFT), and even industry itself is not interested any longer in promoting or participating in the assets investment of the industry but rather in other models that involve management of the systems. However specific lessons can be learned and used from the UK experience.

Some of the aspects that can be observed in the UK water privatisation following the framework for analysis proposed in this thesis are as follows:

Cost recovery: Due to the profit maximisation interest of the private companies, the water supply system works according to cost-recovery system. The example of the UK does not provide enough information about the extent to which externalities have been included in the cost of water, but from the data of OFWAT, pollution issues around which traditionally most of the externalities are charged have improved since 1993

⁵ Notice the difference between publicly traded companies and public (or publicly owned) companies or institutions. The former refers to private owned companies traded in the stock market and the latter are state-owned companies.

and UK appears to have a high standard of environmental protection in the discharge of polluted water. Information is however contradictory and Lobina and Hall (2001) argue that according to a list published by the Environmental Agency, Vivendi, Suez Lionnaise and Enron (three of the biggest multinational water corporations) subsidiaries, owners of several water companies in UK, were among the worst polluters in 1998 in UK. This information does refer to pollution from other industries too since those companies own waste-to energy incinerators as well.

Accountability: One of the main criticisms of the privatisation process is the lack of accountability of the companies (Nwankwo and Richardson, 1996). For example, in the five-year price review of 1994, the companies considerably outperform their estimated operating costs. Lobina and Hall (2001) suggest that this difference between the budgeted and the real could have been a strategy of the water companies to mislead OFWAT in the calculations to establish higher prices. Also, shortly after the price review of 1994, the water companies discovered that the investment needs were inferior to their estimations and the companies then “made use of this ‘capital efficiency’ to boost dividends, not to cut prices” (Lobina and Hall, 2001).

The lack of information obtained by the regulator, as well as the five-year price review scheme seem to create an accountability problem, since the way that water companies manage the information, have worked against public interest. This can be observed in the price increases after privatisation and the excessive profit margins of the water companies.

Operational efficiency: What is the social effect of improving efficiency if the benefits can not be enjoyed by the consumers? Prices in UK increased 42% in real terms from privatisation in 1989 to 1998, even though companies have outperformed their efficiency and productivity increase projections.

Investment: Lobina and Hall (2001) argue that one of the problems during the drought of 1995 was that companies under-invested in order to maintain dividends, therefore they were not prepared for the drought. Lobina and Hall (2001) make reference to the press release of AFX News in June 1996 where OFWAT suggested that Yorkshire Water PLC had failed to ensure reliable water supply and other important services due to the company’s dividend policy.

One important aspect related to investment in infrastructure is the proposal beginning in mid-2000 from water companies, where they suggest splitting the water business into management and assets. Under the proposed scheme the companies would continue operating the system but the assets will be transferred and further financed by a non-profit organisation through borrowing (Lobina and Hall, 2001). This will return the responsibility of financing assets to the government but this time without the more profitable management of the business. The companies have recognised that the asset-owning business is a drain of resources and want to keep the more profitable part of the business after having taken all the benefits of an advantageous purchase.

Universal access to water: Even though water service coverage (the percentage of households with access to safe drinking water) does not represent a problem in UK, there are factors that are related to the Universal Access of Water, such as the disconnection policies. However, although disconnection of water services was allowed during the conservative government, with the entrance of the Labour Party in 1998 disconnections were made illegal.

Human health and water quality: According to the information of OFWAT water quality in UK is very high and has shown a continuous improvement. This can be seen as an achievement of the regulatory system.

Extended participation and recognition of needs: The analysis of this issue in the UK case is rather difficult. The participation and recognition of needs when the water utility was in public hands is questionable. Did the public have the opportunity to decide in favour or against privatisation? For example, a study conducted by Eiser *et al* (1996) about the “attitudes to privatisation of UK public utilities” found that in 1989 (year of the privatisation of the water utility) “there was little enthusiasm” for the privatisation of the

water and electricity supply industries. Although the study was not intended to find the levels of support for the government policy, this reflects to some extent that the people's voice was not considered in the decision.

It is beyond the scope of this research to analyse the extent to which the UK political system and public companies are open to broad participation. However, governments have more pressure to recognise voter needs than private companies in a monopolistic market with a long-term secured contract have to recognise customers' needs.

Fair wages at all levels of organisation: No information has been collected about the wages at all levels of the organization, but one criticism of the privatisation is the high increase of executive salaries.

Wealth distribution: Higher prices of water without social policies and high profits of the water companies, which are mostly owned by big multinational corporations, represent deterioration in wealth distribution. Also the sale of the water companies at a greatly discounted price creates a transfer of wealth to those who bought shares (not normally the poorest sectors of society) and eventually to the multinational corporations that ended up been the main shareholders of the companies.

Extraction at lower rates than replenishment and water conservation: No information has been analysed about the capacity of the water sources and the conservation policies.

Non-pollution of ecosystems and water bodies: One of the successful areas of the regulatory system is the control of pollution of ecosystems and water bodies. As mentioned above, the Inspectorate of Drinking Water monitors 55 parameters for controlling pollution and all of them have shown improvement since 1992. It should be noted, however, that water pollution was not very problematic prior to privatisation.

Recognition and protection of other environmental services provided by water: The success in controlling pollution on ecosystems shows to some extent the efforts made and attention given to environmental aspects, however there has been some criticism regarding the lack of interest shown by OFWAT in this matter. This is evident in the Seventh Report of the Environmental Committee of the House of Commons that establishes that OFWAT has no specific duty to promote sustainable development, and that OFWAT believes that this responsibility should rest with the government and not on the economic regulator of water (House of Commons Environmental Audit Select Committee, 2000, paragraph 215).

In summary, although the regulatory system has proven successful in ensuring a high quality standard of water supplied and discharged waste-water, the case of UK shows that the consumers have lost in the privatisation of the water companies. Furthermore, there is no proof that the high quality standards are the result of privatisation, since quality was already good at the time of privatisation. The government may have relieved itself of the responsibility of investing in the upgrade of the water system, but at a high cost for the population of the country.

B. Dar es Salaam, Tanzania – A government incapable of delivering water services

1. Description of the case

Dar es Salaam is Tanzania's biggest city. Tanzania has suffered from serious water problems during the last few decades. Following the years of socialisms in Tanzania, water was provided as a free service, though it became evident that this constrained the development of a sustainable water system and also increased the country's debt. (Water Aid, DRAFT)

After its independence, Tanzania became a socialist state (1961-1986) where the major means of production were communally owned by the government. From 1986, Tanzania initiated a reform of their state following market-oriented policies. This was articulated through the Structural Adjustment Program of World Bank and International Monetary Fund (IMF). However, differences between Tanzania and these organisations

made them withdraw support to the country in 1995. Immediately after this, a new government implemented a macroeconomic reform and among many other measures large cuts in public expenditure compensated for the withdrawal of international support. For water and sanitation a policy based on demand was developed; this service would be provided upon demand, however, this meant that the poorest sectors of society were left un-serviced. (Water Aid, DRAFT)

Dar es Salaam has a population estimated in year 2000 of between 2.5 and 3 million, growing even to 5 million during daytime. Every day 262 million litres of water are extracted from the Ruvu River and 6 million litres from the Kizinga River. However just 53 million litres are delivered daily to private connections. Another 17 million litres are delivered through community kiosks and 30 million litres are taken by illegal taps or non-payers. Therefore, only 37% of the total extracted water is actually delivered and of this amount, only 23% is actually billed (World Bank advisers say that a mere 8% is billed). The rest is lost mainly through leakage. (Water Aid, DRAFT).

The demand of water in Dar es Salaam is estimated to be from 350 to 400 million litres per day. Therefore the actual 100 million litres delivered represents just between 25-28% of the demand. Although it seems that current water sources are insufficient for covering the demand, it is more obvious and more important that the problem of water losses are largely due to the poor state of the infrastructure system. (Water Aid, DRAFT). According to Kjellén (2001), only one third of the households in Dar es Salaam are connected to the pipe system. The rest of the population has to secure their water through neighbours' sources or private vendors In 1997 a study estimated that US\$620 million were needed for the refurbishment and the extension of the infrastructure of the city (Water Aid, DRAFT).

During the last five years the IMF has been insisting on the privatisation of DAWASA, the water agency responsible for providing water and sanitation, as a pre-requisite for including Tanzania in the list of Highly Indebted Poor Countries (HIPC). The process of privatisation has been highly criticised. The Tanzania government has contracted credit for US\$145 million to upgrade DAWASA. One of the main criticisms is that what is supposed to be a policy for reducing the country's debt is actually increasing it. Another criticism is directed against the providers of debt, most notably the African Development Bank (ADB), which claims an interest in helping Tanzania providing safe water and sanitation to the poor. But critics say that the only objective of the loans is to make DAWASA attractive for private investors. Other lenders are World Bank, European Investment Bank and 'Agence Francaise de Developpement'. (South African Documentation and Cooperation Centre, 2002)

The proposed model of Private Sector Participation is through a lease contract. DAWASA will be kept as a "Public Granting Authority" that will hold the assets and together with the Ministry of Finance, the responsibility for investments in rehabilitation, upgrading and expansion of the water system. A new private company would be created to operate the system. An independent regulator will regulate both DAWASA and the new operator. This maintains the current problems of investment. The private company will only be responsible for operating the system and can also be sub-contracted by DAWASA for the construction works but not to finance them. (Water Aid, DRAFT)

2. Analysis of results

Cost recovery: According to DAWASA only 23% of the total water production is billed, and a mere 16% is actually paid. But according to World Bank advisers only 8% of the water production is actually billed. The problem of not recovering cost is obvious, and can be attributed to the mismanagement and lack of institutional capacity of DAWASA, and to the country's social and economic problems in terms of the population's ability to pay. However, as shown in the case study prepared by Water Aid, even though the tariffs scheme charges lower tariffs to lower income areas, in reality very poor people are paying higher prices since they have to buy the water at the informal water vendors' market (Water Aid, DRAFT). Therefore, the inability to pay cannot be seen as the main limitation to recovering costs. Table II shows the cost to different poor consumers of water in Dar es Salaam.

Table II
Comparison of drinking water charges paid by poor consumers

Type of poor consumer	Amount paid per month and volume consumed	Paid to:
House with a piped connection to DAWASA	10,000 shillings, no limit on volume	Flat rate paid to DAWASA
Household who buy water from a neighbour on a regular basis	1,000 to 1,500 shillings, average of 4 jerry cans per day	Flat rate paid to owner of piped connection or private well
Household that buys from water vendors	2,400 shillings, average of 4 jerry cans per day	Rate paid to water vendor per jerry can delivered

Source: Water Aid, DRAFT.

Operational efficiency: The inability to bill its customers, the large amount of water that is lost through leakage, and the overall poor state of the water system are signs of the inefficiency of DAWASA's operation. By paying higher prices to private water vendors, the citizens of Dar es Salaam show that there is ability and willingness to pay that through bad billing systems has not been used to upgrade the operation of DAWASA.

Investment: Recently the Tanzanian government received a loan of US\$145 million from international organisations to upgrade DAWASA operations. However, it is estimated that US\$ 650 million in investments is needed to make the system operable. Of great concern too is the lack of financial independence of DAWASA, which poses a serious problem regarding the already high debt of the country. The proposed privatisation of the operation would not solve the problem since the assets and investment responsibilities remain with the state.

Universal access to water: As mentioned above, less than one third of the households in Dar es Salaam have access to piped water. The rest have to obtain water through their neighbours, at a higher price than DAWASA tariffs.

Human health and water quality: The water quality and health issues in Dar es Salaam were not reviewed, but, considering the poor state of the infrastructure system for both water and sewage, it can be expected that quality standards are low.

Extended participation and recognition of needs and accountability: Lack of institutional capacity, lack of awareness of people of the functioning of the water company and a city troubled by many urban problems besides water provision, makes it unlikely that proper accountability, participation and recognition of needs have been taken into account.

Wealth distribution: Although the problem of access to water affects the whole population and not just the poorest people, with their lower ability to pay, the poor are more affected by having to pay high prices to neighbours or private water vendors for obtaining their water.

Extraction of water at lower rates than replenishment and water conservation: No information has been reviewed about the capacity of the Ruvu and Kizinga rivers, but the fact that around 63 % of the extracted water is lost in leakages of the system represents a wasteful use of water and a threat to the rivers.

Non-pollution of ecosystems and water bodies: The water sources and other ecosystems are in great danger of pollution since only 8% of the population is connected to the sewer system. Also some industries discharge toxic chemicals into the sewer system. (Water Aid, DRAFT)

Recognition and protection of other environmental services provided by water: It is unlikely that DAWASA, largely incapable of solving the more basic problems of water, are considering solving problems that have traditionally been neglected or even unknown.

Summarising, DAWASA has clearly failed in the objective of providing the city of Dar es Salaam with a good water system. The limitation is partly due to the economic situation of the country and the lack of resources to invest. However, it seems that DAWASA is highly inefficient in its operation and has only exacerbated the situation. The proposal for Private Sector Participation does not offer solutions for the investment problem. Considering the high percentage of the population that live in poor conditions, the PSP profit orientation system would most likely create an even bigger inequality and distribution problem.

C. Porto Alegre, Brazil: A success story of public water provision

1. Description of the case

Porto Alegre is the capital city of the southern state of Brazil, Rio Grande do Sul. In 1996 the city had a population of 1,286,251 (Perfeitura Municipal de Porto Alegre). Porto Alegre has prided itself for having the highest quality of life in Brazil (Hall, Lobina, Viero and Maltz, 2002). This quality of life is strongly correlated to the relative high quality of the water and sewage system. In 2001, 99.5% of the population had access to water and 84% of raw sewage was collected by the utility. This has contributed to Porto Alegre's relatively low infant mortality rate of 13.8 per 1000 inhabitants compared to the national average of 65 per 1000 inhabitants. (Hall, Lobina, Viero and Maltz, 2002)

In 1990 only 2% of raw sewage was treated in Porto Alegre; today this has improved to 27%. The city is currently trying to secure a loan to build the necessary infrastructure to increase this to 77%. The 'Departamento Municipal de Agua e Egestos' (DMAE) is the organisation in charge of providing water and sewage services. This entity has been autonomous since 1961 when the city council decided to separate the water department and create an autonomous budget from the municipality in order to comply with the requirements for a loan from Inter-American Bank for Development. (Hall, Lobina, Viero and Maltz, 2002)

The price scheme utilised by DMAE is based on cost-recovery, including operating cost, investments and capital cost. However social tariffs are considered for low-income consumers. In January 2002 the price per cubic metre of water was US\$0.3749, which was one of the lowest in Brazil. (Hall, Lobina, Viero and Maltz, 2002) Table III shows the prices in different cities in Brazil.

TABLE III
Comparison of Prices – Figures in Brazilian Reais

	Service/Comapany	City/STATE	20m ³ Water(R\$)
1	CORSAN	Rio Grande do Sul	41.79
2	CASAL	Maceió/Al	31.62
3	CASAL	Florianópolis/SC	31.20
4	SANEPAR	Curitiba/PR	30.75
5	DESO	Aracaju/SE	26.65
6	COMPESA	Recife/PE	25.43
7	CESAN	Vitória/ES	25.15
8	DMAE	Porto Alegre/RS	21.31
9	SANEAGO	Goiania/GO	20.65
10	CAESB	Brasília/DF	20.15
11	SABESP	São Pailo/SP	19.08
12	CAERN	Natal/RN	18.95
13	COPASA	Belo Horizonte/MG	18.80
14	SANASA	Campinas/SP	15.95
15	CAGECE	Fortaleza/CE	13.93

Source: Hall, Lobina, Viero and Maltz, 2002

Leakage, measured as ‘unaccounted-for water’, has consistently declined from 50% in 1990 to 34% in 2001. The labour ratio of DMAE is 3 employees per 1000 households which is close to the 2.7 ratio of USA companies and lower than the ratio of 4.5 for Paris. (Hall, Lobina, Viero and Maltz, 2002)

Some important aspects that are considered public service benefits are the reduction of water consumption and the increase of coverage. DMAE attributes decreasing consumption to the progressive tariff scheme (Hall, Lobina, Viero and Maltz, 2002). This is clearly a public interest in contrast to the private interest of maximizing profits even if this means to encourage policies that promote higher use of water. Table IV shows the decrease in water consumption from 1995 to 2001.

Table IV
Water Consumption in Porto Alegre

Year	Accounted Water (m3/month) Yearly average
1995	9,099,994
1996	9,123,140
1997	9,423,496
1998	8,934,423
1999	9,056,081
2000	8,914,904
2001	8,525,411

Source: Hall, Lobina, Viero and Maltz, 2002

One of the main ingredients in creating a successful water system is the participatory approach followed by the city of Porto Alegre. Consultation, transparency and a truly participatory democracy characterised the decision making in most areas of governance in Porto Alegre. This is clearly reflected in the participatory budget, which extends to the water company. Citizens meet to vote on their priorities, then, short-listed priorities are analysed under a cost-benefit criterion. DMAE provides guidance and technical information to the citizens, but is also open to public criticism. Once the citizens have voted for their priorities, DMAE analyses the technical feasibility of the projects following criteria of the Participatory Budget Council. (Hall, Lobina, Viero and Maltz, 2002)

Environmental aspects have mixed results. On one hand, the amount of raw untreated sewage released into the Guaíba Lake, which is the main source of water for the city, creates a serious environmental and health problem. On the other hand, DMAE is conscious of these problems and has embarked on an “ambitious” project to clean the beaches and waters of the Lake. DMAE is responsible for environmental education for its employees, schools and general public. (Hall, Lobina, Viero and Maltz, 2002)

2. Analysis of results

Cost recovery: The price scheme is based on cost-recovery with tariffs for low-income customers. However, the cost-recovery is limited to the operating cost, investment and capital cost, but excludes the cost of externalities. This creates a good economic and social scheme but is weak on the environmental side. The internalisation of externalities will represent a complex set of trade-offs. Unless they are charged mainly to high-income users, the impact of increased prices would have a social cost, but at the same time the reduction of environmental and health problems by internalising cost would also have a positive social impact.

Accountability: The participatory approval of the budget and the whole institutional system provides good grounds for accountability of the operator.

Allocative efficiency: It can be argued that with profit maximisation objectives the allocative efficiency would be maximised for the incentives that private firms provide to maximise capital gains. However to properly estimate the allocative efficiency a full analysis of consumer/producer surplus would be needed, in combination with the other factors considered in this analysis. Also, allocative efficiency cannot be viewed independently of distributional objectives, and since all the benefits of the water system remain with the public sector, the allocative efficiency of DMAE even if not maximal, is more desirable from a social point of view.

Operational efficiency: DMAE has a very good productivity ratio of 3 employees per 1000 households connected. The company is also working on the implementation of an automation plan that will reduce cost, human error, and will reduce the use of electricity, chemicals and maintenance (Hall, Lobina, Viero and Maltz, 2002)

Investment: As specified above, the pricing scheme includes the recovery of capital cost and provision for the expansion of the system. DMAE is financially independent of other municipal and government organisations, but still lack the financial capacity to expand infrastructure, mainly the water treatment works. Currently DMAE is trying to secure a loan to increase the treatment of raw sewage from 27% to 77%.

Universal Access to water: The coverage of water services in Porto Alegre is 99.5%, an excellent figure for a developing country.

Human Health and Water quality: the widespread provision of water has enabled the city of Porto Alegre to have a significantly better health standard than the rest of the country. For example, the infant mortality rate is 13.8 per 1000 inhabitants compared to 65 per 1000 for the national average.

Extended participation and recognition of needs: The participatory budget of the company allows all inhabitants and communities to set the investment priorities of the company. This is one of the best participatory systems in the world.

Wealth distribution: The high coverage of the water system, the application of social tariffs, and the recognition of the needs of people in the planning and budgeting of the water system represent good progressive and developmental policies.

Extraction at lower rates than replenishment and water conservation: The progressive tariff scheme has worked in favour of water conservation. No information was collected about the capacity of the water sources utilised by DMAE.

Non-pollution of ecosystems and water bodies: The discharge of untreated sewage and waste water into the Lake Guaíba still represents a problem, but the company has worked to improve the amount of treatment from 2% in 1990, to 27% today and plans to further increase this to 77% in the near future.

Recognition and protection of other environmental services provided by water: DMAE is aware of the current environmental problems and has, for example, embarked on a plan to restore safe bathing on the shores of lake Guaíba. Also, they work with awareness campaigns and environmental education. In 2000, for example, DMAE employees visited schools reaching a total of 3,508 students as part of their education programme.

In summary, Porto Alegre is a good example of how the structural problems that publicly owned water companies have traditionally faced, can be managed and overcome. However, the example also shows that the solutions are not simple. In Porto Alegre, it has taken more than merely the efforts of the water company to have a successful water system. The outcomes are also a result of the participatory political system and the whole institutional framework of Porto Alegre. This highlights the importance of the 'extended participation and recognition of needs' as a key element to attain sustainability.

Table V. summarises the results of the theoretical discussion and in the three case studies presented above. It analyses the main phenomena observed in a qualitative and interpretative manner. If specific case studies were to be analysed under this framework, a multidisciplinary group of discussion and combination of qualitative and quantitative results are recommended.

Table V
Matrix of analysis

Economically sustainable use of water	England and Wales	Dar es Salaam	Porto Alegre	Theory	
	PSP	Public	Public	PSP	Public
Cost recovery	Yes	No	Yes- with stepped tariffs	Always	Depends on policy
Accountability	Limited	No	Yes	Less than Public	Depends on policy
Allocative efficiency	An analysis of consumer and producer surplus in combination with other variables would have to be performed.			Different opinions, but PSP does not consider distributional elements of allocative efficiency.	
Operational efficiency	Mainly operational efficiency	Highly inefficient	Both allocative and operational efficiency	Traditionally argued as more efficient. More incentives for efficiency	Traditionally argued as less efficient. No options explored
Investment	Created by regulatory commitments Currently trying to return investment responsibility to the government	Very bad. The water system is in poor state, and less than 30% of the city's population is serviced.	Limited by resources	If enough incentives, but the business of investing in assets is considered drain of profits by private companies	Normally budgetary problems
Socially sustainable use of water	England and Wales	Dar es Salaam	Porto Alegre	Theory	
				PSP	Public
Universal access to safe drinking water	Infrastructure covers most of the population, but disconnections to those who cannot pay is a criticism	Very limited. Between 28% to 33% according to different sources	Very good (99.5%)	Conflict with profitability	Limited by inefficiency and budgetary problems
Human health and quality of water	High	Not reviewed	High	If enough incentives	Normally limited by inefficiency and budgetary problems
Extended participation and recognition of needs	No	No	Yes	Rarely	Rarely but more often than PSP
Employment	Not analysed	Not analysed	Not analysed	No social criteria	Paternalism

Fair wages at all organizational levels	High executive payments	No review	No review	Better than Public at low levels but excessive salaries at high levels	Normally not
Wealth distribution	People lost during privatisation. High cost for poor people.	Poor system for all social classes	Very good. Use of stepped tariffs favours poor users	Little	Normal
Cultural value of water	No information available	Not reviewed	Not reviewed	Not considered at all	Rarely considered
Environmentally sust. use of water	England and Wales	Dar es Salaam	Porto Alegre	Theory	
				PSP	Public
Extraction at lower rates than replenishment and water conservation	No information available	No information available	No information available	Conflicting objectives	More suited to the objectives
Non-pollution of ecosystems and water bodies	Low pollution	High pollution	Some pollution due to budgetary problems	Normally not interested	More likely to be considered
Recognition and protection of other environmental services provided by water.	No	No	Yes	No	More likely to be considered

Summarizing the above matrix, on the case studies presented five main factors were found to affect the performance in terms of sustainability of either public or private ownership and management. In the case of Private Sector Participation the main factor is:

- Conflicting objectives between private interest and several sustainable use of water objectives

In the case of public owned utilities the factors are:

- Lack of financial resources to improve, and expand infrastructure
- Performance limited by operational inefficiency and lack of incentives
- Results depend on policy

Finally one factor that is observed in both cases (private and public) is:

- The environmental sustainability issue is often not considered, although is more likely to be considered by public companies. This can be the effect of lack of information, ignorance, or conscious omission for one of the above-mentioned factors

VII. Final Discussion

This chapter intends to summarise the findings and arguments of the research and focuses on answering the research question:

What are the goods and bads of Private Sector Participation in the water industry? And who benefits and who loses?

In order to facilitate talking about goods and bads, a framework of analysis has been defined. As the thesis has focused on a multi-criteria concept of sustainable development, the research question has been considered in the light of these many criteria.

As discussed in Chapter V, the three ‘pillars’ for analysis of Sustainable Development used here are economic sustainable development, social sustainable development and environmental sustainable development. All of these have been considered in the context of water provision for human consumption. Therefore, to answer the question what is good and what is bad we can summarise the elements described in the chapter as follows:

A good water supply system is one that: *While trying to recover all costs, including provisions for investment and externalities, and working with the best allocative and operational efficiency possible, is capable of providing all the population with the amount of safe drinking water that allows them to live a healthy, and culturally rich life; promotes the opportunities for work; focuses on the real needs of people and allows them to participate in the decision process being capable of understanding and influencing the actions of the administrators; and without compromising the perpetuity of the water resource and its quality, nor any service provided by it to the environment, humans, and other species.*

The question of *good for whom* becomes evident in this paragraph: People, all the people, not only the more privileged, nor simply our own generation; ecosystems, all kinds of ecosystems, including all living species, and non-living environments; and the environment in general.

Who has benefited from private sector participation? One should be wary of generalising given the methodology used here, but from the examples, the following can be observed:

In the case of the water privatisation of UK, who has benefited? The data shows that the private companies were the main winners in this process. They bought the water utilities for a mere 10% of their market value, and they have obtained profits far superior to other water companies in the world. Thus, the private investors have been the winners. What did the consumers gain from this transaction? It is difficult to imagine the state of the water system had it not been privatised, but consumers ‘lost out’ on the sale of the water companies at such discounted price. They then have had to pay higher water prices to finance the cost of new investments and also to cover the cost of providing the water companies with a substantial profit.

In the privatisation proposed for Dar es Salaam, Private Sector Participation would be restricted to the management of the water services, and the investment responsibility would remain with the public sector. The private sector would secure in this way its profitability by charging for the services it provides, without the responsibility of overtaking the less profitable business of asset ownership. No information has been collected about more specific issues of the lease contract proposed for the Private Sector Participation in Dar es Salaam, but the proposed structure clearly advantages the private sector, while maintaining the investment problems. Therefore, the government, and again the people will be the losers. It is important to note many countries have been coerced into Private Sector Participation by the World Bank and IMF.

The case of Porto Alegre is an example of a successfully managed publicly owned water company, though it still has limitations. However, from the analysis presented here, it can be said that the winners are the users

and the inhabitants of Porto Alegre who have a good water system. The poorest people are also winning in this scheme due to the social tariffs. Any consideration to transfer benefits to the private systems would be at the cost of people since the private sector would be appropriating part of that public benefit.

However, as in the case of Dar es Salaam, many publicly owned water systems have failed to satisfy the water needs of the people. This is a combination of lack of resources to invest in upgrading, maintaining and expanding the water system, as well as operational inefficiency of the operator. Therefore Private Sector Participation has been deemed necessary. Considering the monopolistic nature of water provision, regulation has been the solution to avoid abuse from private firms of that monopoly. However, as discussed in this research, regulation has limitations in the extent to which private interest can be matched with public interest. The main limitations are the complexity of the agreements and incomplete information about the actions of the private operators.

As can be observed in the case regarding the privatisation of water in Wales and England, even a sophisticated regulatory system, composed of three regulation organisations, has been incapable of making the user the main winner in the process. The sale was highly against the public interest, and the economic regulator has not been able to ensure that prices are fair and investment sufficient.

Therefore, we are confronted with two scenarios; neither of them has been able to achieve the objectives of a sustainable water system described initially. Both have limitations, but in the case of Private Sector Participation the limitation is of a more fundamental nature: *Private firms have a conflicting objective with the public interest of the water supply systems and market laws and competition do not apply in this sector.* In the case of the public owned water systems, the limitations are structural: *(a) Governments have not been able to secure the financial resources to supply water needs; (b) Public organisations have lacked the incentives to increase operational efficiency and performance; (c) in an attempt to satisfy social needs, public companies have not been able to recover the cost of the service.*

Fundamental limitations are more difficult to solve than structural ones. Regulation systems can be optimised, but they will always have to deal with the compromises of conflicting objectives. Further, in the provision of a basic need, the profit margin of private firms will always represent a subtraction from the total public benefit.

The water company of Porto Alegre is a good example of how structural problems can be overcome by good management, and a good institutional and political system. The main components of success observed in the Porto Alegre case that are important to highlight are:

- A truly participatory system, which recognises the needs of people;
- A system that recognises both the social and economic values of water by working on a cost recovery basis while providing social tariffs for the poor;
- An independent budget that strengthens the economic capacity of the water company;

VIII. Conclusions

This thesis has explored the question of ‘What are the goods and bads of Private Sector Participation in the water industry?’ And, ‘who benefits and who loses?’

A good water supply system is defined in this thesis as having the following characteristics:

While trying to recover all costs, including provisions for investment and externalities, and working with the best allocative and operational efficiency possible, is capable of providing all the population with the amount of safe drinking water that allows them to live a healthy, and culturally rich life; promotes the opportunities for work; focuses on the real needs of people and allows them to participate in the decision process being capable of understanding and influencing the actions of the administrators; and without compromising the perpetuity of the water resource and its quality, nor any service provided by it to the environment, humans, and other species.

Using an analytical framework constructed in this thesis, it has been observed that there are fundamental limitations for private firms to achieve the objectives of a good water supply system. It is concluded that the profit orientation of private firms often conflicts with several of the characteristics described in the previous paragraph. However, it is observed that public organisations also are faced with limitations, but of a more structural nature, based on the way that these organisations are structured and not on their objectives.

It is further concluded that fundamental limitations are more difficult to solve than structural limitations. Regulation systems can be optimised, but they will always have to deal with the compromises of conflicting objectives. Furthermore, in the provision of a human basic need, the profit margin of private firms will always represent a subtraction from the total public benefit. On the other hand, it is more likely, although not easy, for public organisations to overcome these limitations since the fundamental objectives are not in conflict with the characteristics of a good water supply system as defined above.

One of the more critical limitations of public organisations is the lack of financial resources to invest in the upgrade, maintenance and expansion of the water systems, mainly in developing countries, where water supply problems are enormous. However, as observed in the examples presented here, Private Sector Participation does not seem to provide a solution for these problems, considering that the trend is for private firms to participate in the management of companies but not in the financing of the infrastructure. Therefore, it is critical that other alternatives be explored if the objective of halving “the proportion of people who are unable to reach or to afford safe drinking water by year 2015” is to be achieved.

IX. References

- Arce D. and Sandler T. 2002. *Regional Public Goods: Typologies, provision, financing and development assistance*. Sweden: Expert Group on Development Issues.
- Annan Koffi, 2001. Message of UN Secretary-General Kofi Annan on World Water Day. World Water Day: <http://www.worldwaterday.org/2001/news/msgun.html>. Accessed on 6 December, 2002
- BBC News. *Customers lost out in water sell off*. BBC News: Tuesday, 24 March, 1998, 12:56 GMT . In http://news.bbc.co.uk/2/hi/special_report/1998/water_week/68806.stm. Accessed on 15th October, 2002
- Barnekov T., Boyle R., and Rich D. 1989. *Privatism and Urban Policy in Britain and the United States*. Oxford: Oxford University Press
- Bös D. 1991. *Privatization: a Theoretical Treatment*. Oxford: Oxford University Press.
- Boubakri N. and Cosset Jean-Claude. 1998. *Privatisation in Developing Countries*. The World Bank Group – Finance, Private Sector and Infrastructure Network: Viewpoint, Note No. 156
- Brueckner Jank, 1997. *Infrastructure Financing and Urban Development: The Economics of Impact Fees*. Journal of Public Economics (66): 383-407
- Choguill C. 1996. *Ten Steps to Sustainable Infrastructure*. Habitat Int. (20) No3: 389-404
- Cragg M. and Dyck I.J. *Executive Pay and the UK Privatization: The Demise of the 'One Country, Two Systems'*. Journal of Business Research ,47 (2000): 3-18
- Eiser R., Reicher S. and Podpadec T. *Attitudes to Privatization of UK Public Utilities: Anticipating industrial practice and environmental effects*. Journal of Consumer Policy 19 (1996): 193-208
- Daly, H., 1992. *Steady-State Economics*. London: Earthscan Publications Limited.
- Gleick P. *The Human Right to Water*. Water Policy 1 (1999): 487-503
- Gleick Peter, Wolff Gary, Chalecki Elizabeth and Reyes Rachel, 2002. *The New Economy of Water – The Risks and Benefits of Globalization and Privatisation of Fresh Water*. California: Pacific Institute for Studies in Development, Environment, and Security.
- Green J. DRAFT. *The England and Wales Water Industry Privatisation*. London: Water Aid
- Gutierrez E. and PSP Team. 2001. *Framework Document: A survey of the theoretical issues on private sector participation*. London: Water Aid.
- Hall D. and Lobina E. 2002. *Water Privatisation in Latin America, 2002*. Greenwich U.K.: PSRIU, University of Greenwich.
- Hall D. 2001. *Water in Public Hands: Public sector water management – a necessary option*. Greenwich U.K.: PSRIU, University of Greenwich.
- Hall D., Lobina E., Viero O.M. and Maltz H. 2002. *Water in Porto Alegre, Brazil – accountable, effective, sustainable and democratic*. Greenwich, U.K.: PSRIU, University of Greenwich and DMAE.
- Hanley N. Shogren J. and White B. 2001. *Introduction to Environmental Economics*. Oxford: Oxford University Press
- Hallmans B. and Stenberg C. *Introduction to BOOT*. Desalination 123 (1999): 109-114
- House of Commons Environmental Audit Select Committee. 2000. *Seventh Report: Water Prices and the Environment*. HC-597. London, UK: House of Commons
- Jacobson C. and Tarr J. 1995. *Ownership and Financing of Infrastructure: Historical perspectives*. Policy Research Paper 1466. Washington D.C.: The World Bank
- Jolly, R. 1998. *Water and human rights: challenges for the 21st century*. Address at the Conference of the Belgian Royal Academy of Overseas Sciences, March 23, Brussels.
- Kjellén M. 2001. *Water Provision in Dar es Salaam, Tanzania: The public-private interface*. Marseille, France: Proceedings of the symposium Frontiers in urban water management: Deadlock or hope?
- Lobina E. and Hall D. 2001. *UK Water Privatisation – A briefing*. London: Public Services International Research Unit.
- Megginson W., Nash R. and van Randemborgh M. 1996. *The Privatisation Dividend*. The World Bank Group – Finance, Private Sector and Infrastructure Network: Viewpoint, Note No. 68
- Munisinghe M, 1995. *Implementing Sustainable Development: The role of environmental economics*. Washington DC: The World Bank

- Nwankwo S. and Richardson B. *The UK's privatized utilities experience: why the regulators are under attack*. International Journal of Public Sector Management, Vol 9, No 3 (1996): 26-39
- Official United Nations website for the Johannesburg Summit 2002 – the World Summit on Sustainable Development: www.johannesburgsummit.org/index.html. Accessed on 12th October 2002.
- OFWAT, 2001. Drinking Water 2001 – Overview of Water Quality in England and Wales. On: www.dwi.gov.uk/pubs/annrep01/05.htm. Accessed on 18 September, 2002
- Parker D. *Regulation of privatised public utilities in the UK: performance and governance*. International Journal of Public Sector Management, Vol 12, No, 3 (1999): 213-235.
- Parking M, Powell M. and Matthews K. 1997. *Economics*. Essex, England: Addison Wesley Longman.
- Prefeitura Municipal de Porto Alegre, <http://www.portoalegre.rs.gov.br/> . Accessed on 10 October, 2002
- Pierce C. and VanDeVeer D. 1995. *People, Penguins, and Plastic Trees: Basic Issues in Environmental Ethics*. Belmont, California: Wadsworth Publishing Company
- Postel S. and Carpenter S., 1997. *Natures Services: societal dependence on natural ecosystems*. Edited by Daily G. Washington: Island Press.
- Rogers P, Bhatia R. and Huber A. 1998. *Water as a Social and Economic Good: How to put principle into practice*. Stockholm: Global Water Partnership Technical Advisory Committee
- Shirley M. and Walsh P. 2000. *Public versus Private Ownership: The Current State of the Debate*. Policy Research Working Paper 2420. Washington D.C.: World Bank, Development Research Group.
- Schumacher E.F., 1973. *Small is beautiful: Economics as if people mattered*. London: Blond and Briggs
- South African Documentation and Cooperation Centre (SADOC). *TANZANIA: Water privatisation scheme criticized*. SADOC: June 13, 2002. URL: <http://www.sadocc.at/news/2002-199.shtml> Accessed on 17 October, 2002.
- Tredoux C. and Pretorius T., 1999. *Reducing and understanding complexity: multivariate data analysis*. In: Research in Practice. Edited by Terre M. and Durrheim K. Cape Town, South Africa: UCT Press.
- United Nations General Assembly. 1948. *Universal Declaration of Human Rights*. Resolution 217 UN Doc. A/64.
- United Nations Conference on Environment and Development (UNCED). 1992. *Agenda 21*. Rio de Janeiro, Brazil: UNCED
- United Nations. 2001. *Access to safe Water Fundamental Human Need, Basic Human Right, Says Secretary-General in Message on World Water Day*. Press Release: SG/SM/7738, OBV/200
- United Nations, 2001
- Vickers J. and Yarrow G. 1988. *Privatisation: An economic analysis*. Cambridge, Massachusetts: The MIT Press
- Ward C. 1997. *Reflected on Water*. London: Casell.
- Water Aid. DRAFT. *Private Sector Participation in Dar es Salaam, Tanzania*. London: Water Aid.
- World Summit on Sustainable Development. 2002. *Plan of Implementation, Paragraph 7*. Official United Nations website for the Johannesburg Summit 2002 – the World Summit on Sustainable Development: www.johannesburgsummit.org/index.html. Accessed on 12th October 2002.
- World Summit on Sustainable Development. 2002. *Plenary Sixth Meeting (AM), 28 August 2002*. ENV/DEV/J/6. New York: United Nations. World Summit on Sustainable Development - Department of Public Information – News and Media Services Division
- World Summit on Sustainable Development. 2002. *Water, Energy, Health, Agriculture and Biodiversity – Synthesis of the framework paper of the working group on WEHAB*. A/CONF.199/L.4. Johannesburg: United Nations, World Summit on Sustainable Development