

https://dspace.org/

New approach to private sector participation in the water sector of Africa's developing countries

Eldidy, Nezar Abdelfattah Mohamed

2008-08-12T07:42:46Z
http://hdl.handle.net/10539/5325

Downloaded from a DSpace repository. https://dspace.org/

NEW APPROACH TO PRIVATE SECTOR PARTICIPATION IN THE WATER SECTOR OF AFRICA'S DEVELOPING COUNTRIES.

NEZAR ABDELFATTAH MOHAMED ELDIDY

A research report submitted to the Faculty of Engineering, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Science in Engineering.

Johannesburg, 2005.

ABSTRACT

This research has established a Best Practice for Private Sector Participation in Water Supply Development for Africa's developing countries, identifying problems, constraints, risks, and suggesting a form of Public Private Partnership, which will address, the problems identified. forms of Public Private Partnership have been studied. Stakeholders problems have been broken down into categories corresponding to the characteristics of Public Private Partnership.

In African developing countries where the majority of its population are poor, the current approach to private participation in water sector can unavoidably erect barriers to improving service for low-income households in developing countries. The approach frequently involves exclusive control of a local monopoly over a long period and an obligation to provide service to all or to all who request it within the area of exclusivity

A new approach to private participation in development of water infrastructure pro-poor requires rethinking the design of both water sector transactions and supporting regulation, especially when output standards can encourage innovation in inputs, they discourage more significant innovation by continuing to use existing forms of service.

The research highlights proposes a new model for the development of water supply schemes as well as management of existing water schemes, The Structure of the management model are derived along with the participants roles and risks portfolio is analysed. The Model produced results are in agreement with logical solutions.

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted for the Degree of Master of Science in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

_____

Nezar Abdelfattah Mohamed Eldidy

30th Day of April 2005.

DEDICATION

To My Father

Prof. Dr. A. M. Eldidy

(MAY HIS SOUL REST IN PEACE)

ACKNOWLEDGEMENTS

This research report would not have been possible without the assistance of the following people which is greatly appreciated.

Professor Stephenson, of the Water Systems Research Group whose insight, guidance and assistance during the research is sincerely appreciated.

My mother Mrs A. M. Eldidy, and my sister Dr. R. A. Eldidy and My wife Mrs. S. Eldidy, for their continuous encouragements and support.

Mrs. A. Thompson for her efforts in editing the final draft.

CONTENTS **Page No.**

CHAPTER 1. UNDERSTANDING THE WATER SECTOR OF AFRICA 1.1

1.1 MAIN FEATURES OF WATER SECTOR THAT IMPACTS ON COSTS AND OPERATION 1.2

1.1.1 Water Sector Internalities: due to state of existence of water 1.2

1.1.2 Water Sector Externalities: due to market constraints 1.3

1.2 WATER SECTOR GOVERNANCE, POLICIES AND IMPLEMENTATION: 1.3

1.3 FINANCING WATER PROJECTS IN AFRICA 1.4

1.4 HISTORICAL MODELS FOR PRIVATISATION/PRIVATE SECTOR PARTICIPATION 1.5

1.5 SECTOR CHALLENGES AND RISKS IN SUB-SAHARAN AFRICA 1.6

1.5.1 Urban Poor of Africa (Nature of Markets) 1.7

1.5.2 Governance and Poverty 1.7

1.5.3 Understanding and localizing provision constraints : 1.8

1.6 EVALUATING AND ALLOCATION OF RISKS 1.8

1.7 RISK DEFINITIONS 1.8

1.7.1 What are the problems of the water supply sector in Africa? 1.10

1.7.2 Investment in infrastructure in developing countries 1.11

1.7.3 Factors affecting water supply 1.12

1.8 STRATIFIED MANAGEMENT AND DEVELOPMENT MODEL (SMDM) 1.13

CHAPTER 2.LITERATURE REVIEW AND SECTOR ANALYSIS 2.1

2.1 INTRODUCTION - A BRIEF HISTORY OF DEVELOPMENT IN THE WATER INDUSTRY 2.1

2.2 MAIN FEATURES OF WATER SECTOR THAT IMPACTS ON COSTS AND OPERATION 2.3

2.2.1 Water sector internalities 2.3

2.2.2 Water sector exteriorities 2.11

2.4 WATER SECTOR DETERMINANTS AND EVOLUTION OF WATER AS AN ECONOMIC GOOD 2.15

2.5 WATER SECTOR GOVERNANCE, POLICIES AND IMPLEMETATION 2.23

2.5.1 Water Governance 2.24

2.5.2 Civil Society 2.25

2.5.3 Main Characteristic of effective water governance 2.25

2.6 MODELS OF GOVERNANCE 2.27

2.6.1 The bureaucratic politics and process model. 2.27

2.6.2 The legislatorial behaviour model. 2.27

2.7 The LAW 2.27

2.8 GOVERNANCE, CATALYSTS AND PLAUSIBLE FACTORS IN GOVERNANCE. 2.30

2.8.1 Interest Groups 2.30

2.8.2 Principal-Agent Theory 2.31

2.8.3 Regime theory and Public Choice 2.31

2.8.4 Management mode 2.32

2.8.5 Policy mix 2.32

2.9 THE POLITICS OF WATER GOVERNANCE 2.35

CHAPTER 3. *PRIVATISATION, RISKS AND THE URBAN POOR* 3.1

3.1	GENERAL	3.1
3.2	PRIVATISATION HISTORICAL BACKGROUND	3.2
3.3	Models for Privatisation	3.6
	3.3.1 Outright privatisation	3.6
	3.3.2 Participative privately financed techniques	3.7
	3.3.3 Corporatisation and the use of semi-private companies	3.8
	3.3.4 Management contracts	3.10
	3.3.5 Concession based methods.	3.35
3.4	EVALUATING AND ALLOCATION OF RISKS	3.18
	3.4.1 Risk definitions	3.19
	3.4.2 Risk classification	3.20
	3.4.3 Risk structures and allocation	3.22
	3.4.4 Cash flow and risk	3.23
3.7	FINANCING WATER PROJECTS	3.39
3.8	SECTOR CHALLENGES AND RISKS IN SUB-SAHARAN AFRICA.	3.40
3.9	NATURE OF THE URBAN POOR OF AFRICA.	3.42
	3.9.1 Definition of Poverty	3.42
	3.9.2 States, markets and poverty	3.45
	3.9.3 The Institutions and the poor	3.46
	3.9.4 Governance and Poverty	3.48
3.10	UNDERSTANDING AND LOCALIZING PROVISION CONSTRAINTS	3.50

CHAPTER 4. WATER SUPPLY DELIVERY AND THE PRIVATE SECTOR INVOLVEMENT AS VEHICLE FOR DELIVERY IN A PRO-POOR APPROACH. 4.1

4.1 MANAGING AFRICAN WATER SECTOR 4.2
4.2 THE PROBLEMS OF WATER SUPPLY SECTOR IN AFRICA 4.3
4.2.1 Internalities of water sector and its impact on cost. 4.4
4.2.2 Externalities of water sector and its impact on cost 4.8
4.3 FACTORS AFFECTING THE SELECTION OF PRIVATISATION OR PRIVATE SECTOR PARTICIPATION MODEL: 4.11
4.3.1 From governments/institutions perspective 4.11
4.3.2 From financiers perspective: 4.13
4.3.3 From community perspective 4.16

CHAPTER 5. NEW APPROACH TO PRIVATE SECTOR PARTICIPATION IN URBAN POOR COMMUNITIES OF THE DEVELOPING COUNTRIES OF AFRICA 5.1

5.1 GENERAL 5.1
5.2 BACKGROUND OF CATME 5.2
5.3 TOWARDS COMMUNITY BASED PRIVATE SECTOR PARTICIPATION 5.5
5.4 STRATIFIED MANAGEMENT AND DEVELOPMENT MODEL (SMDM) FOR WATER SUPPLY IN THE POOR URBAN ENVIRONMENT TOWARDS INCREASED PRIVATE SECTOR PARTICIPATION 5.7
5.4.1 Description of Module Components, functions, contract nature and tasks 5.9
5.4.2. Risks allocation 5.17
5.5 CONCLUSION 5.19

LIST OF FIGURES

Figure 2.1	Change of global temperature	2.3
Figure 2.2	Change in global precipitation	2.3
Figure 2.3	Total water withdrawals by region, 1995 and 2025	2.4
Figure 2.3	Total Irrigation water consumption by region, 1995 and 2025	2.4
Figure 2.5	Water Consumption per sector , 1995 and 2025	2.4
Figure 2.6	Potential and actual consumption of irrigation water , 1995 and 2025	2.4
Figure 2.7	Distribution of the global population not served with improved water supply, by region	2.5
Figure 2.8	Total non-irrigation water consumption by region, 1995 and 2025	2.5
Figure 2.9	Per Capita domestic water consumption by region, 1995 and 2025	2.5
Figure 2.10	Market Structure	2.13
Figure 2.11	Ideal Governance Diagram	2.24
Figure 3.1	Cumulative Impacts of Urban Poverty	3.43
Figure 3.2	How institutions fare on a range of evaluation Criteria	3.47
Figure 3.3	Linkage between poverty reduction and governance	3.49
Figure 4.1:	Major Privatisation in Africa	4.9
Figure 4.2:	Privatisation in Africa: Top ten countries in sales values	4.12
Figure 5.1:	System component per of the urban water scheme	5.19
Figure 5.2:	Proposed model of management	5.20
Figure 5.3:	SMDM application and private sector participation	5.21
Figure 5.4:	Governance per urban scheme	5.22
Figure 5.5:	Stakeholders roles	5.23
Figure 5.6:	stages of SMDM implementation	5.24

TABLES:

Table 5.1 Risk Structure for the proposed SMDM 5.18

Chapter 1

UNDERSTANDING THE WATER SECTOR OF AFRICA

Making private participation in development of water infrastructure pro-poor requires rethinking the design of both water sector transactions and supporting regulation, especially when output standards can encourage innovation in inputs, they discourage more significant innovation by continuing to use existing forms of service.

The research is to bring about a new approach to Private Sector Participation in the water sector of the urban poor of Africa's Developing Countries.

This research is to address primarily the following:

- The optimum form of private sector participation in Water Services development to urban poor communities
- Conditioned on which the private sector solve many of the water problems on mid-term and long term.
- the Risk structure for the envisaged mode of PSP and the stakeholders roles and responsibility to ensure an effective private sector participation in a high

Also, in a sector with many uncertainties, natural, governmental, financial, and in a country with low performance in enforcing laws, the form envisaged for the private sector participation to invest in the water services should be addressed in light of the financial risks foreseen, investment returns, possible sector incentives and its the impacts on the quality of life for urban poor.

Many of the current changes in approaches to delivery water and sanitation services derive from a change in thinking about the nature of water. In the past, many have viewed water as a social good. Increasingly, water is viewed as an economic good because it has value—and water development and management are steered toward uses valued more highly than their development costs.

A Secondary Research Technique has been adopted where the contents of available documents gathered from World Bank, Development Banks, among others, were to be collected and examined.

In 1992, and during the Earth Summit in Dublin, the "Dublin principles" forged in a process and affirmed that water resources should be managed holistically and sustainable, respecting subsidiary and ensuring that water to be recognized as an economic good.

In Africa, the rapid population growth has met the low nationwide coverage in water supply, and has not been accompanied by an increase in the delivery of essential urban services such as water supply, sewerage and sanitation, and collection and disposal of solid wastes.

In African Developing Countries where the majority of its population is poor, the current approach to private participation in water sector can unavoidably erect barriers to improving service for low-income households in developing countries. The approach frequently involves exclusive control of a local monopoly over a long period and an obligation to provide service to all or to all who request it within the area of exclusivity

1.1 MAIN FEATURES OF WATER SECTOR THAT IMPACTS ON COSTS AND OPERATION.

1.1.1 Water Sector Internalities: due to state of existence of water

(A) WATER SOURCING, SHORTAGES AND COLLECTION: Scarcity of water is rising rapidly, challenging its availability for food production and putting its value in a state of constant increase. The value of water varies from one region to another to the following:

- Demand
- Rivers, naturally occurring water catchments and ground water
- Dams and bulk transmission pipelines

(B) WATER USAGE AND ITS IMPACT:

- Social, environmental and economic characteristics
- Impact on urban and economic development
- Water rights

1.1.2 Water Sector Externalities: due to market constraints

- Water operations and operators:
- Natural monopoly characteristics
- Water treatment and retail distribution
- Market structures and classification of markets
- Bulk (wholesale) water markets stratification

1.2 WATER SECTOR GOVERNANCE, POLICIES AND IMPLEMENTATION:

Some believe if the correct laws, regulations, and institutions are in place, then one will get good governance of the water resources regardless of what else is happening in the country, but the picture is not that evident.

However, Practical experiences are quite different, as in many countries the best laws and regulations, and the best institutional frameworks are in place, but the actual performance of the water sector is very poor.

Water governance refers to the range of political, social, economic, and administrative systems that are in place to allocate, develop and manage water resources and the delivery of water services at different levels of society.

Governance is a more inclusive concept than government per se; it definitely embraces the relationship between a society and its government.

(i) Main characteristics of effective water governance:

- Open.
- Transparent.
- Participative.
- Accountable.
- Effective.
- Coherent.
- Efficient.
- Communicative.
- Equitable.
- Integrative.
- Sustainable.
- Ethical.

1.3 FINANCING WATER PROJECTS IN AFRICA

A project finance structure which allows water projects with attractive cash flow and risk profiles to secure long term private capital, has become increasingly pivotal in international financial allocations and a nation's budgeting process. Financing water projects is now conditional on two local factors: first to have an attractive cash flow and second an attractive risk profile. In other words it should have a low risk profile, which many of African urban, let alone low-income or rural, communities lack.
Some of the water sector challenges are:

(a) Water is expensive to convey or transport but comparatively cheap to store.
(b) Most of water industry infrastructure is buried which makes it difficult to assess. This might result in difficulties in investment's planning and pose risks for contract design and negotiation.
(c) Significant currency risk, as customer pay in local/domestic currency that does not match international debt and equity financing.

(d) So far, little competition has been introduced in the different components of water supply.

1.4 Historical Models for Privatisation/Private Sector Participation

As a consequence of the evolution of Dublin Statements (ICWE, 1992), privatisation of the water industry has been put forward international donors and financiers to Sub-Saharan Africa as the only way forward. The magnitude of this exercise varies based on the geopolitical nature of the country under question.

Governments pursue privatisation, on the grounds of being a prerequisite of international donors and funding agencies. Governments were faced by forceful opposition that made them consider various models, especially when, in some cases, the conditions, laws and policies had not yet been formulated or proper regulating bodies were not in place. A comparison was set between commercialisation or the French model based on management delegation, as the English model is criticised by most African governments, especially in the water sector, due the inherited problems of coloniphobia (fear of re-colonisation), unlike the French model where the service only was entrusted to private sector. In either case opposition erupted and was negotiated or suppressed.

Several models of Privatisation and private sector participation have been adopted based on holistic approach to water supply management of a scheme, such as:

- Outright privatisation
- Participative Privately Financed Techniques
- Corporatisation and the use of Semi-Private Companies
- Publicly Owned Corporations

- Semi-Public Companies
- Management contracts
- The leasing model or build, lease, transfer (BLT)
- Pre-financing
- Concession based methods
    - Build, operate, transfer (BOT)
    - Build, own, operate, transfer (BOOT)
    - Build, transfer, operate (BTO); build, transfer, service, maintain (BTSM)
    - Build, own, operate (BOO)
    - Lease, renovate, operate, transfer (LROT)
    - Design, build, finance, operate (DBFO)
    - Design, construct, manage, finance (DCMF); design, build, finance, operate, manage (DBFOM)

1.5 SECTOR CHALLENGES AND RISKS IN SUB-SAHARAN AFRICA

There is no question that political and economic instability, low per capita incomes and often challenging geographic conditions have significantly constrained the development of Africa's infrastructure in general. At the same time, investments made in the water sector have often been squandered through policies that gave prominence to short-term political and other objectives. In some countries, for instance Nigeria, in 1988 44% of manufactures relied on their own private water supply system and boreholes. These figures are increasing. Water vendors contributed to supply in Sub-Saharan Africa with 40 – 90% of total households demand (Kerf and Smith 1996). The low income consumers' relief from state owned utilities often comes from local informal sector providers, claiming in some instances more than 30% of household income.

Water sector financers face difficult challenges in the Developing Countries of Africa, such as:

- Small Markets, Affordability and Payment Risks
- Infrastructure prices in general and water services prices in particular tend to be politically sensitive.
- Reliance on foreign capital alone has s number of potential weaknesses, including greater exposure to exchange rate and convertibility risks, coupled with greater political sensitivity for foreigners dominating sectors that have been viewed as strategic.
- Many Sub-Saharan African government have weak legal and regulatory capacities.

1.5.1 Urban Poor of Africa (Nature of Markets)

Poverty is a deprivation of essential assets and opportunities to which every human is entitled. Everyone should have access to basic education and primary health services. Poor households have the right to sustain themselves by their labour and be reasonably rewarded, as well as having some protection from external shocks. Beyond income and basic services, individuals and societies are also poor—and tend to remain so—if they are not empowered to participate in making the decisions that shape their lives. Poverty is thus better measured in terms of basic education, health care, nutrition, water and sanitation, as well as income, employment, and wages. Such measures must also serve as a proxy for other important intangibles such as feelings of powerlessness and a lack of freedom to participate.

While Most poor people in Egypt define themselves as being excluded from the decision making process, seeing it as a privilege that they do not enjoy, Jamaican poor people say, “We want to have more influence over government.” (Baharoglu and Kessides Sep 2002)

1.5.2 Governance and Poverty

The quality of governance is critical to poverty reduction. Good governance facilitates participatory, pro-poor policies as well as sound macroeconomic management. (AsDB 2003). However, denial of basic services to the poor is not just a matter of lack of investment. Often, it is the result of

(i) institutional structures that lack accountability,
(ii) domination by local elites,
(iii) widespread corruption,
(iv) culturally determined inequality, and
(v) lack of participation by the poor.

1.5.3 Understanding and localizing provision constraints :

In a general sense, people have inadequate water and sanitation because they are poor and lack the income to purchase the services they want. However, the poor often pay more for their access than do the better-off households, both in absolute terms and relative to their income.

Poverty alleviation programs seek to improve the income of the poor and thus their purchasing power. Pro-poor water and sanitation programs seek to improve access to services through policies or investments that reduce costs and should a pre-requisite to any water and sanitation provision.

1.6 EVALUATING AND ALLOCATION OF RISKS

Understanding of the categories of risk is necessary in order to tackle the finances of any project or to determine the best sensitivities to test the robustness of a project's cash flow projections.

1.7 RISK DEFINITIONS

The first step towards definition of risk must is to ascertain all of the risks to which a project or a company might be exposed; otherwise one will remain ignorant of the possibility of a financially crippling loss until it occurs. However, simply stating what 'risk' is can lead to debate. For example, risk could be:

- the change of a loss;
- the uncertainty of loss;
- the possibility of loss;
- uncertainty;
- divergence of actual from expected results;
- probability of an outcome different from the one expected;
- possibility of the occurrence of an undesirable contingency;
- a condition in which a possibility of a loss exists.

For the project financier, the last definition is probably the most appropriate. However, from a sponsor's point of view the definition might well include the possibility of not achieving the expected financial returns.

A full understanding of who takes what risk and the general rules applied by project financiers can result in remarkably good project finance agreements without too much difficulty. An early dialogue with the financiers will serve to validate the sponsor's expectations of risk sharing in financing a project. A firm understanding of these objectives should be established, perhaps with the assistance of a financial adviser.

We can classify the risks of financier or summarise them into 2 categories; internal and external. Internal risks are entirely under the control of the financier, while the external ones are a function of the water sector environment (internalities and externalities) of the targeted communities.

A superficial competition evolved in Africa between international competitors without considering capacity building of local companies nor contracts' awards, and 4 or 5 multinational companies are competing to replace more than 50 existing public water companies (at least one in each country - Nigeria has more than 36 while South Africa is has more than 240 public local service providers). The claims of monopolistic approaches in the water markets, is now being replaced with oligopoly approach and many allegations and convictions of corruption in the process hampers the opportunity of local African companies to render the same service.

1.7.1 What are the problems of the water supply sector in Africa?

The African local market is characterized by low financial capacity, fast population growth versus high mortality and morbidity rates, vast land, low labour productivity and an autocratic approach in governance.

The current problem in most the developing countries is the slow pace of developing their water infrastructure versus an increase in demand and depletion of the resource. This has resulted in an increase in the cost of service delivery which has to meet the reality of the ability the pay of most of the consumers in these countries.

Analysing the GDP per capita for Sub-Saharan Africa, we find that the population of 30 countries out of the 45 are living on less than 1US$ per day , equivalent to about R7.00 a day (Nigeria is arrayed among counties in this category), 7 countries live on US$1.50 a day. Comparing this situation with the cost of one bottle of water in South Africa of almost R7.00 we can understand the dilemma of such countries.

Two main pivotal problems in the water sector are currently looming and will have an impact on water management decisions:

(a) Limited resources represented in: (Internality of Water Sector Privatisation (IWSP))
    (i) Limited water resources and poor demand assessment and management policies.
    (ii) Limited human capacity to manage existing and projected water infrastructure.
    (iii) Limited capacity to expand existing infrastructure.
(b) Limited ability of pay for the resources. (Externality of Water Sector Privatisation (EWSP))
    (i) Markets lack financial capacity.
    (ii) Low ability of consumers to pay
    (iii) Limited or low creditworthiness
    (iv) Limited social and culture inheritance.

1.7.2 Investment in infrastructure in developing countries

Whether investment in infrastructure causes growth or growth causes investment in infrastructure is not fully established, but the link between development of infrastructure and economic growth certainly exists. A fully integrated economy cannot be achieved unless the country can provide and maintain adequate internal and cross-border transport systems, reliable energy sources for production, clean water and sanitation systems for the population and efficient communications technology. These are without doubt factors that seriously limit economic growth and may create a severe bottleneck for general development in many developing countries.

Analysis of the existing state of infrastructure in developing countries clearly shows that across several sectors, the need for investment in basic infrastructure is huge. A comparative appraisal of the infrastructure coverage in developing and developed economies also indicates that in order to bridge the existing gap significant amount of funds will be necessary.

Though many opportunities exist for the use of public-private partnerships in Africa, severe constraints must be overcome. The major constraints that many developing countries face in attracting private financing for infrastructure development include:

Low levels of purchasing power - This is essential for private financed infrastructure scheme since the projects have to generate a sufficient and stable cash flow as well as the necessary foreign currency to carry out the foreign investment against an effective demand. Specifically, this encompasses:

- Payment by end users
- Availability of foreign currency
- Political and Economic risks
- Social Risk
- Lack of proper legal and regulatory framework

1.7.3 Factors affecting water supply:

We can see that the delivery of service from different perspectives:

(i) The resource:
(ii) The service providers
(iii) The financier
(iv) The consumer.

With the diverse nature of water and its usages, it can be that there are several factors affecting the selection of a water management model, depending on the nature of the community, its ability to pay, and participation in the proposed water supply system.

In our research approach to water supply management we recommend two models, the first model is a cognitive approach to management enhancement

(CATME) of an existing system in a poor community, while the second is a Stratified Management and Development Model directed towards private sector participation (SMDM) in new water supply scheme and or extension of existing water scheme.

The first model enhances the credit-worthiness for the existing water institution through

- Capacity building of existing water units.
- Water operations to enhance assets through developing an asset management plan and proper inventory and documentation of its asset base.
- Prepare grounds for expansion and creation of new extensions for the scheme through application of the second model SMDM

1.8 STRATIFIED MANAGEMENT AND DEVELOPMENT MODEL (SMDM)

The above method is based on the following:

(a) Separation or unbundling of various components of a water scheme to:

- Collection and Storage.
- Bulk Water Transport System (BRTS)
- Water Reticulation Transport System (WRTS)
- Treatment Processes:
- Operation and Maintenance.
- Sewage collection and treatment progressive system.

(b) The Model aims to:

- Increase competition on all components of the water scheme either horizontally or vertically.
- Increase risk sharing among participants

- Increase participation among private sector flattening the risk organogram
- Avoid long term monopolies in the water supply sector, by reducing concession periods over the unbundled components of the water supply
- Enable competition over various components of the water supply components.
- Allow local competition to emerge over the years of the water scheme, and in due course of the operation of the water scheme.

CHAPTER 2:
LITERATURE REVIEW AND SECTOR ANALYSIS:

2.1 INTRODUCTION - A BRIEF HISTORY OF DEVELOPMENT IN THE WATER INDUSTRY.

Water resources provide important benefits to humankind, in the form of commodity benefits and environmental values. Water quality standards have a significant impact on mortality and morbidity on one hand, and on the utility's costs on the other.

Water works and distribution systems were invented a long time ago. In China, Yu the Great, patron of hydraulic engineers tamed floods around 2200 B.C, while Egyptians started water coagulation with lime by the 1500 BC. The Romans built famous aqueducts. In the late 18th century, wooden underground pipes provided London with water from the river Thames, and in Paris just before the French revolution, the brothers Perrier built a piped water system.

The spread of piped water systems was slow. Water vendors were indispensable in every town of the world in the 18th century and continue to be so in many cities of the developing world, by then. Where water vendors provide services, consumers have a choice. They can bargain over price, or they can check quality. In China, the boiling of suspect water was recommended and "vendors sold boiling water in the streets" (Braudel, 1979). Where vendors compete, consumers can thus judge the quality of water and switch suppliers when no longer satisfied with their current vendor. The vendors in turn are free to ask for prices that cover their costs, but consumers can turn to cheaper suppliers when price quotes are excessive. Inefficient vendors can go out of business, but consumers are interested in paying prices to keep as many vendors in business as needed.

The advent of piped water drastically changed the situation. In piped systems, water can be supplied much more cheaply than by street vendors. Today, prices of piped water are often only 10 to 20 per cent of those charged by vendors, or even less. At the same time choice is reduced, because it is normally inefficient to lay competing pipeline systems, which would provide consumers with a choice. Initially, in the 19th century, competing water pipeline systems were laid in various towns in a number of countries, for example Canada and the United Kingdom. But whether as a result of free competition or municipal regulation, soon there were only single water monopolies left for each area supplied with piped water (Foreman-Peck and Millward, 1994 and Armstrong and Nelles, 1986).

The focus of activities in the drinking water sector since the onset of the nineteenth century has been the provision of safe and reliable water to various segments of the population. Initially, the primary problem faced by many domestic water supply programs was overcoming limitations in the availability of water vis-à-vis its quality, and the solution was predominantly technical in nature. If there was no acceptable surface water available, new technology was introduced (or existing technology from other sectors - such as the petroleum industry - was adapted) to tap deep groundwater aquifers. When this was achieved, the focus shifted to making the technologies more efficient and cost effective and more appropriate to national and regional conditions and capabilities, although work in this area is far from complete (drilling and pumping technologies continue to be improved, and alternative technologies such as rainwater harvesting and filtration of surface waters continue to evolve). By 1930 the United States of America, unlike many other countries, had successfully eliminated out break of major death-causing waterborne diseases, due to successful application of filtration and chlorination practices.

2.2 MAIN FEATURES OF WATER SECTOR THAT IMPACTS ON COSTS AND OPERATION.

2.2.1 Water Sector Internalities

(i) Water sourcing, shortages and collection :

Demand for the world's increasingly scarce water supply is rising rapidly, challenging its availability for food production and putting global food security at risk.

Agriculture, upon which a burgeoning population depends for food, is competing with industrial, household, and environmental uses for this scarce water supply. Even as demand for water by all users grows, groundwater is being depleted, other water ecosystems are becoming polluted and degraded, and developing new sources of water is becoming more costly.

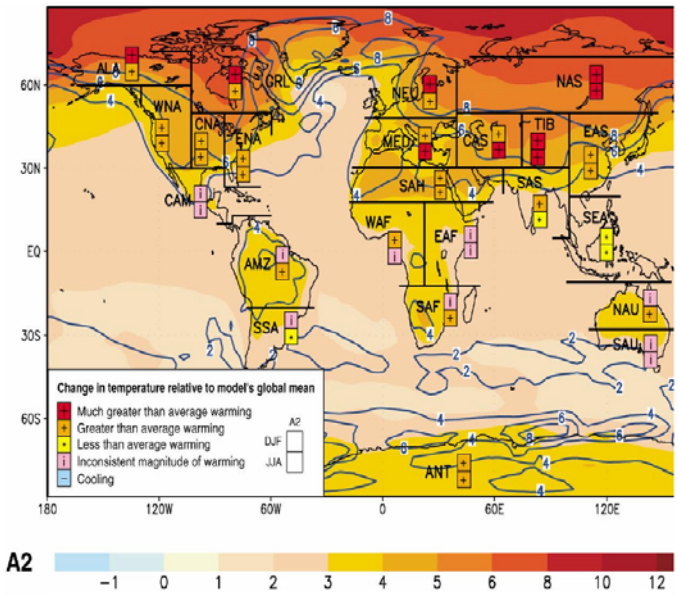


Figure 2.1 Change of global temperature
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

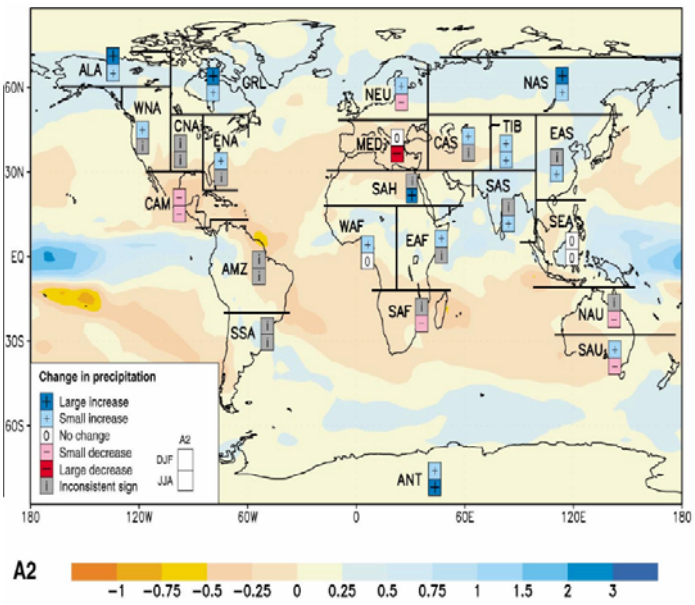


Figure 2.2 Change in Global Precipitation
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

Water development underpins food security, people's livelihoods, industrial growth, and environmental sustainability throughout the world. In 1995 the world withdrew 3,906 cubic kilometres (km^3) of water for these purposes (Figure 2.3). By 2025 water withdrawal for most uses (domestic, industrial, and livestock) is projected to increase by at least 50 percent. This will severely limit irrigation water withdrawal, which will increase by only 4 percent, in turn constraining food production. About 250 million hectares are irrigated worldwide today, nearly five times more than at the beginning of the 20th century. Irrigation has helped boost agricultural yields and outputs and stabilize food production and prices. But growth in population and income will only increase the demand for irrigation water to meet food production requirements (Figure 2.4). Although the achievements of

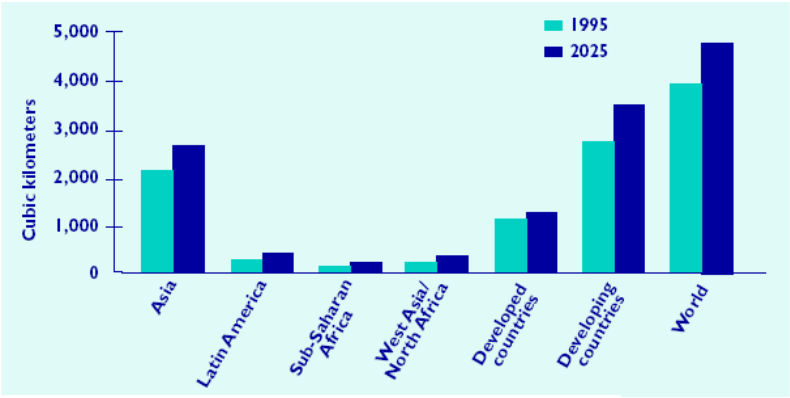


Figure 2.3 Total water withdrawals by region, 1995 and 2025
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

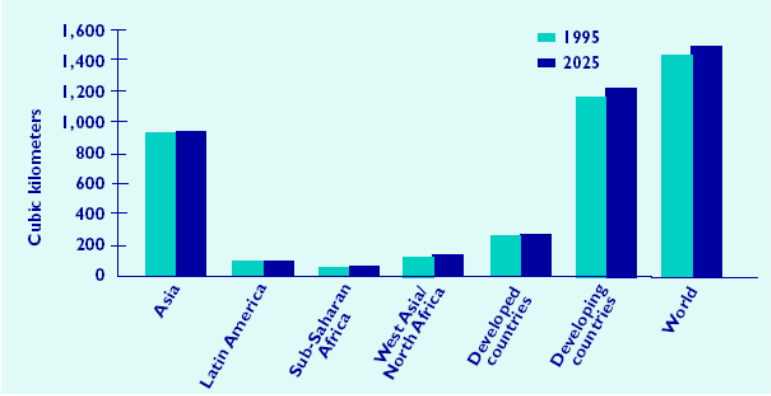


Figure 2.4 Total Irrigation water consumption by region, 1995 and 2025
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

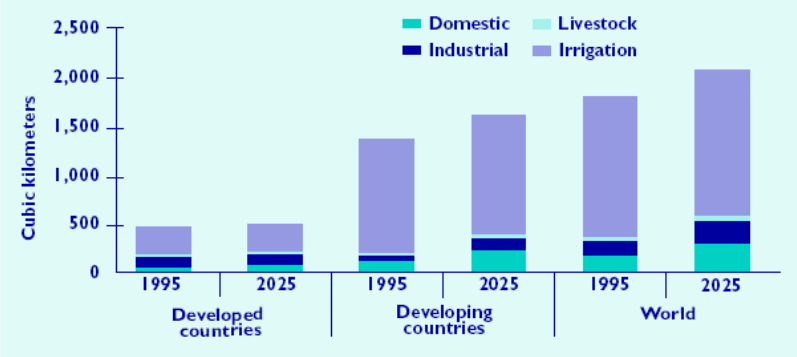


Figure 2.5 Water Consumption per sector , 1995 and 2025
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

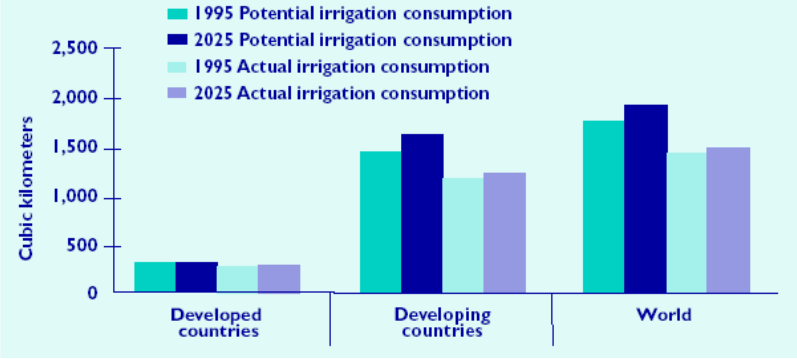


Figure 2.6 Potential and actual consumption of irrigation water , 1995 and 2025
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

irrigation have been impressive, in many regions poor irrigation management has markedly lowered groundwater tables, damaged soils, and reduced water quality. Water is also essential for drinking and household uses and for industrial production. Access to safe drinking water and sanitation is critical to maintain health, particularly for children. But more than 1 billion people across the globe lack enough safe water to meet minimum levels of health and income.

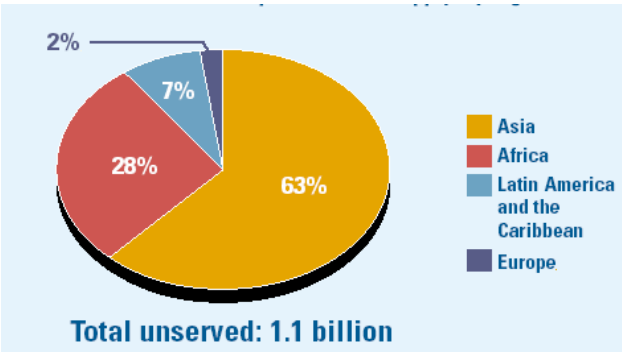


Figure 2.7 Distribution of the global population not served with improved water supply, by region
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

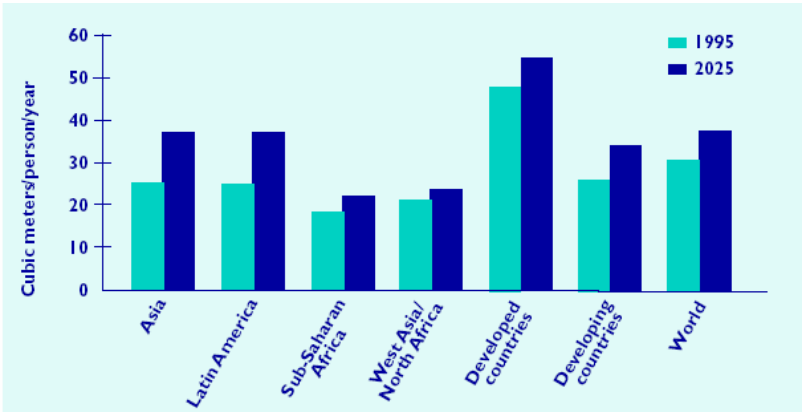


Figure 2.8 Total nonirrigation water consumption by region , 1995 and 2025
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

Although the domestic and industrial sectors use far less water than agriculture, the growth in water consumption in these sectors has been rapid. Globally, withdrawals for domestic and industrial uses quadrupled between 1950 and 1995, compared with agricultural uses, for which withdrawals only slightly more than doubled.

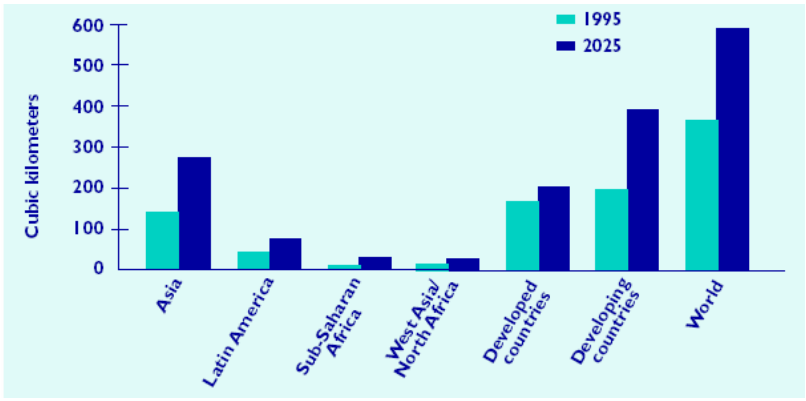


Figure 2.9 Per Capita domestic water consumption by region , 1995 and 2025
Source : Global Water Supply and Sanitation Assessment 2000 Report – UNICEF & WHO 2000)

Water is integrally linked to the health of the environment. Water is vital to the survival of ecosystems and the plants and animals that live in them, and in turn ecosystems help to regulate the quantity and quality of water. Wetlands retain water during high rainfall, release it during dry periods, and purify it of

many contaminants. Forests reduce erosion and sedimentation of rivers and recharge groundwater. The importance of reserving water for environmental purposes has only recently been recognized: during the 20th century, more than half of the world's wetlands were lost.

There is no doubt that scarcity vis-à-vis competition between agricultural water needs and irrigation, domestic water supply, commercial and industrial water supply and need for drought contingency and conservation planning, floodplain management and strategic water conservation plans have to react and result in a value for water that varies from one region to another, but not predominantly from one community to another.

(ii) Rivers, naturally occurring water catchments and ground water

These are all critical inputs to the water supply system, and their existence is primarily determined by natural landscape characteristics and subterranean formations - rather than by man. These critical components of the water supply system are naturally occurring resources rather than natural monopoly resources. The rights to the water held in these natural resources should ideally be allocated and be transferable between the various usages. The development of a national water resources strategy and implementation policy is also of critical importance.

As much as water and its quality is critical to human existence in some communities, water not only gives and maintains life but water resources, catchments and rivers form integral parts of the social, recreational, economic and even religious fabric of society.

(iii) Dams and Bulk Transmission Pipelines

The type of dam structures and their cost and other water catchments can vary considerably from region to region and are dependent on a range of factors,

including geography. In some instances, there may be substantial cost differences between the first and subsequent facilities in the same region. For example, the first dam constructed has the choice of the lowest cost site. The traditional view is that there are strong economies of scope between individual catchments

It is often argued that the optimal management strategy in water systems is to draw on water contained in the smallest/shallowest reservoirs first (where relative evaporation is highest). However, water from smaller reservoirs generally costs more per unit than water from larger reservoirs. The economies of scope for dams and other catchment management systems are not restricted to the water supply system; they also play a crucial role in limiting the damage from excess rainfall and flooding.

Competition between individual dams from different sources and water supply catchments is possible if from different sources. The geography and topography of the land and thus the availability of alternative water supplies will determine the potential for such competition, in large part. Competition between alternative sources of supply would be viable if the underlying costs are not prohibitively different.

There is also a strong relationship between head works and transmission pipelines. For example, if a pipeline business was denied access to the upstream water supply, the pipeline assets dedicated to that particular water supply would have little value. The opposite may also be true if the water provider has no alternate use for its water supply. Water quality may also be an issue if these functions are separate. Traditionally, such concerns have been alleviated by vertical integration of the upstream water supply and pipeline utilities. However, if these operations were separate, parties could overcome or reduce these risks by long-term contracts to carry a particular volume of water exceeding a particular quality standard. There is evidence to suggest that transmission pipelines enjoy substantial economies of scale. However, water transmission is rarely or never examined in isolation from distribution.

Bruggink (1982) examined water transportation and found significant economies of scale in water supply and distribution utilities. The largest utility in his data sample supplied 605.6mill m^3 of water per annum. The mean utility supplied 39.6mill m^3 of water per annum. As transmission pipelines are likely to enjoy substantial economies of scale, direct competition will only be possible for the initial ownership of the pipeline. Competition could also occur if another transmission pipeline, transporting water from another head-water, serviced the same downstream market.

(iii) WATER USAGE AND ITS IMPACT

(a) Social, Environmental and Economic Characteristics.

Water in Some communities and countries not only gives and maintains life but water resources, catchments and rivers form integral parts of the social, recreational, economic and even religious fabric of society.

Water's use by one consumer group, such as farmers, will impact on its use by others. Thus consumption of water by communities in the upstream regions of a river or catchment area results in reduction of water quantities available to down stream users. If substantial quantities are used upstream, water quality, as well as water quantity, can be effected. However, the gradual nature of some ecological changes, such as salination of groundwater, means that the costs of present actions are not always readily identifiable.

Often the costs associated with a particular (intensity or pattern of) use of water is a function of its availability at present and in the future. Water supply to households and firms also creates a need for water discharge. These water cycle issues and indeed many discharge effects on the quality of the water resource are generally out of the direct control of the water supply utility. There are also complex chemical and physical interactions which create problems — e.g. low water pressures do not allow flushing of pipes and may so contaminate safe water. Industrial and human wastes dissolved in water are

sometimes difficult to detect and treat and often the culprit polluter cannot be identified. The most recent challenge to water treatment is the microscopic parasite called Giardia — a water borne source of a flu-like infection which does not respond to chlorine and requires finer filtration (membrane) techniques than are typically used even in advanced systems, or in the case of arsenic contaminated water.

(b) Impact on Urban and Economic Development

The manner in which we use and dispose of water impacts on virtually all aspects of our society and environment. The availability of an adequate water supply impacts on the viability of agricultural and particularly industrial development.

The main attraction for business and industry is the availability of infrastructure, and this results in the fact that investors and entrepreneurs have more freedom and flexibility to locate some distance from markets choosing cities or countries where the infrastructure most suits their requirements. A good quality reliable water supply is an important consideration in their location decision.

There are documented examples where the achievement of a reliable good quality water supply has led to dramatic improvements in the level of economic activity. Also, the adequacy of the water supply also impacts on the health-morbidity (disease) levels and mortality of the population. Many deadly diseases, such as cholera, and many other nonfatal, though nonetheless serious, complaints such as intestinal disorders, are spread through contaminated water supplies. Other diseases, such as hepatitis, are spread as a result of an inadequate sewerage system. Modern water supply and sewerage systems are critical in securing the superior health outcome of people living in the more developed parts of the world.

While the body can adjust, to a limited extent, to contaminated water sources, diarrhea and gastrointestinal diseases afflict large numbers of indigenous Asians on a regular basis. In a review of hundred health impact studies, Lindstrom, (1991) estimates that of 900 million people suffering from diarrhea, improvements in water quality and or sanitation had dramatic effects the incidence of disease. The United Nations study explains that paradoxically, in some of the very poor countries there is a link between poor water quality, poor health, and increased population levels.

(iv) Water Rights

Water rights are more prominent in agricultural use and irrigation. In many developed and developing countries water supply is administrative allocated among competing users, often on a first-come-first-served basis, or based on availability. Usually, in agricultural based communities, the allocation is traded with mutual consent especially among adjacent land or can only be traded with the land to which it is often attached In some cases such allocation methods do not or cannot specifically recognize the economic value of water. The absence of a national agricultural and water a masterplan, or failure to implement such masterplan, may diminish the value of water or lead to conflicts between user groups and inappropriate uses of water.

A water property right can confer ownership. The holder of this right may also transfer the right in whole or part on a permanent or temporary basis. Ownership, in developing and less informed countries is usually vested in its government. In a productive community a water right creates a real interest in property which allows the holder to impound, divert or use water. However in imperfect and immature communities where inequality and lack of transparency exists it may incur serious conflicts and loss of value.

2.2.2 Water Sector Exteriorities

(i) Water operations and operators:

In many developing countries the major problem has been not so much a lack of water per se, but rather, the quality of the available water supply and, in urban areas, a dearth of household piped water connections. For example, the available supply of water may appear to be potentially plentiful for domestic and industrial consumption but this assessment does not take into account that in some regions, and at certain times of the year or in periods of drought, water is scarce or the cost of accessing the potentially available water may be high. A 1995 survey of 50 water utilities in thirty one Asian developing countries found that in the fifty cities surveyed, unaccounted-for water was greater than 30 percent of water production (AsDB 1997).

Only two of the cities surveyed had unaccounted-for water levels of less than 10 percent. The levels of unaccounted-for water were particularly high in a number of cities with less than 150,000 connections. Unaccounted-for water in the cities with larger utilities ranged from a low of 6 percent in Singapore to a high of 53 percent in Jakarta. Metering of all production and consumption, and regular maintenance, repair and replacement of meters does not take place in many developing Asian countries.

(ii) Natural Monopoly Characteristics

The existence of natural monopoly in water supply is an empirical question — in many urban areas there is problematical competition from private shallow and deep wells. High water tariffs, in combination with unsafe piped water, create a situation where many prefer not to connect or to make limited use of piped water supply. In general, economic and environmental considerations point to a single producer as the most efficient outcome — with well closure usually justified on environment grounds — i.e. preserving the aquifers.

Water supply involves a network of inter-connected systems and components It is common for many infrastructure networks to be able to take advantage of economies of scale and/or scope in all or part of the network. These economies can mean that one network can supply the whole market cheaper than can two or more competing providers. In these circumstances, the part of the network that displays substantial economies is known as a natural monopoly..

(iii) Water Treatment and Retail Distribution

Kim and Clark (1988) analysed a cross section of sixty community drinking water systems in the US. The study found that large utilities exhibited considerable economies of scale in water treatment. However, the large utilities that distributed water over a substantial distance also suffered from diseconomies in distribution. These diseconomies, in some instances, offset the economies achieved in water treatment. This suggests there are inefficiencies in increasing water. the work of Kim and Clark (1988) suggests that:

- There are substantial scale economies in water treatment.
- There are economies of scope associated with the joint production of residential and non-residential water supply.
- There are substantial economies of scale in distribution to non-residential users, particularly when distances are relatively short.
- There is evidence of scale diseconomies in residential supply distribution networks beyond a certain size.
- When residential and non-residential supply are treated as a single output there are overall economies of scale in the combined supply. However, these economies become exhausted as the utility grows in size.

(iv) Market Structures and Classification of Markets

Given the complex and interactive nature of water-based environmental economic systems and the important role of water quantity and quality in

human life, it is commonly argued that water supply, as well as sewerage and drainage, are too important to be determined in the marketplace. On analysing perfectly competitive market and monopoly, it is worth mentioning that in perfectly competitive market, firms have no market power at all. In a monopoly market a monopolist has a lot of market power.

The amount of market power depends on the following factors:

- Number of firms.
- Size of each firm.
- Barriers to entry.
- Availability of substitute goods.

Market Structure: the number and relative size of firms in an industry while Market structures can be classified into several types and are presented in Figure 2.10.

	Market Structure				
Characteristic	Perfect Competition	Monopolistic Competition	Oligopoly	Duopoly	Monopoly
Number of firms	Very large number	Many	Few	Two	One
Barriers to entry	None	Low	High	High	High
Market power (control over price)	None	Some	Substantial	Substantial	Substantial
Type of product	Standardized	Differentiated	Standardized or differentiated	Standardized or differentiated	Unique
Example	Wheat, Milk	Novels, Movies	Crude Oil, Long-Distance	Computer chips	Diamond

Figure 2.10 Market Structure

A peculiar nature of water markets evidenced from a range of countries indicates that within water supply businesses there is often possible product use-based structuring or a separation of bulk supply and retail supply functions. This highlights that there are at least three possible markets within the water supply system, namely the water rights market (as previously discussed), the bulk or wholesale market and the retail sector, which comprises potentially separate markets for water distribution, drainage and sewerage. The potentially competitive market segments of the network can be vertically separated from other market segments. After separation, competition may be successfully implemented.

The previous discussion suggests that the existence of a natural monopoly in water supply is most likely restricted to parts of the network and may be dependent on size. Thus, it is feasible that the water supply network can be unbundled and operated based on possible markets and operations. The following discussion considers the markets for bulk and retail water supply and the competition, real or potential, that might occur.

(v) Bulk (Wholesale) Water Markets Stratification:

The quality of bulk water is also increasingly under threat from urban development and pollution. Bulk water supply conflicts can make planning of investment difficult and can limit the capacity of current or new water enterprises to meet the demands of their customers. There are a variety of options for dealing with bulk water supply issues. If property rights in water are well-defined, tradable and legally enforceable, then a market for water rights will develop. The water right holders will have an incentive to ensure that the water is directed to its highest value use whether that use be bulk supply for metropolitan markets or irrigation. The water rights market would, in theory and practice, involve many sellers and purchasers and thus is highly competitive. However, in some countries there may be a number of political, social and legal barriers to the introduction of water rights. Other market options include establishing:

- Regionally based catchment authorities to manage water allocation and pollution concerns.
- Contracts in relation to bulk water supply and retail water entities, setting out water quality parameters and quantities.

Another option is to establish an ownership structure for bulk water supply which allows all downstream water enterprises and other entities, such as farmer based regional water associations, to establish or have equity in a bulk water company. The bulk water entity would operate like a cooperative and

supply raw water in bulk for irrigation and to retail companies within a region in accordance with contractually binding conditions. The central objective of the Bulk Water Corporation would be to improve raw water supply generally in terms of reliability, quantity and quality, and to do so on a long-term basis. Any concerns about monopoly in bulk supply are removed or at least diluted as all retail users of water have an interest in the bulk water supply company.

2.3 WATER SECTOR DETERMINANTS AND EVOLUTION OF WATER AS AN ECONOMIC GOOD:

Despite an unchanged status-quo around the world, diarrheal diseases kill more than 3 million people annually and cause approximately 900 million episodes of illness through contaminated drinking water. In a country such as India, 80 percent of disease, includes a sizable share of 500,000 children die each year from diarrhea.(World Bank 1992). A fundamental new approach has evolved to value, assess, develop and manage freshwater resources.

Water, waste management and related environmental issues have been the subject of increasing international concern and debate. The UNDP global consultation on Safe Water and Sanitation for the 1990s, held in New Delhi (1990), appealed for concerted action to enable people to obtain two of the most basic human needs - safe drinking water and environmental sanitation. Its guiding principles included protection of the environment and health, institutional reforms, community management, financial strategies and appropriate technologies. The UNDP symposium “A Strategy for Water Sector Capacity Building” (1991, Delft, The Netherlands), defined the three basic elements of capacity building as:

- Creating an enabling environment with appropriate policy and legal frameworks,
- Institutional development including community participation, and
- Human resources development.

The international water agenda was broadened, and the driving theme of scarcity and misuse of fresh water was the motto. Two conferences in 1992, sponsored by the UN system: the International Conference on Water and the Environment (ICWE) in Dublin, and the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil. highlighted a number of principles:

- *Principle No. 1* - Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

  Since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or ground water aquifer.
- *Principle No. 2* - Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

  The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects.
- *Principle No. 3* - Women play a central part in the provision, management and safeguarding of water.

  This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them.

- *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.

In 1993, the World Bank (1993a) issued a comprehensive policy paper defining its new objectives for the water sector. FAO recently established an International Action Programme on Water and Sustainable Agricultural Development (IAP-WASAD). Likewise, the UN Specialized Agencies, international non-governmental organizations (NGOs) and bilateral assistance agencies are all coordinating or participating in special programmes related to water resources. The Ministerial Conference on Drinking Water and Environmental Sanitation (at Nordwijk, the Netherlands, in March 1994) called for strategies for drinking water and sanitation to be developed in the context of broader strategies for sustainable water resources management and environmental protection.

These approaches can only be brought about through political commitment and involvement from the highest levels of government to the smallest communities. These commitments have to be backed by substantial and immediate investments, public awareness campaigns, legislative and institutional changes, technology development, and capacity building programmes. Underlying all these must be a greater recognition of the interdependence of all peoples, and of their place in the natural world.

Based on these four guiding principles, the Conference participants envisaged the major benefits to come from implementation of the Dublin recommendations to be:

- Alleviation of poverty and disease
- Protection against natural disasters
- Security of existing water resources.
- Sustainable urban development
- Agricultural production and rural water supply
- Protecting aquatic ecosystems
- Resolving water conflicts
- Creating and sustaining the enabling environment
- The knowledge base
- Capacity building.

The proclamation seemed to be a compromise between those who wanted to treat water in the same way as other private goods, subject to allocation through competitive market pricing, and those who wanted to treat water as a basic human need that should be largely exempted from competitive market pricing and allocation.

Like many such proclamations, it has the virtue of being sufficiently vague to allow for agreement, while leaving an implied operational content over which there may be strong disagreement.

The vagueness was hijacked and utilized primarily by economists and other financially interested parties, to develop theories buttressing the idea that predominant policies should be ownership and profit based ones which can be adjusted to cater for various costs, overlooking the need to deploy additional resources for proper management for water resources.

Fresh water is a finite and vulnerable resource*;* essential to sustain life, development and the environment. Water resources provide important benefits to humankind, both commodity benefits and environmental values. For physical, social and economic reasons, water is a classic non-marketed resource. Even for commodity uses, market prices for water are seldom

available or when observable, often are subject to biases. Water-based environmental values and external effects are rarely, if ever, priced. However, because of the increasing scarcity of water for both its commodity and environmental benefits and scarcity of the resources required to develop water, economic evaluation plays an increasingly important role in public decisions on water projects, reallocation proposals and other water policies.

Many of the current changes in approaches to delivery of water and sanitation services derive from a change in thinking about the nature of water. In the past, many have viewed water as a social good. Increasingly, water is viewed as an economic good because it has value—and water development and management are steered toward uses valued more highly than their development costs. Some argue that, the surest test that water services are so valued is that users are willing to pay at least as much as the economic cost of providing them. The supply-dominated approach to providing water services never came close to passing this test. In fact, the test was considered irrelevant because the social value of extending government services was believed always to exceed economic costs, regardless of how high they were. That belief biased the approach to service delivery options and the amount of service financing considered necessary. But even those who felt pricing and the market test were irrelevant to development had to address cost and financing issues.

The current characteristic features of water supply include the following:

(i) Water is usually a location-specific resource and mostly a non-tradable output.
(ii) Markets for water may be subject to imperfection. Features related to the imperfect nature of water markets include:
    (a) Physical constraints,
    (b) The high costs of investment for certain applications,
    (c) Legal constraints,
    (d) Complex institutional structures,
    (e) The vital interests of different user groups,

(f) Limitations in the development of transferable rights to water,

(g) Cultural values and concerns of resource sustainability.

(iii) Investments are occurring in medium term (typically 10 years) phases and have a long investment life (20 to 30 years).

(iv) In light of the newly proclaimed market principles, pricing of water has rarely been efficient. Tariffs are often set below the average economic cost in developing countries. If water availability is limited, and competition for water among various water users (households, industries, agriculture) is high, the opportunity cost of water is also high. Economically, Scarcity Rent occurs in situations where the water resource is depleting. Originally, opportunity cost and depletion premiums have rarely been considered in the design of tariff structures. If the water entity does not fully recover the average cost of water, government subsidies or finance from other sources is necessary to ensure sustainable water service delivery.

(v) Water is vital for human life and, therefore, a precious commodity. Water supply generates significant benefits, yet water is still wasted on a large scale. In cities and towns of developing countries, there is a very high incidence of unaccounted-for water (UFW). The average UFW rate is 35 percent.

(vi) Economies of scale in water supply are moderate in production and transmission but may be rather low in the distribution of water.

Water development and management should be based on a participatory approach; but water services are not fully paid for in most developing countries. The water sector is usually administered by hydro-planners and engineers on various levels. In most developing countries water policies are a supply-driven, with targets to enhance the quality of life of its community. Water tariffs have been proposed by operators as quasi-rent only, but eventually fixed by political governance below its value. The change of focus from supply-driven, subsidized programs to ones in which users are provided with the services they want and are willing to pay for, have come swiftly and was not supported with phased local capacity building needed for developing

countries. Suddenly most developing countries found their water institutions redundant and decided to embark on the easiest form of service enhancement, such as facilities leases to the predominantly “foreign/local” private sector.

There is no doubt that the performances of the public sector in developing countries makes difficult to sympathies or defend, but in sincerity the solution can be more dangerous and damaging if the problems of public sector management are built in to the society's texture. Some of the well-known and interrelated ills of the public sector can be readily listed (Wade 1982; Repetto 1986):

- Rent seeking, either economically, in the form of direct bribes and corruption, or
- Socio-political in the form of empire building, high costs and excessive supplies.
- The divorce of incentives from performance, indeed sometimes almost an inverse relationship.
- Capture of public agencies and funds by politically powerful interests and their clients.
- “By the book” Administrative operations, rather than management in terms of objectives and results.

International institutions encouraged private sector participation, with hefty programs and concessions that are being tested in Africa and Latin America. Some of those models were tested in Africa's past French colonies. They were mainly a management-lease form of privatization and those of a concession nature have been converted gradually to lease contracts (Cote D'Ivoire), thus reducing risks, increasing interest and increasing rent.

To date, the world has experimented with four kinds of institutional regimes: outright public provision of water (common throughout the world and particularly developing countries), government-supported natural monopoly with regulated price (the English model), government-supported natural

monopoly with regulated rate of return (the American model), or a government-controlled franchise, lease, or concession agreement (the French model and its variants). Cowen & Cowen (1998) proposed a fifth possibility of complete privatization of water assets and unregulated natural monopoly. This scenario involves no price regulation, no rate of return regulation, no residual government ownership of assets and no surreptitious regulation!!

In most developing countries the participatory approach has rarely developed beyond stakeholder workshops, with no pre-briefing and transparent deliberation on a road map. Whether the subsequent communiqué of the Dublin Conference can really effect the direction of governments and financing institutions has been preconceived and decided. Most African countries have jumped into the privatisation program, specifically management privatisation, prior assessment or selecting a model that can suit its conditions.

Bounakrt and Cousset (1999) found from preliminary results of a sample of 16 privatised firms in Africa that privatisation resulted insignificant profitability improvements, although efficiency, as well as output, measured by real sales, decreased slightly but not significantly, while capital expenditures rose significantly in the post privatisation period.
It is also quite clear that the participatory approach involving users, planners and policy-makers at all levels, has yet to be really effective. Based on interviews with water companies most water utilities see privatisation as a gift were money can be pumped into the system, with the assumption that their careers remain unhampered, while others may see this as drive to secure their careers.

Water has an economic value in all its competing uses and should be recognized as an economic good but has yet to be recognized in most if not all the sector's peri-urban centers.

The idea that water usually *is* an economic good follows directly from the definition of economics as "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses" (Robbins, 1935).

Water meets these requirements: It serves a multiplicity of ends (ranging from drinking and bathing, through irrigation, recreation, and environmental use, to waste disposal, and thus satisfies the condition of "alternative uses."

In many cases, water is scarce in the sense that it cannot fully satisfy all its alternative users simultaneously.

From the preceding there is no doubt that raw water has a value (more pronounced in the case of scarcity) and costs are function of the value added in making it a hazardless and consumable good.

2.5 WATER SECTOR GOVERNANCE, POLICIES AND IMPLEMETATION:

For a technocrat (engineers, economists, development planners, etc.) governance is about laws, regulations, and institutions. Some believe if correct laws, regulations, and institutions are in place then, one will get good governance of the water resources regardless of what else is happening in the country, which may not be the case.

Practical experience is quite different, as in many countries the best laws, regulations, and institutional frameworks are in place, but the actual performance of the water sector is very poor.

Practical observers will note, however, that without a reasonably functioning political system it is entirely unreasonable to expect textbook laws, institutions, and regulations to function as predicted. Note that we have not

suggested that the *best, rational, or efficient* political system, but rather a *reasonable* one be sought. What is needed is a new framework within which to examine the interaction between politics, laws, regulations, institutions, civil society, and the consumer-voter.

2.5.1 Water Governance

Water governance refers to the range of political, social, economic, and administrative systems that are in place to allocate, develop and manage water resources and the delivery of water services at different levels of society.

The notion of governance, when applied to water, refers to the capability of a social system to mobilize energies in a coherent manner for the sustainable development of water resources.

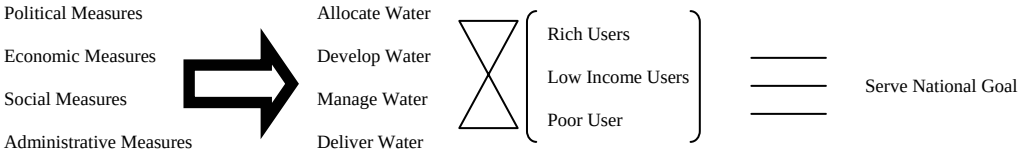


Figure 2.11 Ideal Governance Diagram

This includes the ability to design public policies; arrayed and developed in line of national goals, socially accepted by majority, have as their goal the sustainable development of water resources, and to make their implementation effective by the different actors/stakeholders involved in the process.

An adequate level of governance performance is one aspect of the development of water resources, the other aspects being technical and economic. These aspects are by no means free of overlaps, but governance points us to the political and administrative elements of solving a problem or exploiting an opportunity. Governance of water is a subset of the more general issue of the creation of physical and institutional infrastructure, and of the still

more general issue of social cooperation, which reminds us of the problems of defining who are the stakeholders, communication among stakeholders, the allocating of contributions and outputs, and the creation of institutions. Governance is a more inclusive concept than government per se; it definitely embraces the relationship between a society and its government.

2.5.2 Civil Society

Civil society can be considered to be composed of all organizations such as professional societies, labour unions, interest groups, trade groups, political parties, and other freely formed clubs and associations. While some claim it should not include Governmental organizations, but it is arguable, that they are members of the civil society of any state amongst other NGOs. Of course, special-purpose interest groups are also part of civil society. In contemplating water governance, the broadest definition of civil society should be used.

2.5.3 Main Characteristic of effective water governance:

(i) **Open**. Institutions should work in an open manner, communicating what they and the government do and the decisions taken, in a language that is accessible and understandable to the general public

(ii) **Transparent**. All policy decisions are transparent to insiders and outsiders to follow the steps taken in policy formulation, especially on financial transactions.

(iii) **Participative.** The quality, relevance and effectiveness of government policies depend on ensuring wide participation throughout the policy chain –from perception, conception, formulation to implementation. Improved participation is likely to create more confidence in the end result and in the Institutions which deliver the policies.

(iv) **Accountable**. Roles in the legislative and executive processes need clear demarcation. The “rules of the game” need to be clearly spelled out, as should the consequences of violation of the rules, and have built-in dispute resolution mechanism and enforcement to ensure that

satisfactory solutions can still be reached when seemingly irreconcilable conflicts or differences arise among the stakeholders.

(v) **Effective.** Policies must be effective and timely, delivering what is needed on the basis of clear objectives, an evaluation of future impact and, where available, of past experience. Effectiveness also depends on implementing policies in a proportionate manner and on taking decisions at the most appropriate level. Most importantly, the policies should be incentive-based. This will ensure that there is a clear social or economic gain achieved through following the policy.

(vi) **Coherent**. Policies and action must be coherent and easily understood. The need for coherence in governance is increasing: the range of tasks has grown; and so has diversity; challenges such as climate and demographic change cross the boundaries of the sectoral policies on which the government has been built; regional and local authorities are increasingly involved in water policies. Coherence requires political leadership and a strong responsibility on the part of the institutions to ensure a consistent approach within a complex system.

(vii) **Efficient.** Classical economic theory demands efficiency in terms of economic efficiency, but there are also concepts of political, social, and environmental efficiency which need to be balanced against economic efficiency.

(viii) **Communicative.** Institutions of Governance and systems need to communicate with the participants and stakeholders in very direct ways.

(ix) **Equitable.** Equity between and among the various interest groups, stakeholders, and consumer voters needs to carefully monitored throughout the process of policy development and implementation. It is essential that the penalties for malfeasance be, and are seen to be, equitably applied.

(x) **Integrative**. Water governance should enhance the effectiveness of Integrated Water Resources Management (IWRM). Institutions will have to consider all uses and users within the traditional water sector and also their interconnections with and impacts upon all other potential users and sectors.

(xi) **Sustainable.** Water governance must serve future as well as present users of water services.

(xii) **Ethical.** Water governance has to be (strongly) based on the ethical principles of the society in which it functions. This manifests itself most strongly in the issue of property rights for use, access, and ownership of water.

2.6 MODELS OF GOVERNANCE

2.6.1 The bureaucratic politics and process model.

This model is based on political-bureaucratic bargaining in a federal system. Its focus is typically the executive branch, with the elected legislature hardly in the picture.

2.6.2 The legislatorial behaviour model.

Another model concentrates on the elected legislature, with the view that to understand legislatorial behaviour is to understand that legislators are "single-minded seekers of re-election." It follows from this that the legislators' goals are to improve the welfare of their constituents in the shortest possible time frame. The realities of information processing are also important when describing congressional behaviour. With humanly limited capacities to absorb and judge, legislators are so overloaded with information that they have to be extremely selective when committing their attention.

Legislators deal with this by specializing in a particular and limited area; in other domains they take their cues from other sources (colleagues, outside groups, committee reports) that they have learned to trust.

2.7 The Law:

Without this policing, called the *law*, systems of property would never have advanced beyond appropriative behaviour backed by force.

Examples of different property rights regimes, with their associated rights and obligations, include:

(i) Open Access Property

There is no defined group of users or owners and the benefits are available to anyone. Individuals have both privilege (the ability to act without regard to the interests of others) and no right (the incapacity to affect the actions of others) with respect to use rates and maintenance of the asset. This applies particularly where the common resource is plentiful and the distributive and management issues of scarcity have not arisen.

(ii) Common Pool Property

The management group (the owners) has a right to exclude non-members and non-members have a duty to abide by the exclusion. Individual members of the management group have both rights and duties with respect to usage's rates and maintenance of the property

(iii) Private Property

Individuals have the right to undertake socially acceptable uses and a duty to refrain from socially unacceptable uses. Other (non-owners) have a duty to allow socially acceptable uses and a right to expect that only socially acceptable uses will occur.

(iv) State Property

Individuals have a duty to observe use and access rules determined by the controlling agency of the state. The agency has the right to determine these rules of access and use.

In most countries water is state property, but a typical history of water property rights follows the path starting out originally as an *open access*

property which was initially appropriated by a group and became a *common pool property* resource with ultimately the state appropriating these rights from the common pool resource ownership group to create *state property*. The state is then faced with how to deploy the resource to the national advantage. How can that be done fairly and equitably without reducing incentives for efficient use of the resource is the key to water governance at the beginning of the 21st century.

An important matter is to what extent the processes of *publicising* and *devolution* of water rights serve segments or the entire population. If the water resource is managed excessively through private markets, only those with property or income (effective demand) will have access. If it is managed by public authorities, it is still not certain that poor, isolated or socially immobilized elements will maintain access to water proportional to their numbers or their needs.

Many questions can be posed about the viability of any of the property rights regimes based upon the collectivity of the individual players and their initial resource endowments. Conceptually it should be a short step from successful collective action at the group level on common property resources (CPR) to being able to achieve consensus on public policies to govern state property at a national or state level.

Unfortunately, doing this in any society leads to *winners* and *losers*. The mechanisms to compensate the losers are quite difficult to arrive at in a pluralistic society, particularly when the losers are already disadvantaged groups, or not numerically or politically strong. This is where *Politics* enters the picture.

2.8 GOVERNANCE, CATALYSTS AND PLAUSIBLE FACTORS IN GOVERNANCE

2.8.1 Interest Groups:

When a national legislator thinks about the constituency that elected him, he or she rarely if ever sees an undifferentiated mass of individual voters. They see categories of interests. In some cases, they see only a few dominant interests. There are literally hundreds of active interest groups - environmental groups, water resources groups, professional associations, and industry associations - involved with water policy. These interest groups often have overlapping concerns and memberships. They constitute vital channels for particular members of public to participate in the federal governmental process. Pork barrel projects are the fodder for the well known "iron triangles" of legislators, bureaucrats, and active interest groups that develop in specific issue fields (the term "pork barrel" was first used to describe the exchange of benefits in successive US Rivers and Harbours Acts).

In the water area, the old idea of a “concurrent majority" (Calhoun, 1853) may be much more relevant than newer views on the interest group model. Under this older concept, it was recognized that major government policy decisions must be made with the approval of the dominant interest groups directly affected. It appears, for example in the US, for federal water quality legislation, that the environmental NGOs and lobbyists are actively encouraged to give their approval before legislation can be passed. Another approach is to carry out an *interest group* analysis of the feasibility of pursuing specific governance goals. This approach has been tested by Dinar et al., (1999) on the water sector of Pakistan with a specific focus on a new and very large drainage project which involved both hardware investments and institutional (software) reforms. They examined the likelihood that the various interest groups would be powerful enough to influence the investment and management decisions in their direction.

2.8.2 Principal-Agent Theory

One attractive way to approach making specific political analyses is to rely upon the recent findings of *Principal-Agent Theory*. Principal-agent models have been employed in many different academic fields in order to explain relationships between participants including: business, in which the principal is the boss and the agents the employees; economics in which the consumer is the principal and the producer is the agent; and in various political science sub-fields, in which members of the legislatures are the agents of their constituents, or bureaucrats are agents of the executive, or the governments of third world countries are the agents of international lending institutions, and so on.

The literature on principal-agent theory is quite extensive. Proponents claim that the theory has been successful in explaining much of the reality of the relationship between certain sets of actors. In fact, it has been said that:

> *"The application of the economics of property rights, transaction costs, and agency to political institutions is on the verge of transforming our understanding of American political institutions. There is reason to believe that the new approach will also provide valuable insights, theorems, hypotheses, and empirical findings, not only for modern American institutions but also for institutions across time and space" (Eggertsson 1990).*

2.8.3 Regime theory and Public Choice

A useful development of the interest group theory is the use of public choices about outcomes as the criterion for analysing the probable regimes under which a political regime may flourish. If we look at the distribution of both the benefits and the costs of a particular action by the state, depending upon whether the benefits (and the costs) are concentrated on a few recipients or widely disbursed throughout the economy we can predict what type of political regime is likely to rule the roost.

2.8.4 Management mode

There are many ways of managing national water resources, but one basic choice is between centralized and de-centralized management and control. The former could take the shape of river basin authorities (e.g., France), while the latter could take the form of power vested in a number of regional, urban or functional agencies and utilities doing deals with each other (e.g., California). Political traditions and power structures, and the balance between the center and the regions, will influence which model is preferred.

Another strategic choice is over the relative roles of the public and private sectors in operating the water industry. Although operation by public departments or utilities is still the norm, an increasing number of countries are privatizing operations. There is the further choice between allowing private companies full ownership of assets (as in the UK) or admitting them as concessionaires with assets remaining in public ownership (as in France).

A further decision has to be made over management *style*, which polarizes between authoritarian (e.g. irrigation technocracies in some South Asian countries) and participatory (e.g. self-management by community organizations).

2.8.5 Policy mix

Doing nothing, or postponing any changes, is always an option, and may be perfectly rational in some cases, but the costs of inaction should not be ignored. If action is to be taken, a basic choice is between supply-oriented policies and those focusing on demand management.

A further option is the use of 'command and control' measures (regulations, quotas or instructions) rather than economic instruments relying on incentives (prices, taxes, fees or markets). In practice, the choice will be over the *balance* between the two types of measure, both of which are necessary. Indeed there may be good policy imperatives for continuing subsidies in the water sector, even if they change in form and value.

Water sector is considered to cover all water consumptive uses, from both surface and sub-surface sources as well as reclaimed or recycled sources, Such as:

- irrigation,
- domestic consumption, and
- industrial use

Institutions are influenced by a variety of factors such as:

- historical precedents,
- constitutional provisions,
- political arrangements,
- demographic conditions,
- resource endowment, and
- economic development.

Institutions can be conceptualised as an entity defined interactively by three main components,

1. ***Law:***

- Legal treatment of water and related resources,
- Format of water rights,
- Provisions for conflict resolution,
- Provisions for accountability,
- Scope for private sector participation,
- Centralization tendency, and
- Degree of legal integration within water law.

2. *Policy:*

- Project selection criteria,
- Pricing and cost recovery,
- Inter-regional/sectoral water transfer,
- Private sector participation,
- User participation, and
- Linkages with other economic policies.

3. *Administration:*

- Spatial organization,
- Organizational features,
- Functional capacity,
- Pricing and finance (independent body for water pricing, & the severity of budget constraint)
- Regulatory and accountability mechanisms, and
- Information, research, and technological capabilities.

Institution performance aspects to capture the overall effectiveness or performance of:

- Overall effectiveness of water law,
- Overall effectiveness of water policy,
- Overall effectiveness of water administration, and
- Overall effectiveness of water institution, in terms of,
    - Adaptive capacity,
    - Scope for innovation,
    - Openness for change, and
    - Ability to tackle emerging problems.

The overall effectiveness water institution depends on both the individual and interactive effects of the performance levels of the three institutional components.

Water sector performance--considered to cover the performance of all water sub-sectors, is also decomposed in terms of its

- Physical,
  - Demand-supply gap,
  - Physical health of water infrastructure,
  - Conflict resolution efficiency (low-cost and less time),
  - Smoothness of water transfers across sectors/regions/users.
- Financial,
  - Investment gap (actual vs. requirecl) and
  - Financial gap (expenditure vs. cost: recovery).
- Economic,
  - Pricing gap (water prices vs. supply cost), and
  - Incentive gap (water prices vs. scarcity value of water, opportunity cost).
- Equity dimensions.
  - Equity between regions, and
  - Equity between sectors.

2.9 THE POLITICS OF WATER GOVERNANCE

In the preceding we have presented the functions, balances and structures internal to a water institution (*internal governance*), and have taken up the framing of social agreements on property rights and the structures to administer and enforce them known as the law, and then the influences coming from civil society and from the "current" government. These are all parts of the *external governance* of water. Issues can arise for water governance from economic and technical spheres as well as political. So far, we have discussed water governance in the rational-bureaucratic mode. But

usually the driving force in any area of governance is *politics*. There is an interactive relationship between politics and governance. It portrays an orderly world where politicians act as rational legislators in formulating laws for the general welfare, which in turn are implemented by the institutions that carry out the legislated water policies through rules and regulations. Governance is now not seen as a simple linear process, but as a discursive and highly complex set of interactions between laws and institutions, personal and group interests as well as the general interest. For a water enterprise, politics is certainly part of the governance domain, but not particularly attributable to any one of the partitioned areas we have sketched.

Hydro-politics can occur inside or outside a water enterprise, but the politics of water governance are primarily the play of the sociological factors (structures, institutions, even leader personalities) that lie outside the water enterprise. These reflect the more general sociology of the country, that is to say, of the water institution's setting. The enterprise's own governance is nested within these factors and the boundary between the enterprise and its environment is permeable, and social capital, which can take the form of political power, can also move in both directions across it. The politics of water governance are typically the sociological factors (structures, institutions, etc.) that lie outside the provision of water. Politics are factors outside the water sector, reflecting the more general sociology of the country involved, that is to say, of the water provider's setting. Both the water provision enterprise, with its rules, and the politics outside it, which form its setting and within which the provision enterprise is nested, can be considered parts of governance could be perhaps called, interior governance and exterior governance. Both the interior and exterior governance affect the water provision enterprise, and can make it succeed or fail. The exterior governance may be such that the provision enterprise never comes into existence, or even occurs to anyone as a solution to a population's water access problem. So in a sense, a favourable or at least neutral external environment/setting is critical for the existence/success of a water provision enterprise, in addition to the requirement that internally it meet certain conditions as well. One thing that

the external sphere can provide for the specific water enterprise is stabilization of certain things, such as property rights, broad rules and laws, so that the enterprise can build on stable expectations with regard to surrounding realities, and not to be coping with constant external flux and unreliability, which can paralyse local activity. In other words, the water provision enterprise can draw strength from its external world. Many interventions from the external governance sphere could indeed be constraining, but others could be at a given moment unhelpful but supportive, integrative and helpful in the longer run. It is clear that authority, or political capital developed entirely outside the water sector, can be brought to bear within water affairs, for the good or ill of the water enterprise.

Africa trails the world in quantity and quality of infrastructure. Poor infrastructure hampered its growth and negatively impacted to its ability to compete and develop.

- Electricity: 48% of Africa has access to electricity, ranging from 1% in Burundi to 96% in Senegal.
- Water: 42% have access to safe water where 7% in Djibouti to 100% in Mauritius
- Telecom: in the average we have 1.2line/100 people. Chad, Zambia and Mali have 0.1 lines while SA has 8.89 lines.
- Roads: in average we have 339 km/m capita – ranging from 56km/ capita in Chad to 2.27 in Liberia.

Since independence, African countries' infrastructure provisions and management have been entrusted to state owned enterprises. The management of these enterprises suffered conflicting objectives and weak/perverse incentives. It is also noted that management was usually selected based on loyalty than professionalism, and staffing, in many cases, reflects tribalism and group favouring.

In addition to the preceding, investments in these sectors were driven by political objectives, while tariff structures for services were not referenced and ignored the societies' stratifications, and were characterized by weak collection.

In response to the growing problems in traditional public enterprises, many governments in Africa attempted to improve performance of state owned enterprises. These reforms put great emphasis on commercial principles, and tried to provide a degree of insulation from the political influence, but a great challenge rests in many cases to carry on with supply driven performance while adjusting to economic sustainability.

To continue with provision of such services, billions of dollars are needed every year to maintain, other than monies need for expansion and provision of new facilities. Several countries have called on investors to invest in the sectors with promise of considerable benefits and facilities. It is a fact that infrastructure investments have been the fastest growing component of capital flows in developing countries in general increasing from $1.3 billion in 1986 to $27 billion in 1996.

A project finance structure allows infrastructure projects "with attractive cash flows and risk profiles" to secure long term private capital. Most of African markets don't fall within the brackets of the aforementioned statement coupled with the fact that usually investment in infrastructure has a complex risk profile, long pay off periods and the countries are risk sensitive. Also infrastructure investments are typically up-front with a high degree of asset specificity.

The share of African of investments in African's developing countries remains the least compared to Latin America and Far Asian markets, due to its risk profile. Financiers called on reforms to offset most of these risks but yet remain four main challenges that have to be faced:

(a) Low per capita income makes infrastructure markets in Africa unattractive and small to potential private investors, and raise concerns about affordability for low-income consumers.

(b) Lack of clear “rules of the game” as many of the governments have weak regulatory capacity and weak dispute resolution mechanisms, coupled with scarcity of skilled resources and widespread corruption. The consumers also in these markets sometimes adopt defiance-like behaviours to rules of law.

(c) Considerable non-commercial risks, as infrastructure prices in general tend to be political sensitive. This makes infrastructure investments especially vulnerable to political risks, including governments reneging on its own commitments, such as concession periods, tariff adjustment mechanisms, convertibility or transfer risks and expropriations.

(d) Assemblage of local finance: Reliance on foreign capital alone has a number of potential weaknesses including greater exposure to exchange rate and convertibility risks, coupled with greater political sensitivity for foreigners to dominate sectors that have been reviewed as strategic. Also this has hampered growth of local investors in many cases due to the underdeveloped nature of the capital markets, where short and medium term private investments are mainly financed from retained earnings, owners’ equity and borrowings. Accordingly, development of local finance markets can help assemblage of local finance which in return plays a powerful role in enhancing country’s profile.

barrier of entry to possible locally formed companies with a high control of water prices and water rights sometimes as equilateral.

Country	Date	Company	Sector	Contract Type	Lead Investor
Cote d'Ivoire	1960	SODECI	Water	15 year renewable concession	SAUR
South Africa	1992	WSSA	Water	25 year concession (Queenstown) and 10 year concession (Fort Beaufort)	Suez-Lyonnaise
Guinea	1989	SEEG	Water	Ten year lease contract	SAUR, EDF
CAR	1993	SODECA	Water Supply	15- year management leasing contract	SAUR
Mali	1994	EDM	Water and Electricity	4- year overall management contract	SAUR,EDF-HQI
Senegal	1995	Sde	Water	51% ownership	SAUR
Guinea-Bissau	1995	EAGB	Water and Electricity	Management Contract	Suez-Lyonnaise-EDF
Gabon	1997	SEEG	Water and Electricity	20 year concession	Vivendi, ESBI
South Africa	1999		Water	30 year concession Dolphin Coast	SAUR
South Africa	1999		Water	30 year service contract Nelspruit	Biwater, Nuon
Mozambique	1999	Aguas de Mocambique	Water	Concession -15 yrs (Maputo and Matola) and 5 years for the other cities	SAUR + IPE (Portugal
Kenya	1999	Nairobi	Water	10 year management contract for the water billing and revenue management	Vivendi
Chad	2000	STEE	Electricity and Water	30 year management contract	Vivendi
Cameron	2000	SNEC	Water	20 year concession and 51% stake	Suez-Lyonaise
Burkina Faso	2002		Water	5 year support and service contract	Vivendi
Niger	2001		Water	10 year renewable lease contract-provision of water services to whole country.	Vivendi

Figure 4.1: Major Privatisation in Africa
Source: PSIRU database; Campbell-White and Bhatia, *Privatisation in Africa* IBRD 1998

Accordingly, we argue that an increase of number of competitors either vertically, in terms of water supply components (collection, treatment, transportation, and distribution) and also horizontally to geographically spread. With such an approach the regulator or supervisory body should have the authority to monitor all service

CHAPTER 3:
PRIVATISATION, RISKS AND THE URBAN POOR

3.1 GENERAL:

The infrastructure required to meet the needs of twenty-first century business, particularly in Africa and the developing world will be immense. The developing world still lacks even the basic essentials of adequate transport links, clean water and energy supplies, let alone public buildings.

A project finance structure allowing water projects with attractive cash flow and risk profiles to secure long term private capital, has become increasingly pivotal in international financial allocations and a nation's budgeting process. Financing water projects has been now conditioned to two local factors: the first is to have an attractive cash flow and second an attractive risk profile. In other words it should have a low risk profile, which a lot of African urban communities lacks, let alone low-income or rural ones.

Water is the last monopoly in the utilities sector currently in the world. It has a long term investment returns and has its industrial characteristics challenges (ICC) that restrict investment in its market to certain operators and operation forms. Some of these challenges as explained earlier are:

(a) Water is expensive to convey or transport but comparatively cheap to store.
(b) Most of water industry or company is buried which makes it difficult to assess. This might result in difficulties in investment planning and posing risks for contract design and negotiation.

(c) Significant currency risk, customer pay in local/domestic currency that does not match international debt and equity financing.

(d) So far, little competition has been introduced in different components of water supply.

Above are the sector's global compelling challenges due to the nature of water and its industry, excluding locational political and socio-economic challenges pertaining to community or state in particular.

It is worth mentioning that the local project risk factor may differ from the country risk factor due to governance failure and mismanagement.

Usually, investment in physical infrastructure has a complex risk profile, long pay-off periods – which in essence can be an opportunity or an impairment to private investors – financiers have to establish links between capital flows to infrastructure/water proposed projects and the behaviour of international interest rate, domestic reforms and liberalization. The promise of steady/growing long term cash flows is the basis of the private sector's or financier's interest in financing those projects.

3.2 PRIVATISATION HISTORICAL BACKGROUND:

In recent years, the trend is to refer to state owned companies as a monopoly, as if a certain group was intended to benefit, while the truth is that dividends were always paid to the national pocket and not to international companies. The limited number of global operators coupled with rigorous short listing conditions turned the market from a state owned monopoly to aggressively operated oligopoly market where rewards to national coffers are somewhere between Zero and 35%, of its original gains.

During most of the last century, physical infrastructure was seen economically as a "public good" something to be provided and maintained by the state for the general use of the population at large and provisions were funded out of general taxation,

while water and sewage treatment have often been paid for by the users through tariff structure or fees unrelated to the resource actually made.

Physical infrastructure is increasingly more expensive and even in the developed world, many governments can no longer afford to mobilize necessary resources to provide sufficient infrastructure. Public sector utilities have been perceived by their communities as under-funded and insufficient. This has impacted on their management drive and initiative which are so important for sustainability, and in return impacted negatively on the corporate image of the public sector, where the later is seen to be largely incapable on its own, of providing and maintaining major infrastructure at acceptable levels of cost and performance. In addition, in recent years running costs of public utilities have come under increasing scrutiny, in a quest to curtail spiralling taxation for survivingship. The new "let users pay" principle evolved to minimize or curtail the shortcomings of procuring necessary recurrent capital investment. This principle is generally acceptable by governments of developing worlds than their citizens. This resulted in more resistance in developing world (Ref. Ghana and South Africa Privatisation *(McKinley, APF, CAWP))*. The resistance indication rose from the strategic importance of infrastructure to be conceded to foreign private sector, possible increase of services' rates and unemployment. In the midst of all the privatisation initiatives, it is necessary to remember that the provision and operation of infrastructure services are not entirely a commercial business, but also a social consideration that cannot be ignored.

Britain developed private finance initiatives which attempt to move public sector policies away from the purchase of public sector assets towards the purchase of private sector services.

One of the earliest and important concessions in the form of private/public partnership was recorded in Egypt; i.e. the case of the Suez Canal Project. The idea of a canal to join the Mediterranean with the red Sea evolved as early as the Pharaohs era, and was visited again in 1700+ during Bonapart's lead of the French

invasion. However, due to miss-calculation of levels the project was shelved until it was activated again by a semi-retired French diplomat, De Lesseps in 1850+. The later, who was a close friend of Said Pasha, the Turkish Viceroy, convinced him of the project and cost it at £8 million. British opposition hindered De Lesseps efforts to raise the necessary finance, and made him run back to the Said Pasha to raise the funds, topping the total at £26 million and Viceroy ended with 16/31 of the shares, after using Egyptian labour under the Corvee System. The concession period was 99 years and Said Pasha shares ended due to heavy debts in the English Coffer. The concession was recanted by President Nasser on behalf of Egyptian government triggering the Suez crisis and a tripartite war was launched against Egypt.(Smith 1999)

The first Private Investment Initiative (PII) in the water supply sector was water distribution to some parts of Paris administered by the Perrier brothers in 1782, after which the use of concessions for water supply to France, Spain, Italy, Belgium and Germany from about 1850 onward.

In the United Kingdom, the earliest initiative of private investment in infrastructure was in turnpike roads. The poor state of roads in Great Briton till early eighteen century was the prime motivation, Coupled with the fact that roads' maintenance was legally a public duty, the central government had in most cases devolved the responsibility to local communities who had neither money, resources or motivation to effectively carryout maintenance activities . The PII was mainly hindered due to the prolonged periods of governments to develop an act enabling interested parties to raise private capital. It is also worth mentioning that turnpikes roads never achieved financial success paying off their debt within the Act's term, and concessions were automatically extended virtually *ad inifinitum*; until they were abolished and the roads were once again under public control in 1880.

Under the same aforementioned act, another form of infrastructure investment evolved. It was the finance of railway mania. After the success of financing Liverpool/Manchester railway through Private Investment Initiative (PII) in early

1800s, numerous companies were floated between 1830 & 1840, many of which deliberately fraudulently offered optimistic returns. A disaster was ultimately inevitable, and it was easy to part the general public from its money thought promoters engaging in dirty tricks.

The situation regarding the regulation and administration of privately funded infrastructure schemes was by this time inadequate, and angry deluded shareholders began to clamour for more government protection. The stage appeared to be set then for the business to be brought under government control and regulation.

It is also worth mentioning that public intervention and government involvement in infrastructure was called on by investors and shareholders to curb trouble, avoid loss of interest and ensure proper books of accounts. Till 1868 there was no accountability to shareholders and transparency has been demanded since 1868.

Now the new initiative of private sector investing in infrastructure has eliminated the risks of extended project's period where concessions automatically extend the lead and the profit cap is guaranteed by tariff increases prior to any concession being given.

From the above it is noted that historically:

- It is observed that private sector peaked and then vanished quite rapidly.
- In most of the previous historical schemes, the lack of governance and public monitoring coupled with corruption practices have contributed to profit and public interests loss.
- People were driven by two packs supporting act/policy and promise of profit, which was eroded by either extended periods than planned or misestimation of project total cost.

The question now comes, what happens to new infrastructure development. They are not attractive as the risk portfolio is variant each engineering project is function of its locality, and the public is more informed, which put off the financiers and economists.

3.3 Models for Privatisation

There are many different possible arrangements for private sector participation, ranging from outright and complete privatisation through various degrees of partnership and shared control.

3.3.1 Outright privatisation

Outright privatisation, whilst originally the major model for private sector participation in infrastructure provision (see Chapter 2), is now much less common. Perhaps the most common modern examples are seen in the areas of water supply, power generation and telecommunications industries, and even here these industries are usually subject to substantial degrees of government regulation and control. None the less, from a financial standpoint, outright privatisation, with its total lack of reliance on any public sector investment, is plainly the most desirable option for those governments embracing a high degree of free market economics. The problem of course comes in ensuring that the service to consumers can be protected by an adequate regulatory framework, and that strategic public services can be maintained in times of emergency without the risk of government being subject to any form of blackmail by the service providers.

Outright privatisation is perhaps successful in industries such as telecommunications, where the service is provided at a comparatively low unit cost to a large number of consumers, and where the market can be easily opened to a large number of potential competitors (that is where a natural monopoly is unlikely to arise). The telecommunications industry is also typically characterized by rapid technological change and very high research and development costs, and a regulated

and competitive private sector is therefore often seen as the most efficient way to promote improved consumer services. The only investment required by government is the establishment of industrial regulatory and consumer protection systems, and this may easily be recovered from the private sector operators through some form of licensing system.

The commercial nature of the outright privatisation model may however limit government's freedom both to influence the way in which the industry itself develops, and also the extent to which government can ensure that services are made available to those sections of society where, although there is a social need, the demand for the service is insufficient to ensure that it ban be supplied at an economic price. A typical example in the telecommunications sector commonly concerns the provision of telecommunications facilities as a public service to outlying or remote consumers, for example rural farmers or small isolated communities, where the full cost of providing the service may be prohibitive. Whilst it is possible for government to undertake a certain amount of 'social engineering' and to provide some support for such consumers through its regulatory frameworks, such moves are likely to be actively resisted by service providers unless government provides some form of subsidy.

3.3.2. Participative Privately Financed Techniques

A wide range of techniques have been developed to allow the private sector to participate, with government, in the financing, procurement and operation of public sector utilities. The models include Corporatisation and the use of mixed companies, management contracts, leasing, pre-financing, and a variety of concession based methods using some private sector resources to provide some combination of design, construction, financing, operation, and subsequent transfer to the host government. While all of these techniques allow government to provide large and costly infrastructure without the budgetary constraints normally imposed by substantial capital expenditure, it has been argued that in overall economic terms the use of private finance in this way is more expensive over time than the use of public capital,

essentially because government is in a position to borrow money at more competitive rates of interest than the private sector.

3.3.3 Corporatisation and the use of Semi-Private Companies

(1) Publicly Owned Corporations

A number of governments have created special-purpose corporations specially to construct and operate infrastructure facilities. A wide range of options exists, ranging from companies, which are totally publicly owned, to semi-private (i.e. mixed) companies having both public and private sector shareholders.

One example of a totally publicly owned corporation is provided by the development of the French motorway network during the mid 1950s. In this case, a number of free standing concession holding companies were formed, but the whole of their equity was held by local authorities and by a public credit institution, the Caisse des Depote et Consignations (CDC). Although the French government had no direct stake in the companies it was none he less heavily involved in both the financial and technical aspects. In so far as the technical aspects were concerned the State was responsible for the initial design of the motorway, and also for the maintenance contractor. In terms of finance, loans for the construction work, guaranteed by the State, were issued through CDC. The total absence of any private sector involvement meant that the concession companies were simply a 'front' for the State, a device which enabled government to circumvent its own budget restrictions.

Other examples of publicly owned corporations which operate much more like truly private companies exist elsewhere. In Hong Kong, for example, the Mass Transit Railway Corporation (MTRC) and the Kowloon-Canton Railway Corporation (KCRC) operate in this way. Although the government of the Hong Kong Special Administrative Region retains sole ownership of both organizations and also retains the right to appoint all members of their respective boards of directors, they operate very differently from conventional government departments in that:

(a) They operate their core business as private companies, and both are governed by the provisions of the Companies Ordinance.
(b) They may, within the context of their core business, plan projects on their own based solely on financial viability.
(c) They are authorized to raise the necessary development from the capital markets.
(d) Their staff are not civil servants.

(ii) Semi-Public Companies

Others have created semi-public and public sector shareholders. In this case, the company typically operates outwardly as a commercial concern, with private sector shareholder raising their own capital funds on the open market. The company is subject to direct governmental control, and it is common for government to retain a controlling interest, either by having a minimum of 51% of the share capital or by holding a so-called 'golden share'.

A further example is the Japanese 'third sector' approach which was introduced the mid 1980s. The declared objective of this initiative was to bring together both public (the 'first sector') expertise and individual projects based companies (third sector') with a view to:

(a) 'tapping the vitality' of private sector management in order promote large scale projects with greater efficiency than might be expected from government acting on its own.
(b) stimulating additional private sector activity in ways which would benefit regional development;
(c) Developing synergy between the public and private sectors to help solve local problems.

Projects would be financed partly through the private sector and partly through government subsidy, and the project companies would be staffed by secondment

from the public and private sector partner's organizations. Special legislation was enacted and a large number of such companies were established during the late 1980s and early 1990s.

The approach does not appear to have been very successful and a number of the proposed project companies found difficulty in attracting sufficient private sector partners. In addition many companies were left in chaos, with projects which were no longer financially viable and bitter complaints from the private sector partners about their bureaucratic public sector colleagues, when the Japanese economy collapsed in the mid 1990s.

3.3.4 Management contracts

Existing services and utilities are commonly privatised through the medium of management contracts, where the private sector takes over responsibility for the operation and maintenance of some existing facility, which was previously operated by the public sector. This form of arrangement may be especially useful when the public sector has a facility which is in need of some upgrading or renovation, but does not have the necessary funds available to carry out the work. An alternative to a conventional management contract is a fixed tern concession based upon a lease, renovate, operate and transfer (LROT) contract as described below.

(i) The leasing model or build, lease, transfer (BLT)

In this model, a facility (for example a motorway) is typically designed, financed and constructed by the private sector, and is then leased back to government for some pre-determined period of time at a pre-agreed rental. Rental costs are commonly based upon the costs of construction and finance and, according to Trosa and Schreiner (1994), will usually represent about 9-10% of the investment costs. During the period of the lease legal ownership of the facility rests with the private sector partner, and at the end of the leasing period government typically has the option to either renew the lease, buy out the private sector partner for a lump sum, or to

simply walk away from the deal leaving the facility in private sector hands. Operation and maintenance of the utility during the lease period will typically be the government's responsibility and, in the case of a motorway for example, government may choose to either operate the utility effectively free of charge to the user (usually recouping the costs from general taxation or from some form of specific vehicle road tax), or to charge a toll. It may also contract out the operation and maintenance, either as part of the original contract or to a separate contractor under an operation and maintenance contract, or retain responsibility for operation and maintenance itself. Where operation and maintenance forms part of the original deal, the project may be described as build, lease, transfer, maintenance (BLTM).

This form of procurement thus effectively provides government with a way of financing large-scale infrastructure out of ongoing revenue rather than out of capital expenditure, but the primary disadvantage is that the legal ownership remains with the private sector. It is also common fur this type of project for government to contribute to the initial construction, perhaps by assembling and providing the necessary land and external utilities (e.g. drainage disposal, access roads, etc.) and/or providing assistance with initial route alignment, obtaining the necessary planning approvals, etc. With this form of arrangement the private sector partner has the advantage of knowing that the operational risks he carries are largely mitigated by the length of the lease and the frequency and amount of the periodic rent review. There remains, of course, the political risk that government might renege on the terms of the lease. The developer however carries no risk relating to the extent of usage of the facility, this being assumed by government. Risk transfer is therefore seen as minimal.

(ii) Pre-financing

The pre-financing model is similar in many respects to the leasing model, but the major difference between them is that with the pre-financing model the private sector will initially finance and construct the project, with government paying off the full cost, including the financing charges, by a series of pre-agreed annual lump sum

payments over some agreed period of time (typically around 15 years). With this model it is again usual for government to provide the land free of charge, and also to prepare initial route alignments and to obtain the necessary planning permissions. The final detailed design may be prepared by government, with tenders being invited for the financing and construction only, or the final design may be entrusted to the contractor on a design, finance and construct basis.

Tenders for the work will therefore comprise an offer to finance and construct the works to some agreed specification in exchange for a laid down series of lump sum payments over an agree time period. As in the case of the leasing model, government may either operate the facility itself, or may contract out the operation and maintenance to the private sector.

With this approach it is common for ownership of the completed facility to pass to government, and for the payments to begin immediately upon completion of the construction work, and there is therefore considerable incentive for the work to be completed in the shortest possible time. As with the leasing model, this approach has advantages for the developer in that all market risks are borne by government and the developer's risk is normally limited to cost and time over-runs on the construction contract and fluctuations in the costs of providing the necessary capital.

It was reported in 1995[6] that the German government had begun a programme of twelve major motorway contracts using this model, totalling some 151 km at an estimated cost of some DM3.89 billion.

(iii) Mixed models

A development of the leasing and pre-financing models has been used for the redevelopment of the A2 motorway between Helmstedt and Berlin in Germany (Smith 1999). On this project ownership of the scheme passed to government immediately after construction, and the annual payments from government depend upon the traffic flows. Payments are calculated based upon the number of different

types of vehicles using the road, with different fees. The road is not operated as a toll road, and the government payments are based on traffic counts. This method can therefore be seen as a precursor of the British “shadow tolling” approach incorporated into the design, build, finance and operate (DBFO) strategy, which is discussed in more detail below.

The risks for the developer and for government are thus significantly changed when using this approach. Since payments are based upon traffic flows, if traffic flows are lighter than predicted then the developer will suffer, but if traffic flows exceed expectations then government will have to pay more. The government payments are therefore much more difficult to anticipate and to plan for.

3.3.5 Concession based methods

A wide variety of techniques have been developed based upon the concept of a fixed term concession, using various combinations of private sector resources to design, construct, finance and operate facilities. Where the concession makes provision for ownership of the facility to be vested in the host government, this may occur either upon completion of the construction work or at the end of the concession period depending upon the terms of the concession agreement. Note however that, in some cases, even if legal ownership is transferred upon completion of the construction phase, the operator is frequently required to be deemed to be the owner for taxation purposes. Upon completion of the concession period the host government generally takes over responsibility for operation and maintenance of the facility. At this state the host government may, if it wishes, allow a further concession for operation and maintenance, often on a lease, renovate, operate, transfer (LROT) basis.

It is common for the concession period to include the design and construction period. As discussed earlier, concession based approaches are among the oldest form of public/private sector partnership. The terminology and acronyms used to describe concession based projects are not however always used consistently, and different projects, which apparently use the same terms, may vary significantly in the actual

contractual arrangements. On the other hand, a number of terms are virtually synonymous. The principal variants in most common use are as follows.

(i) Build, operate, transfer (BOT)

Often used as a generic term for concession based agreements where the facility is designed, financed, operated and maintained by the concession company for the period of the concession, typically between 10 and 30 years.

Under the 'standard' BOT route, the concessionaire's involvement with the project terminates at the end of the concession period, and at this point all operating rights and maintenance responsibilities revert to the host government. Legal ownership of the utility may or may not rest with the concession company. In many projects legal, ownership of the constructed facility is required to pass free of charge to the host government immediately upon completion of construction, but the concessionaire retains the right to operate the utility for the full concession period effectively as a licensee.

(ii) Build, own, operate, transfer (BOOT)

This phrase describes the earliest concession model, although the late Turkish Prime Minister, Targut Ozal, is popularly cited as originating the phrase 'Build, own, operate and transfer' in the 1980s in connection with proposals for the construction of power plants in Turkey. In this model ownership of the utility rests with the concessionaires until the end of the concession period, at which point both ownership and operating rights are transferred free of charge to the host government. Host governments often consider legal ownership of the concession by the concessionaires to be undesirable, particularly where the utility is of strategic importance, and the use of this variant is now much less popular.

(iii) Build, transfer, operate (BTO); build, transfer, service, maintain (BTSM)

Technically these terms could be applied to any project where ownership of the facility passes to the host government upon completion of the construction phase. In practice the terms tend to be used for projects where the host government takes possession of, and pays for, the completed facility once construction has ended, with the developer being responsible for maintenance and operation of the plant for the period of the concession. This approach has been used for projects such as chemical waste treatment and waste recycling plants, where very specific expertise is usually required in the design and operation, but the revenue stream is difficult to predict with any degree of accuracy. Payment for operation of the facility is often a combination of a fixed and predetermined 'availability charge' covering the fixed costs of the facility, supplemented by a further variable charge depending upon the extent of use.

(iv) Build, own, operate (BOO)

The limit of the build, own, operate approach is, of course, outright privatisation, but BOO projects are sometimes let out on a concession basis for a fixed period of time with no provision for transfer of ownership to the host government. In projects of this type the developer is responsible for design, funding, construction, operation and maintenance of the facility during the concession period, at the end of which several options might apply. Typically the project agreement might provide for one or more of the following options:

(a) Renegotiation of the original agreement for a further concession period.
(b) Negotiation of a new agreement on a renovate and operate basis.
(c) Purchase of the facility by the host government (who may then of course issue a separate lease, renovate, operate and transfer concession).
(d) Termination of the facility, in which case the developer may be responsible for decommissioning, demolition and reinstatement of the site. In this case the

project may be defined as build, own, operate, remove (BOOR). An example of a project of this type is the A$25 million Yan Yean Water Treatment Plant constructed outside Melbourne by a Transfield-North West Water joint venture, where the plant is required to be removed and the site reinstate at the end of the 25 year concession period.

(v) Lease, renovate, operate, transfer (LROT)

This approach may be used where a host government already owns a facility, which requires modernization and improvement, or which may be used as a 'follow-on' to an existing concession once it reaches the end of the concession period. In this case the private sector operator pays a rental to government and undertakes to renovate the utility to some pre-agreed standard, and in exchange is granted a concession to operate the facility for a fixed period of time and to charge a fee for the service. The private sector partner is responsible for financing and carrying out any required refurbishment work in addition to regular maintenance during the concession period.

This approach has been widely used in some parts of the world, for example for government-owned car parks and vehicular tunnels in Hong Kong, and for water and sewage treatment plants in Malaysia. It is likely that this approach may also considered by the Hong Kong government when the initial concession for the original cross-harbour tunnel expired in 1999. (Smith, 1999).

(vi) Design, build, finance, operate (DBFO)

A term coined by the UK Highways Agency to describe their concession based road schemes let out under the Private Finance Initiative. The basis of the 'Standard' DBFO contract is defined by the Highways Agency in the following terms. The private sector partner (the DBFO concessionaire) will be:

- responsible for the design, construction, maintenance (i.e. capital, routine and winter maintenance) and operation of the project road
- responsible for financing the project;
- granted a long-term right of access (probably 30 years) to the project road by the Secretary of the State for those purposes;
- paid by the Department for Delivery of the specified service in the form of payments over the life of the contract.

In addition to the free provision of any necessary land, the public sector contribution is likely to include some or all of the following, depending upon the detailed requirements of particular projects:

- A right of access to the project road without charge
- DBFO payments which are expected to include traffic related payments, usually based upon 'shadow tolls' lane closure charges and additional payments for initiatives designed to improve safety.

Significant features of the DBFO contracts are as follows:

(a) No rights of ownership are conferred on the developer; neither does the developer at any point acquire any interest in the land. The State representative remains the highway authority throughout the Contract period.
(b) The DBFO contractor is merely given a right of access to the road, and effectively a 'licence' to operate it, normally for a period of 30 years.
(c) Five years before the end of the operation period, a joint inspection will be held to identify any work, which the operator is required to carry out before the road is handed back to the Highways Agency.
(d) Payment is made on the basis of traffic flows at predetermined 'shadow tolls'. The level of the shadow tolls forms an element of the DBFO tender.
(e) Some protection will be offered in the form of increased payments in the event that the public sector partner changes the conditions under which the road

operators (e.g. if other competing roads are upgraded during the contract period thus reducing traffic flows).

(vii) Design, construct, manage, finance (DCMF); design, build, finance, operate, manage (DBFOM)

These terms are used in connection with projects let under the British Private Finance Initiative or PFI. These projects are very similar in many to build, own, operate, concessions.

3.4 EVALUATING AND ALLOCATION OF RISKS

While assessing project financing it is necessary to understand the following:

1. what is risk;
2. risk systems;
3. how to identify risk;
4. common structures to allocate risk;
5. linkage between risk and the project finance cash flows; and
6. risk tradeoffs.

An understanding of the categories of risk is necessary to tackle any project finance or to determine the best sensitivities to test the robustness of a project's cash flow projections.

3.4.1 RISK DEFINITIONS

The first step toward risk definition must be to ascertain all of the risks to which a project or a company is exposed, otherwise one will remain ignorant of the possibility of a financially crippling loss until it occurs. However, simply stating what 'risk' is can lead to debate. For example, risk could be:

1. the change of a loss;

2. the uncertainty of loss;
3. the possibility of loss;
4. uncertainty;
5. divergence of actual from expected results;
6. probability of an outcome different from the one expected;
7. possibility of the occurrence of an undesirable contingency;
8. a condition in which a possibility of a loss exists.

For the project financier, the last definition is probably the most appropriate. However, from a sponsor's point of view the definition might well include the possibility of not achieving the expected financial returns.

3.4.2 RISK CLASSIFICATION

Risk identification will be readily agreed as the all-important first step. There are six major 'branches' of risk classifications:

1. statistical;
2. modellers;
3. checklist;
4. project financing;
5. insurance; and
6. structural/jigsaw

a. Statistical

The statistical set discovered probably theory and any risk discussion soon deteriorates into a mathematical jungle. The mathematical techniques usually inadequately represent the judgements necessary in an increasingly complicated and interrelated world.

b. Modellers

The risk-modellers have turned to the computer to handle these interrelationships but soon found barriers because of 'simultaneity'. Certainly the computer has its uses to conduct various analyses (marketed as 'sensitivity' analyses), but very often one finds that this involves changing one or two variables at a time, all other things being equal. Unfortunately, in a modern and complex world, all other things do not remain equal.

c. Checklist

The checklist advocates reliance on a list of key points to audit and the risks are covered. Incredibly, for some of these, there is not even a discussion of what risk might be. This checklist approach is particularly rampant in the feasibility study business and is a major reason why less than 10% of feasibility studies presented for loan applications have provided satisfactory raw material on which to base a project financing decision.

Checklists are useful but should not be the only technique applied. Their popularity springs from overspecialisation of team members.

d. Project finance

The project finance community discovered risk classification early in its development and has generally done the best job of defining the various risk categories and the methods of analysis applied to structuring their financing documentation. The sixteen risks described by DC Gardner (2000) and hereinafter can be referenced to the lines in a project finance cash flow model.

e. Insurance

The insurance community treats risk quite differently from all of the above. Its attention is generally focused on asset loss/reinstatement and the industry is fond of

distinguishing between 'pure' and 'speculative' risk, wherein pure risk involves only the possibility of a loss. In general, pure risks are the only ones that can be insured, whereas speculative risks (where there is also the possibility of a gain) are uninsurable. But this is changing fast as insurance underwriters begin to discover that project 'speculative risk' insurance often rates a higher premium. Thus far, this new area is called 'business interruption' or 'specialty risks' insurance, which looks increasingly like project finance. In fact, these underwriters admit that they are acting as investment bankers and venture capitalists, dealing with risks the insurance industry considers uninsurable. However, a dictum of insurance is that the portfolio should comprise a relatively large number of independent (pure) risks. Otherwise claims tend to come in bunches. Besides keying off actuarial tables based on historical data, insurers – like the modellers – run foul of the overlap of risks.

f. Structural/Jigsaw

Finally, a structural/jigsaw approach has evolved from the protocols in BOO/BOT project financings. This method finds adherents among the lawyers who see the same template being used repeatedly. The theory goes that if each box on the project finance diagram is properly linked to the others with the relevant contract to documentation, then the risk allocation is complete, jigsaw style. Indeed, within each document is a highly structured allocation of risk – the party most capable of handling the risk should bear that risk – almost on a clause-by-clause basis, and almost checklist in style.

This sort of 'one for me and one for you' approach runs the danger of creating a walk away or 'sue me' atmosphere should something go wrong, rather than a constructive atmosphere should things get off track. Already legal risk is appearing in BOO/BOT transactions as the cash flow intricacies have proved beyond the legal community's ability to slot risk into this or that box.

3.4.3 RISK STRUCTURES AND ALLOCATION

The sixteen risks are as follows:

1. operating – technical;
2. operating – cost;
3. operating – management;
4. participant;
5. completion;
6. supply;
7. market;
8. infrastructure;
9. environmental;
10. political;
11. force majeure;
12. foreign exchange;
13. engineering;
14. syndication;
15. funding;
16. legal.

Any risk category that cannot be clearly linked to a cash flow line is not of much use. General phrases such as economic, commercial, business, project, construction, development, financial, or competition should be disregarded as risk descriptions and as to vague to link to cash flow. Risks can be handled in five ways:

1. controlled or shared, as in a contract;
2. financed, such as through standby loans;
3. deemed reduced, per study results;
4. avoided altogether; or
5. allocated to one party or another to cover, support, or absorb.

3.4.4 CASH FLOW AND RISK

A classification of the impact of each project risk on cash flow predictability can be broken down with the correlating impact on the cash flow.

(i) Operating risk

This is also known as production or performance risk and it has interrelated components – technical, cost and management. The ability to achieve the desired production rate economically depends on the engineering, experience and quality of staff applied to the project. These make up the operating cost lines in a cash flow projection.

(ii) Technical component

As a general rule, if:

1. known and proven technology is used,
2. the facilities are projected to remain technologically competitive, and
3. plant/project life is twice the funding life,

Then the financiers will take the technical risk. If an untried technology is incorporated into a new project, most financiers may require a warranty. Project financing is seldom applied to new technology. Even though the technical risk has been passed on to the financiers, continuing covenants will be required to ensure that the borrower applies generally accepted practices and obeys the applicable laws, including environmental regulations. (This is known as the 'prudent operator' clause.)

The financiers will have scrutinized the technical feasibility study, back-up reports and assumptions, perhaps grilling the engineering staff or consultants directly. A number of risk allocation structures are available, such as:

- Technology guarantee.
- Technology management.
- Technology insurance.
- Quality assurance.
- Fleet assurance.
- Alternative sourcing.
- Business interruption insurance.

(iii) Cost risk component

Cost risks apply to labour and materials inputs, productivity and operating expenses (opex), including the effect of inflation. Most cash flows will show 7 – 10 key items of costs with the remaining cost categories usually amounting to only 5-10% of opex.

This cost risk component is sometimes partly absorbed by the financiers by means of an economic test. However, the size of a project financing will depend on the scope of the economic test, if any. The selection of the stream of proceeds will influence the size of a production loan. For example, if gross proceeds are dedicated to loan repayment (common in US oil project financing) then the sponsor takes the operating cost and the tax risk.

One way to evaluate cost risk in the absence of adequate sales contract coverage (market risk) is to examine the position of the project on the 'cost curve' relative to all the other producers of the given product or its direct competitors. (Cost curve analysis has not performed too well in factoring in dramatic currency changes.) This is regularly carried out on a formal basis for operating and total costs for the resources and power sectors. As a general rule, a project in the lower half or lower

third of the cost curve will be readily able to pass the cost risk to the financiers. Risk allocation structures for the cost component of operating risk are as follows:

- Sales contract.
- Cost guarantee.
- Cost waivers (such as taxes or levies)
- Economic test.

(iv) Management risk component

The experience of the management in efficiently applying the given technology and controlling opex is crucial when considering the projected operating performance of a project. The availability of a sufficiently trained workforce may also need close examination in some locations. The financiers may seek an employment contract or 'key-man' insurance to ensure the continued involvement of the sponsor and of strategic individuals. Besides high skills and a proven track record, financiers may seek comfort from:

- Management agreements.
- Key-man insurance.
- Labour contracts.
- Training agreements.

It is difficult to define the dividing line separating these three overlapping components of operating risk, but all are generally under the control of the sponsors and are easier to absorb if the sponsors have a successful history of building and operating similar projects.

(v) Participation risk

This is also known as credit or sponsor risk. The stature of the other companies in the project may have an impact on the project financing, especially if other

participants are weak financially or technically. If there is a weak or inexperienced participant in a joint venture, the lenders may require cross-guarantees.

It is very important to study the company's charter or the joint venture agreement (JVA) because its structure may seriously inhibit project financing. In general, assignment of joint venture's unencumbered interests should be possible without consent for the purposes of financing. The cancellation, abandonment and force majeure clauses may be crucial to the project finance document. Close scrutiny of the JVA will concentrate on provisions for forfeiture, dilution of interest and compulsory contribution by the other joint ventures.

A financially strong sponsor will choose to finance a project less often because it can access other funding sources on a corporation basis, at a lower cost and with less hassle compared with documenting the complex risk-sharing mechanisms and supports in a project financing. Some large companies feel that they cannot "take a walk" from a project that is project financed because it has their name associated with it; some financiers and ratings agencies depend on these companies feeling that way and consequently the credit is essentially the corporation and not just the project.

The main risk allocation structures to handle participant risk in project financing are as follows:

- Joint venture agreement.
- Contingent financial support.
- Financial ratios.
- Off-balance sheet.
- Cross-collaboration and cross-default clauses.

(vi) Completion risk

This is also called construction, development or cost-overrun risk. Broadly speaking, a lender expects the loan proceeds to be spent on building a project which is on time, at budget, and is capable of producing sufficient cash flow after completion of construction and commissioning to repay the loan comfortably. The completion risk is usually not taken by financiers in project lending, and other financial support is necessary prior to completion.

The usual format is to structure an objective completion test which, when satisfied, signals that the pre-completion supports and undertakings are released and the project has commenced its limited-recourse status. This project finance completion is used by the construction contractor in standard turn-key contracts.

There are two main types of completion tests. One calls for the construction to be finished by a certain date and the loan is immediately due if completion has not occurred by that fixed date. A more common test is a performance completion test which might have all or some of the following types of components:

1. Continuous operations for “A” consecutive months;
2. A specified percentage (say 90%) of designed production or throughput achieved and delivered
3. Acceptable plant recoveries, availability, performance, efficiencies;
4. On specification product (s) or output (s); and
5. Achieve a defined operating cost per unit.

Completion tests are becoming more complex as project financiers become more experienced in sizing up acceptable levels of risk and as sponsors realize the possibilities of risk shedding while limiting the impact on their balance sheets. Additional completion test categories now seen include:

1. Sales completion test;
2. Reserve life greater than “B” years (if a resources development); supply tail;
3. Present values of cash flows greater than (150%) of loan outstanding;

4. Financial covenants on working capital, debt, equity and net worth are satisfied; and
5. Minimum product quality/quantity outcomes/efficiencies.

The implication of a sponsor accepting the completion risk is that cost overruns must be met by the sponsor and, in the case of completion not being attained for certain, or not achieving a project financing at all and the loan remains a corporate credit. In most project financing, this is certain to be the risk the financiers do not (or hate to) take. Numerous devices have been structured to package this risk more tolerably. There are at least nine major varieties of risk allocation for completion:

- Completion guarantee.
- Deficiency/shortfall agreement.
- Completion undertaking.
- Overrun undertaking.
- Standby facility.
- Equity and debt subscription.
- Default agreement.
- DIS insurance.
- Turn-key contract.

(Vii) Supply risk

This may also be known as the reservoir or reserve risk in resources financings, and as traffic or throughput risk for infrastructure projects.

The inputs to the project need to be capable of being forecasted and incorporated into the cash flow projections. For a BOO infrastructure project, this may be the traffic willing to pay the toll. Traffic studies are treacherous tools from which to build cash flows.

The estimation of reserves has because a key element in banks' evaluation of resources project financing. The usual rule of thumb for mining is that a proven reserve life needs to be more than twice the loan life, and for petroleum 150% of the loan life. One of the difficulties here is the definition of what is "proven" and producible or of a lesser reserve category and, because of this, an independent reserve report is usually required.

The link of the supply to the production plan is especially important for processing. If supply is believed to be insufficient, the financiers may ask for a warranty. The following risk allocation techniques can be used:

- Traffic/through put study.
- Supply undertaking.
- Supply additions
- Depletion protection.
- Collateral.
- Reserve weighting.
- Reserve insurance.

(viii) Market risk

This is sometimes called sales or price risk and is best defined as the gross revenue line in the cash flow. It is quantity times price.

Market risk occurs, for example:

- when the sales price falls;
- when market share drops (perhaps due to a shift in freight rates or due to a new entry by a lower-cost competitor);
- when demand for a project ceases; or
- when sales are lost due to deteriorating quality of the project's output.

In certain circumstances, the risk arises when sales are cancelable after a period of below-par deliveries. This is one of the most critical areas of risk absorption by financiers.

The best coverage of market risk comes from long-term offtake contracts extending beyond the end of the loan life, although sales contracts are not often feasible or desirable for certain infrastructure or commodities. These contracts should be with a reliable consumer, adequately cover cost risk and escalation and, preferably, have floor prices. As a rule, contracts with three-year price re-openers will only be regarded as three-year contracts even though the deal is for a 'volume' or 'evergreen' contract. Contracts will be evaluated with the minimum tonnage option and after discounting for other delivery conditions.

Special techniques have been developed to handle shorter-term sales contracts, although it would be preferable for some outputs to be sold under a longer-term contract to minimally cover debt. The competitive position of a specific commodity relative to other product substitutes in the market is examined in detail and a technical link with the consumer is deemed highly desirable. The availability of alternative markets (e.g. the sale of coking coal as steam coal) is regarded as a positive contribution to minimizing market risk.

Sometimes a sales completion test will be required as well as the performance completion test before the financiers assume the market risk. As a general rule of thumb, the financiers aim for the present value of the sales proceeds net of operating costs to be at least 1.5 times the amount of loan outstanding (although for a power project, 1.3 to 1.4 is the target). Where the sales contract are very short, sales completion is sometimes written as an ongoing obligation.

This key risk in project financing is the most difficult to cover and usually has the weakest support overall within the project's collection of risks. Supports and risk allocations applicable here include:

- Sales contracts.
- Merchant financing.
- Consumer financing
- Buy-back clause.
- Advanced sales.
- Deficiency agreements.
- Through Agreement:

(ix) Infrastructure Risk

This is also called transportation risk. Infrastructure (other than that being developed in an infrastructure project itself) is a very important component of many projects, and financiers will need to be assured that the chosen infrastructure will remain technologically and economically competitive, especially in comparison with other existing or potential production centres.

The materials handling costs required to deliver or export the production can sometimes equal or exceed the project's operating and capital costs. Moreover, port capacity may be the limiting factor in remote projects.

If the sales price is on an FOB basis, the ability to pass through transportation costs in any sales arrangements means that the buyer absorbs this risk. In some locations, the government builds and operates the rail and port, but one must be careful that the operator is not 'taxed' through higher freight rates or user rates. In general, the financiers will wish to review closely the transportation studies and perhaps to inspect the existing facilities or the proposed sites.

Independent certification will assist the financier's absorption of this risk component. The types of risk allocations applicable here include the following:

- FOB Sales Contracts:
- Pooled Infrastructure Agreements:
- Government Commitments:

(x) Environmental Risk

This risk must be addressed for projects in all parts of the world. A project financing cannot proceed without favourable assurance of environmental compliance from the local regulatory bodies with which the sponsors must deal. This risk category can also arise due to location of the project – e.g. near towns or highways or in proximity to wilderness, heritage, negative reserve or scenic areas. This is not simply a sub-set of political risk but a distinct risk aspect of project financing today. Some multilateral agencies (MLAs) will not even allow a project finance application in the door until it first gets an environmental tick.

Supports and risk allocation structures here centre on:

- Rehabilitation Guarantee:
- Pollution Control Bonds:
- Environmental Movement:
- Environmental Insurance:
- Rehabilitation Waiver:
- Pollution Pool:
- Environmental Warranty:
- Political Risk

This is actually a mix of risk categories, for example, expropriation, currency inconvertibility and tax risks.

Each financier and rating agency has a continuing review process of country risk based on an evaluation of the political and economic outlook. Many funding sources are willing to take some degree of the political risk for certain countries. Loans to sovereign borrowers in the country establish the market "prices" for the country itself.

In the event financiers decide they cannot absorb political risk, then some of the risks may be covered by government-sponsored export credit agencies (ECAs); or through insurance from groups such as Lloyds of London or private insurance which is now being underwritten by large insurance groups. If the project financing parallels an MLA or ECA financing, then some (but not complete) comfort may be derived from the political leverage from these government agencies.

The risk of currency inconvertibility is usually due to arbitrary government action caused by serious balance of payments problems, which should have been identified in the country risk analysis process. A mechanism will usually be set up to accrue the local currency in anticipation that remittance will be permitted at a future date. Debt: equity swaps can also remobilize this inconvertible pool of funds.

The more difficult areas that must be judged on a case-by-case basis concern the following:

(a) terrorists
(b) war and insurrection;
(c) tax and ownership changes (creeping expropriation)
(d) borrowing restraints (e.g. variable deposit requirements);
(e) non-government political activists (unions, environmentalists, lawyers)
(f) bureaucratic/approvals/regulatory risks.

The development agreement with the government can be subject to direct change or cancellation, or to the exercise of other government powers. It is not uncommon for

project lenders to seek a direct guarantee from the government not to subvert the development agreement.

In the case of terrorism or war and insurrection, the financiers may, for example, share an individual risk component after a pre-agreed level of damage has been done. Guarantee mechanisms would otherwise be required in certain countries.

A large project is a wide-open target for creeping expropriation through a noose of continually changing tax or royalty regimes. Financiers will try to anticipate the impact of tax changes on the ability of the project to stand on its own and may not accept more than a defined portion of this risk.

The more difficult aspect of political risk assessment is the impact of non-governmental political activists. It is quite common to see additional repayment time made available to a project where strikes are expected. In fact, force majeure coverage may be very important in such an instance.

Political risk is one that the banks in their wisdom used to feel most equipped to handle – that is until the LDC debt mountain started to cast a shadow over bank loan portfolios everywhere. This is a prime motivation to invoke project financing because it brings a wider constituency to the forefront of a government's thinking on a project. Some of the main structures and risk allocation methods are listed below:

- Development Agreement:
- Political Risk Insurance (PRI):.
- War and Insurrection Residual:
- Tax Indemnification:
- Offshore Proceeds Account:
- Currency Inconvertibility Agreements
- Co-financing:
- Local National Participation:

(xi) Force Majeure Risk

There are four types of force majeure risks:

(a) Acts of man (strikes);
(b) Acts of nature (flood, earthquake);
(c) Acts of government (embargo);
(d) Impersonal acts (market freezes).

Obviously the acts of government category overlaps with political risk. Such acts should not be included in the force majeure definition where the government is a participant to a project or a contract.

Many force majeure events coincide with the other risk categories such as technical risk (water inflow) or political risk (government regulations), but lenders can accept some of the temporary force majeure risk through project financing. The expectation of such risk will lead to a requirement for a flexible transaction.

Business interruption insurance is becoming more prevalent and is another way, favourably viewed by the financiers in a project financing, to cover force majeure risk. However, it is not yet available for amounts exceeding about $500 million. This is one of the risks that seems to affect almost every project at some stage of its development or operation. Supports can come from:

- Insurance.
- Deferral.

(xii) Foreign Exchange Risk

Besides currency inconvertibility (a political risk), foreign exchange exposure can occur when project revenues differ from the currency of the project financing.

Lenders usually avoid foreign exchange risk in project financing. The best hedge is to match the loan currency to the (underlying) currency in which the price of the product/tariff/toll is set. A further step is to match equipment purchases to the sales revenue currency. However, if a large loan is required, the available loan currencies may be limited. Supports here, therefore, are:

- Hedging:
- Swaps:
- Barter:

(xiii) Engineering Risk

Also known as design risk, this poorly understood area is often counted as part of completion risk because engineering and design flaws become quickly noticeable as the project encounters difficulty in construction or start-up. The risk here revolves around the poor quality of the engineering/design work, which can also have a crippling impact on the cash flow stream well after the (excess) capital has been spent pre-completion to counter the hardware problem.

This risk can arise from poor professional advice or the selection of an inappropriate or inexperienced firm for the technology or location involved. Flaws in capital budgeting or poor design estimates are only covered by outsiders under:

- Insurance:
- Independent Certification:

(xiv) Syndication Risk

This may also be called financing or underwriting risk. Once the terms and conditions of the project financing have been negotiated and documented, the actual funding has some risks which should be understood. Of course, if the loan is only given by one financier then this risk category does not apply. However, by a virtue of

the usually large amounts involved, most projects involve a layering of financing or a syndicate which has its own conventions. The arranger or lead managers (one to three banks) carry the negotiating responsibility with the borrower and the participating banks. The agent bank (usually one of the lead managers) arranges the documentation and loan disbursements. The lead managers arrange a syndicate of banks, first choosing the managers (two to six banks) and the co-managers (three to ten banks) the ranking of which depends on the amounts of the loan; and finally there are the participating banks. The capital markets follow a similar syndication pattern.

The types of bank syndicates vary from fully underwritten or club deals among the lead managers to a best-efforts commitment to raise money over and above the amount committed by the lead managers. A fully underwritten financing requires a slightly higher interest margin than a best-efforts financing. If it is decided to arrange a project financing in a number of sequential borrowings, then the borrower takes the risk that the interest margin may increase.

Syndication risk arises when a banking syndicate is to be arranged. It is covered by:

- Underwriting Agreement:
- Broad Syndication:

(xv) Funding Risk

Most bank project financing is funded on a floating rate basis due to the necessity for flexibility in drawdowns and repayment. If interest rates escalate uncontrollably, the available cash flow can be correspondingly reduced and may not be sufficient to repay the principal when due. Financiers usually accept this risk indirectly in project financing.

The longer-term fixed rate capital markets have been aggressively chasing long-term infrastructure and power projects. Co-financing from government or quasi-

government entities such as ECAs or the World Bank may help to introduce fixed rate funding as well as longer maturities. The risk that interest rates will get out of hand is difficult to cover through supports and guarantees, although some techniques can be applied:

- Interest Make-Up Agreement:
- Interest Protection Agreement:
- Hedging:
- Swaps
- Alternate Funding:
- Supplier Credits:
- Leasing

(xvi) Legal Risk

The burden of legal documentation (which in the end apportions the risks among the lenders, insurers, governments, buyer and sponsors) usually rests on the financiers and its advisers. There is some risk that professional advisers will create risks in the document which can affect the tax position, tenure, security, enforcement and other attributes so heavily negotiated in the risk allocation process embodied in the project financing in the first place. Second opinions, judgment and experienced staff and advisers are perhaps the only way to mitigate this final risk category. The risk of professional advisers creating unworkable, faulty or unenforceable documentary structures is difficult to mitigate overtly, but some supports are available such as:

- Title Insurance:
- Legal Opinions:

Conclusion

A full understanding of who takes what risk and the general rules applied by project financiers can result in remarkably good project finance agreements without too

much difficulty. An early dialogue with the financiers will serve to validate the sponsor's expectations of risk sharing in a project financing. A firm understanding of these objectives should be established, perhaps with the assistance of a financial adviser.

Matching these objectives to the structures in project financing is heavily driven by the specific risk to be covered and the balance sheet and tax objectives of the sponsor(s). The large number of supports described above should not become a checklist. Project financing requires sophisticated judgments to arrive at the tradeoff in these short-term budgetary advantages. Some of these techniques may, in some countries, pose particular problems regarding law and taxation, and governments may need to give special consideration to this issue on case-by-case basis.

3.7 FINANCING WATER PROJECTS

With the emergence of the public sector as the custodian of the assets providers of service and the guardian of public interest, the private finance has been directed to other channels of investments that have mid to short-term returns, easy to comprehend, administer and predict until the Dublin statement emerged and new set of rules was put forward for implementation in the sector. Primarily driven by public pressures to reduce the continuously mounting state taxes coupled with the sporadic increase of infrastructure cost and the reduced efficiency of operators, governments followed advices to sell their public assets or entrust them to private operators users to use capability to ensure a sustainable service.

The promise of steady, if not growing long term future cash flows is the basis of the private sector's interest in financing these ventures, however the non-commercial risks that characterized the sector beyond the capabilities of the financier.

3.8 SECTOR CHALLENGES AND RISKS IN SUB-SAHARAN AFRICA

There is no question that the political and economic instability, low per capita incomes and often challenging geographic condition have significantly constrained the development of Africa's infrastructure in general. At the same time, investments made in the water sector have often been squandered through policies that gave prominence to short-term political and other objectives in some countries like Nigeria 44% of manufacture in 1988 relied on their own private water supply system and boreholes this figures are increasing. The water vendors have contributed to supplying Sub-Saharan Africa with 40 – 90% of total households The low income consumers relief from state owned utilities often comes from local informal sector providers, claiming in some instances more than 30% of household income.

It is a fact that rewards in any investment should commensurate the risks, while infrastructure and water sector finance faces four difficult challenges in Africa:

- Small Markets, Affordability and Payment Risks: From a commercial perspective the size of a market depends on its ability or willingness to pay and the number of its potential consumers. Assessing market size requires an assessment of past and future demand and the creditworthiness of the customer. This type of information and its availability is scarce in most Sub-Saharan Africa. More so, demand for services provided on a full cost recovery basis can be harder to assess in countries with a long history of heavily subsidized supply and other poor record keeping on basic commercial information of the institution. In addition, low economic growth and low per capita income raise questions over the potential customer base of the service.

  Affordability of water infrastructure can be viewed from two perspectives:

  (a) Potential private investor where it affects market size and hence commercial opportunities; and

(b) From social policy perspective especially access to service for the poor.

- In low income countries of Sub-Saharan Africa, concerns over cost recovery tariffs is expressed, coupled with the lack of a proper cost subsidizing system. It is worth mentioning that interchanging relationship exists between affordability and the water institutions efficiency. Low per capita income and low economic growth are small and unattractive to private investors. In addition, a long tradition of non-payment by private and public sector – such as in case of Nigeria, is a considerable risk for investors.

- Many Sub-Saharan African governments have weak legal and regulatory capacities. Most of them remain under-developed, faced with defiance like behaviour to rule of law, suffering from scarcity of skilled resources and widespread corruption.

Infrastructure prices in general, and water services prices in particular tend to be politically sensitive. This makes infrastructure investments especially vulnerable to political risks, including the risk of the government reneging on its commitments, such as concession periods, tariffs, etc. Convertibility or transfer risk and expropriation

Reliance on foreign capital alone has a number of potential weaknesses, including greater exposure to exchange rate and convertability risks, coupled with greater political sensitivity for foreigners dominating sectors that have been viewed as strategic.

In Addition, most of the countries of Africa suffers from under-developed local capital markets which shuns local private investors, as short to medium term private investments are to be financed from retained earnings, owners equity and/or foreign borrowings.

3.9 NATURE OF THE URBAN POOR OF AFRICA. (NATURE OF MARKETS)

In sub-Saharan Africa, 71.9% of urban residents live in slums, in contrast to an average of 43% for developing regions. This is being exacerbated by conflict and the lack of property rights for HIV/AIDS widows.

Africa is the only continent in the world to have grown poorer in the past 25 years. Growth National Income per capita has fallen because population growth rates have outstripped economic growth. Africa's population has doubled in the past thirty years, and 40-50% of the people in Africa are under 15 years old.

Slow growth in sub-Saharan Africa **has meant increases in both the proportion and number of the income poor in the 1990s, leaving it as the region with the largest proportion of people living below $1 a day (49%).** If performance does not improve, on current trends, the number of poor would rise from 315 million in 1999 to 404 million people by 2015 and23 countries would also not meet any of the Millennium Development Goals (MDGs) by 2015.

Poverty is not just about incomes. For people in Africa a multidimensional understanding of poverty fits more closely with their reality. For example, lack of physical, human and social assets, lack of savings and credit are seen as important as income. But **fundamental to poverty is lack of power**. Power relations motivate the institutions that mediate access to infrastructure, ICT, health and education. Patrons influence the prioritisation processes and the distribution systems. Addressing poverty is inherently a political rather than technical reform process.

3.9.1 Definition of Poverty:

Poverty can be assessed in the light of two analytical approaches (that is, examining poverty in terms of its multiple dimensions, and examining poverty with reference to vulnerability and asset ownership) which in fact complement each other.

Poverty is a deprivation of essential assets and opportunities to which every human is entitled. Everyone should have access to basic education and primary health services. Poor households have the right to sustain themselves by their labor and be reasonably rewarded, as well as having some protection from external shocks. Beyond income and basic services, individuals and societies are also poor—and tend to remain so—if they are not empowered to participate in making the decisions that shape their lives. Poverty is thus better measured in terms of basic education; health care; nutrition; and sanitation; as well as income, employment, and wages. Such measures must also serve as a proxy for other important intangibles such as feelings of powerlessness and lack of freedom to participate. In practice, the most broadly used standard for measuring poverty will continue to be the adequate consumption of food and other essentials. This yardstick (the poverty line) varies from country to country, depending on income and cultural values. (ADB 2000)

Aluko (1975) refers to poverty as a lack of command over basic consumption needs, which mean, in other words, that there is an inadequate level of consumption giving rise to insufficient food, clothing and/or shelter, and moreover the lack of certain capacities, such as being able to participate with dignity in society.

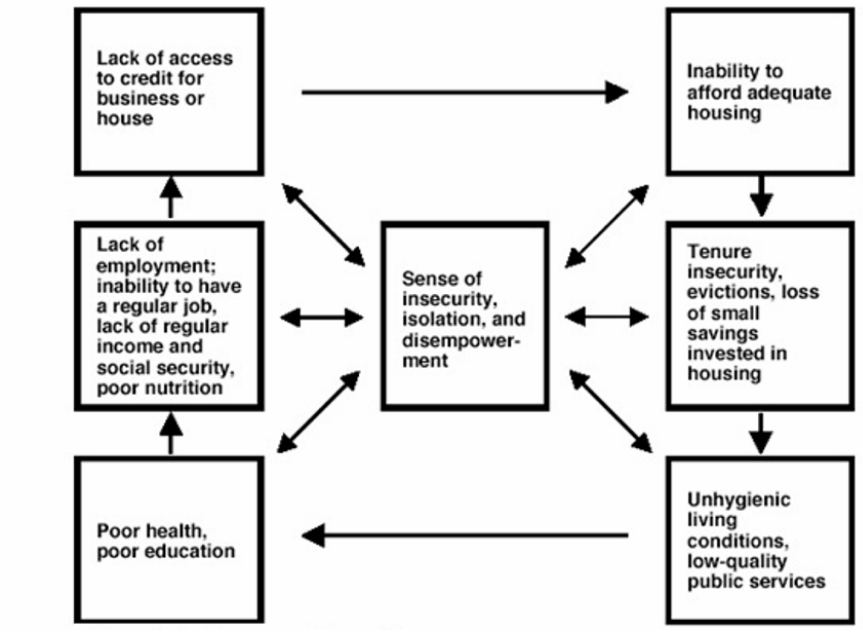


Figure 3.1 Cumulative Impacts of Urban Poverty
Source : World Bank Source Book, Section 16, September 2002

Poverty comes along the following 5 facets and with impacts on planning services for Urban Poor Communities, and their water and sanitation access level.

(a) Income

- Dependence on cash for purchases of essential goods and services
- Employment insecurity/casual work
- Unskilled wage labor/lack of qualifications for well-paid jobs
- Inability to hold a job due to bad health
- Lack of access to job opportunities (urban poor often have to trade off between the distance to a job and the cost of housing)

(b) Health

- Overcrowded and unhygienic living conditions
- When housing and industrial functions are juxtaposed in cities, residential environments become prone to industrial and traffic pollution
- The poor in cities settle on marginal lands prone to environmental hazards such as landslides and floods
- Exposure to diseases due to poor quality air and water and lack of sanitation
- Injury and deaths arising from traffic
- Industrial occupational risks (for example, unsafe working conditions, especially for those in informal-sector jobs)

(c) Security

(i) Tenure insecurity

- Land and housing in authorized areas are not affordable, so the poor typically build or rent on public or private property.
- Houses lack proper construction and tend to be in unsafe areas prone to natural hazards

(ii) Personal insecurity

- Drug/alcohol abuse and domestic violence
- Family breakdown and reduced support for children
- Social diversity and visible income inequality in cities increase tensions and may provide the temptation to commit crime

(d) Empowerment

- Illegitimacy of residence and work
- Isolation of communities that are disconnected from jobs and services
- Insufficient channels of information for obtaining jobs, learning of legal rights to services, and so forth
- Not having the rights and responsibilities of citizens

(e) Education

- Constrained access to education due to insufficient school capacity in rapidly growing cities
- Inability to afford school expenses
- Personal safety/security risks deterring
- School attendance

3.9.2 States, markets and poverty

In the 1980s there were strong reactions against state involvement in development policies and processes. It was widely seen as rent-creating, price-distorting, protectionist, inherently corrupt, and destructive of enterprise - and as preventing the state, with its limited resources, from providing the privately under-supplied goods (roads, education, health, etc.) that comprised its potentially useful contribution to development. Much state intervention was also deemed to harm the poor directly, by turning the terms of trade against poor producers of tradables, and

by creating discretionary access to inputs, subsidies, licenses and credit. These, even if labelled 'for the poor", often went to the wealthy - partly as rents, shared between powerful bureaucrats and their private clients. A smaller state would - it was claimed - accelerate growth and help the poor.

Some aspects of this "neo-liberal" position are better developed than others. The policies it led, entailed a partial removal of distortions, implying ambiguous effects on efficiency [Lipsey and Lancaster (1956)]. Evidence that the new (less-distorted) policy set would do what is promised has often been either lacking or unconvincing. And, while the wasteful rent-seeking behaviour of elites was emphasized, the power structures which created those elites were typically ignored. This last point may well be the most important. Shifting the boundaries between state and market may matter little to the poor while the balance of power is unaltered. Suppose that the poor are rural, dispersed and weak, but that "the state" is induced to desist from turning the terms of trade against the rural sector. On its own this is likely to help the poor. But, if the power-structure is unaltered, such a change will presumably be offset, due to the continuing power of non-poor groups. Hence the state will be pressured to make concessions to the non-poor,

3.9.3 The Institutions and the poor

While most poor people in Egypt define themselves as being excluded from the decision making process, seeing it as a privilege that they do not enjoy. Jamaican poor people say, “We want to have more influence over government.” (VOIP, WB 2000)

Institution	Criteria							
	Responsiveness	*Trust*	*Participation*	*Accountability*	*Unity/conflict resolution*	*Respect*	*Honesty and fairness*	*Caring, loving, listening*
1 Municipalities and local government	—	—	—	—	—	—	—	—
2 Schools	—	—	—	—	—	—	—	—
3 Health services	—	—	—	—	—	—	—	—
4 Police	—	—	—	—	—	—	—	—
5 Politicians	—	—	—	—	—	—	—	—
6 Banks	—	—	—	—		—	—	—
7 Private enterprise and traders		—	—	—	—	—	—	—
8 Shops and moneylenders	+	+	—	—			—	—
9 Service delivery NGOs	—	+	—	—				
10 Emergency NGOs	+	+		—		+		+
11 Religious organizations	+	+	—	—	—	+	+	+
12 Community-based organizations	+	+	+	+	+	+	+	+
13 Local leaders	+	+		+	+	+		+
14 Kin and family	+	+		+				+

A positive rating (+) implies that the majority of responses were positive, and a negative rating (—) means that the majority of responses were negative. Blanks imply either that the criterion was not applicable or that there were insufficient data.

Figure 3.2 how institutions fare on a range of evaluation Criteria
Source: Voice of Poor, WB, 2000

Since values are embedded in cultural contexts, what people value the most varies. The qualities many poor people value in institutional character are trust, participation, unity, ability to resolve conflicts, caring, compassion, respect, listening, honesty, fairness, understanding, hardworking behaviour, timeliness, responsive support, access, and contact with the institution. By these criteria, most

state institutions score poorly. NGOs and religious organizations are more trusted than state institutions, but they do not rate well in accountability or in engaging poor people in decision making. Religious organizations receive high praise for being caring and supportive, but they are faulted for sowing seeds of disunity in communities. Shops and moneylenders are trusted, but not loved. Most institutions, except poor people's own informal networks of family and kin, are not rated positively for participation in decision making or accountability. Since institutional character determines whether poor people will become engaged with an institution, design and redesign of institutions for effective partnerships with poor people must reflect the values and behaviours most cherished by poor people.

3.9.4 Governance and Poverty

The quality of governance is critical to poverty reduction. Good governance facilitates participatory, pro-poor policies as well as sound macroeconomic management.

Since effective and efficient delivery of basic services by the public sector matters most to the poor, weak governance hurts them disproportionately. Public sector inefficiency, corruption, and waste leave insufficient resources to support the requisite level and quality of public services and targeted antipoverty programs. However, denial of basic services to the poor is not just a matter of lack of investment. Often, it is the result of:

(i) institutional structures that lack accountability,
(ii) domination by local elites,
(iii) widespread corruption,
(iv) culturally determined inequality, and
(v) lack of participation by the poor.

Where such problems exist, systemic changes are needed to move from poor governance to government which is accountable to the poor. Such changes are

difficult to bring about, since existing arrangements that exclude the poor reflect prevailing economic and power inequalities. Yet unless these issues of inequality are tackled, it will be difficult to raise the living standards of the poor.

Poverty	Governance
Empowering the Poor	- Rules for seeking and holding Public Office - Oversight by Political Principals (Parliament etc)
Improving Coverage, Efficiency and Sustainability of basic services	- Adequate predictable resources for sectors, local authorities - Demarcation of responsibilities for delivery - Capable and motivated Public Servants - Accountability downwards to the local level - Flexible delivery - Development of Local Capacity
Increasing Access to Markets	- Legal and Regulatory framework - Methods for reducing exclusion from the market - Demarcation of responsibilities and budget procedures for infrastructure support
Providing security: • **From Economic Shocks** • **From Corruption, Crime and Violence**	- Rules for sound economic management - Safeguards for economic vulnerability - Enforcement mechanisms - Efficient courts with competent judiciary and legal personnel

Figure 3.3 Linkage between poverty reduction and governance
Source : Ensuring Good Governance for Poverty Reduction, June 2002,
(Viet Nam's Poverty Reduction Task Force)

The following questions are important in the water and sanitation context:

- Where do the poor live and work?
- What percentage of households consume less water than the national or minimum standards.
- Recommended by the World Health Organization? What is their income and location?
- Which households have members suffering from a high incidence of diarrhea?

- How do poor households spend their income? What are their expenditures on water, hygiene, education, and health (absolute and relative to income)?
- What percentages of households have access to and use a latrine?

3.10 UNDERSTANDING AND LOCALIZING PROVISION CONSTRAINTS

Demand assessments and a constraint analysis would consider both the obstacles recognized by the poor and other limiting factors that may indirectly influence household access.

In a general sense, people have inadequate water and sanitation because they are poor and lack the income to purchase the services they want. However, the poor often pay more for their access than do the better-off households, both in absolute terms and relative to their income.

Poverty alleviation programs seek to improve the income of the poor and thus their purchasing power. Pro-poor water and sanitation programs seek to improve access to services through policies or investments that reduce costs. It should a pre-requisite to any water and sanitation provision.
The constraints on accessing water and sanitation services are likely to differ among rural areas, small towns, and cities. Location-specific features are explored below.

- ***Rural areas.*** The outreach of central government is often limited in rural areas and focus on district centres remote from communities requiring assistance. This makes government agency managerial and logistical support cumbersome and costly, and unattractive to agency staff. In addition, the general lack of communication infrastructure such as roads increases the cost of accessing markets, clinics, schools, and other services, and reduces information flows from and to isolated communities. In other situations it is not the remoteness that determines the poverty of a location. In many villages the poor live among the better-off households, and their constraints to

accessing water and sanitation services are more likely associated with their lack of power to be properly consulted on their needs or to influence decisions.

- ***Small towns.*** Small towns are perhaps best defined as being large enough that collective action and community management do not easily emerge yet too small to meet the fixed costs of a formal utility organization. Technically, their water supply and sanitation needs are not amenable to simple, point source solutions (such as a spring or a borehole), but the appropriate water and sanitation services have technical and managerial requirements that exceed the capacity of most small community organizations. Small town governments may not have the fiscal or legal authority to provide or regulate private provision of services that would be efficient or responsive to local needs. Even where towns have such authority, staff capacity to play these roles may be weak.

- ***Urban and peri-urban areas.*** Slums and informal settlements housing the urban and peri-urban poor are commonly found on low-lying, flood-prone land, leading to drainage and sanitation problems, or on the steeply sloped hills, from which the residents have to descend to collect water. These places are often geographically isolated, dangerous, unhealthy, and lack basic infrastructure and services. Illegally squatting on a piece of land left vacant for the above reasons, the poor lack title to the land they occupy. For this reason, they have no access to formal service provision such as water and credit, they must rely on temporary, low-wage employment in the informal sector, and they are harassed by the authorities or exploited by criminal gangs and profiteers who take advantage of their lack of recourse to the legal system

In addition to the constraints associated with urban poverty, urban water supply, in contrast to rural water supply, generally relies on a hierarchical system of networks that feed into neighbourhood-level tertiary distribution systems. Serving the urban poor through the formal networks requires sufficient capacity in the primary and secondary network and adequate economic returns. More so, network capacity

increases may not be feasible where water resources are scarce, calling for careful management of water demand (financial and physical controls) while where economic returns are low, as is common in fringe or poor areas, there is low incentive for a utility to provide services.

Combining this with the perceived high risk and, at times, legal constraints to delivering services to informal settlements render financial costs prohibitively high. Possible activities aimed at reducing costs and ensuring adequate economic returns, such as providing bulk water to the edge of the informal settlement and allowing residents to organize and manage water distribution, are sometimes frustrated by unrealistic design and engineering standards that require household connections.

Chapter 5:

NEW APPROACH TO PRIVATE SECTOR PARTICIPATION IN URBAN POOR COMMUNITIES OF THE DEVELOPING COUNTRIES OF AFRICA

5.1 GENERAL

With the diverse nature of the water usage, it is clear that there are several factors affecting the selection of a water scheme's management and development model, depending on the nature of the community, its ability to pay, and participation in the proposed water supply system.

The problem of water provision is complicated as it involves major investments yet the market risk is difficult to assess (due to a lack of precise demographic and socio-economic data) and conceived as great (as result of the low income pattern of the beneficiaries). In addition, the high political risk due to lack of participatory approach in governance and investment in most of the African (third world countries).

In line with factors affecting privatisation or private sector participation mode in development of water supply schemes, (Chapter 4. Above) we propose a water supply development and management model and we have recommended two approaches. The first model is a Cognitive Approach To Management Enhancement (CATME) for an existing water schemes in an urban poor community, while the second is a Stratified Management And Development Model directed towards private sector participation (SMDM) for new or extensions to water schemes.

Applying the two models can happen consecutively for any existing water scheme. When applying CATME, the outcome of the application should increase

the financial and managerial credibility of the water company (operator), including the amelioration of his Balance Sheet. This result in an ability to attract creditors and investors to participate in any targeted expansion of the asset base.

5.2 BACKGROUND OF CATME:

Most African countries either have an inherited a water system from the colonial era or from the socialist era. The status of most of these systems is either in a deplorable condition or its expansion cannot meet beneficiary growth rate (reference is made to Akwa Ibom Water Supply Project of Nigeria, and The Abidjan Water Supply concession). In most of the cases studied in Nigeria, South Africa and other places in Africa, there are common management problems which can be summarized as:

1. Low management efficiency.
2. Customer dissatisfaction.
3. Deterioration of assets.
4. Lack of technology based initiatives.
5. High poverty and unemployment
6. Low household incomes
7. High unemployment rates
8. HIV/AIDS prevalence resulting in unpredicted growth pattern
9. Lack of institutional and technical capacity.
10. Low water revenues, resulting in low financial institutional capability to source fund for expansion.
11. Low financial rating as a result of lack of Institutional, Management and technical capacity

The most harmful factor is the lack of institutional, management and technical capacity, as it diminishes the institutional capacity to convince financiers to invest in the sector, due to low capability of management to generate income and compete in the public market on commercial basis.

It is our argument that human capacity is the basis of all development. Material resources cannot on their own create sustainable development if left in the hands of under-capacitated operators. In addition assets that can be used as collateral decay if no proper asset management scheme is in place. To summarize the state of the matter, governance of water institutions is the prime factor for credit worthiness of the institution.

The prime goal of CATME is to increase the credit worthiness through:

- Capacity building of relevant water units.
- Water operator to enhance assets through developing assets management plan and proper inventory and documentation of its assets base.
- Protecting the gains of low income and the poorest in the community.

The Model goes through:

Creating a short term relationship (2-4 years) between a water institutions, in the form of association, with a water management services' provider. The latter will act as advisor and interim manager. This form is to overcome the financial destitution of some peri-urban water utilities, without forfeiting their assets to a third party, through:

- Creating an anonymous water management unit
- Setting water operations review and sub-units scoreboard.
- Setting water assets management plan.
- Water audit, zoning, consumer enumeration and planning staged installation of bulk or consumer meters or derivation of a flat water rate per capita.
- Water quality review and standardisation.
- Tariff review and enhancement of water revenues.
- Water conservation awareness campaign for community.

- Management skill transfer, on the job training and capacity building of the governance unit.

Targeted immediate benefits are:

- Reducing the political risk through the noted inherent rejection of low income communities to other models and enhancing the governance capability and financial credibility. It also allows financiers to assess and existing situation with a well documented assets base.
- On the job training, capacity building and skill transfer is guaranteed.
- Preparing the ground work for implementation of SMDM. (Figure 5.1 below)

We have to argue the following equation:

> **Cost of water:** (Raw water cost) + (Treatment Cost) + (local Transport Cost) + (Bulk Transport Cost) + (Collection Cost) + (Operations and Maintenance Cost) + (Opportunity Cost) + (Replacement Cost)+ (Governance Cost)+ (Operations and Maintenance Cost) + (Externalities Cost)

It is envisaged that the water is in state of equilibrium, as a good has a value, before even extraction and transportation. The water scarcity vis-à-vis water rights , competition between users and water resource planning have to react and result in a value for water that varies from one region to another, but not predominantly from one community to another.

In the future and explained in section 2 above the fact that demand may exceed production may create a water market by which a water barrel may have a price resembling the Oil market. Accordingly water and its reserves may constitute a value for countries and communities.

Low Income communities in peri-urban and urban centres are characterised with endowed capita numbers domiciling the outskirts of cities and towns. This results in a higher cost of transport to reticulation water. In addition, as mentioned in chapter 2 above, it decreases the economies of scale of water companies, since they are stretched in distances, coupled with the fact of product quality restriction. In other words the linking of low income communities and the poor with urban centres restricts the possibility of varying the product level (water quality level).

Another tendency that low income settlements possess is a lack of water measurements systems, which may renders costing tariffs per cubic metre an imprecise and costly exercise if no metering is available.

As much as they possess numbers the poor lack direct political influence and clout which leaves them vulnerable, from a governance point of view.

5.3 TOWARDS COMMUNITY BASED PRIVATE SECTOR PARTICIPATION:

Decisions and models assessment in PSP in the water sector is subject to negotiations between two parties the beneficiaries and the private sector, and mediated by governing bodies.

The beneficiaries this study is concerned with are predominantly the urban poor communities of African Developing Countries. They are characterised by vulnerability, low accessibility to information and no risk taking, while on the other hand the private sector avoids risks, especially on long term conditions and on mega-investments.

The preceding relation between the negotiating parties (private sector and urban poor beneficiaries) has been compounded with years of mutual distrust, as a

result of public propaganda and years of exclusion of poor markets from the investments map of the private sector.

Accordingly, we can visualise a situation where three parties sitting are to the negotiation table for to adopt the water supply deal, by which:

(a) The Beneficiary: is sitting in tattered condition, vulnerable to risk, needs the good and better life, numerous in number and scarce in financial viability, while

(b) The Private Sector: (prospected supplier): profit monger, risk evasive and see the financial vulnerability as high risk.

(c) The Mediator: Governing institution lacks the Beneficiary's trust (refer to Figure 3.2), experience, institutional capacity and powers to enforce strict supervision on Private Sector due to corruption practices.

The picture drawn above is dark enough as the three parties have no common grounds to meet except on the following conditions:

(i) The numbers in population demographics attracts the Private Sector

(ii) Any project to be undertaken involves employment and financial amelioration for the Beneficiaries.

(iii) Risks are shared among a number of Private Sector's members and Beneficiary, through consumer associations, tends to guarantee abiding by the conditions of the deal.

(iv) Modularise the supply schemes to reduce local transport costs, and spread the governance cost over several water supply scheme's components.

(v) Government Participation, either by grants or direct investment, in bulk water transport, with return periods longer than 30 to 50 years.

(vi) Creation of an independent governing unit (Figure 5.4), its members have autonomous, to create a local performance scoreboard, taking in consideration the local conditions of contract and beneficiary, and report and announcing on bi-annually on the Private Sector(s) operation the water

modules, including community financial viability due to job creation in the water sector.

(vii) Several alternatives of water products is proposed and a correlating level of service is accommodated.

(viii) Reducing externalities impacts on the water supply cost, such as provision of waste water schemes.

In our approach to create a water supply development and management module, we propose a Stratified Method of Participation of the private sector(s) in an unbundled (Figure 5.1) approach to water supply:

The Method of participation aims at:

(a) Increasing competition on all components of the water scheme either horizontally or vertically.
(b) Increase risk sharing among participants
(c) Increase participation among private sector flattening the risk organogram
(d) Avoiding long term monopolies in water supply sector, by reducing concessional periods over the unbundled components of the water supply
(e) Enable competition over various components of the water supply components.
(f) Allow local competition to emerge over the years of the water schemes, and due course of the operation of the water scheme.

5.4 STRATIFIED MANAGEMENT AND DEVELOPMENT MODEL (SMDM) FOR WATER SUPPLY IN THE POOR URBAN ENVIRONMENT TOWARDS INCREASED PRIVATE SECTOR PARTICIPATION

The above method is based on the following:

(a) Separation or unbundling of various components of water system to (Figure 5.1):

- Collection and Storage.
- Bulk Water Transport System (BRTS)
- Water Reticulation Transport System (WRTS)
- Treatment Processes:
- Operation and Maintenance.
- Sewage collection and treatment progressive system.

(b) Creation of a governing unit responsible for the collection of water fees, composed of 4 members (see Figure 5.2 and Figure 5.4):

(i) Umpire or a coordinating Chairperson of no authority in direct awards of contract, but ensures financial abidance, and announce the annual monitoring performance report.

(ii) Financial monitoring and arm responsible for assets records and implementation of expansion financial targets and tariff monitoring.

(iii) Monitoring Unit to monitor a local performance scoreboard, taking into consideration the local conditions of contract and beneficiary, and report and announcing on annual on the Private Sector(s) operating the water modules, including community financial viability due to jobs creation in the water sector. The unit also responsible for dispute resolution among members of the water system, and quality monitoring.

(iv) A community representative acting as a liaison office between the community and water governance body. He is also to overseas that the stages of implementation of the unbundling, tendering and awards in a transparent manner.

(c) Creation of individual training unit by each participants of the concession, for members of community served.

5.4.1 Description of Module Components, functions, contract nature and tasks (see Figure 5.3 below)

This Module targets separation between water transport asset owners and asset managers, and creates competition among none specialised companies and the private sector to compete over co-ownership or full ownership of Assets along with the governments, over a prolonged period of time, while on the other hand, increasing the participation of asset managers over a reduced period of concession rights based on performance.

5.4.1.1 Separation or unbundling of various components of water system to:

Water Assets can be separated from Water Management, by which all vertical component of the system can be identified from collection, storage to house connections. On separating the ownership from management the possibility of creation of competition exist, by which the operator does not have to have custody rights of the assets and can be replaced after a certain period of time – (short term).

This will lead to creation of competition in quality and fees for the operator and enhance the capacity of the owner or beneficiary to remove operator in case of none performance.

It is noted (Chapter 3 above) that most of the model proposed has had a long concession that varies between 10 to 30 years (see Figure 4.1), by which the concessionary constraints eliminate competition in the market due to the long concession period, and restrict the evolution of the local competitors in the market, due to market closure. Usually the cause of such a prolonged concession

period is the mega-investment involved over the period in question. In addition at the end of the concession the beneficiaries find themselves with no possible competitor to compete with the existing operator, which diminished their negotiating powers.

From our experience we have found that the major costs of any water system lies in the collection and transport bulk water supply, especially in semi-arid or drought prone countries.

The proposed Bulk Water system is to be tendered among financiers and financial institution for ownership, co-financed with governments in an open tender method.

This requires that governments should be responsible for the planning and design stages of any project, in order to be able to tender the ownership/co-ownership or financing of the project. Also it would ensure that the water rights of various competitors have been reserved and observed to avoid future disputes. This may require that governments to put down or invest prior to any tendering a total amount of about 10% to 15% of the project cost, as planning and tendering costs.

Various components of the system can be tendered among financiers as asset owners to conditions specified to ensure reducing the optimum impact of the water cost equation mentioned above,

Also by unbundling the various components of water a scheme, each unit may be owned by a different participator based on his financial capacity. In another words, establishing of a dam, could be tendered for among various possible owners or financiers, over extended return period, while the components of reticulation system to be tendered for among the existing non formal sector of water operators, based on streets and geographic location.

The advancement in information technology, allows for the accrual of a percentage of tariffs automatically to various players without the hassle of each operator to seeking his rent costs.

Vertical and horizontal unbundling will lead to an increase in job creation opportunity for the community, not only on a construction level, but also on entrepreneurial and operation level, which leads to evolution of small enterprises that can compete with the existing companies and not restricted by the long concession periods that have been noted in various contracts mentioned above.

Application of this method requires:

(i) Strong governing (monitoring) unit.
(ii) Strong law and the existence of a mechanism for quick dispute resolutions, as friction may evolve at tangency lines of ownerships.

As stated the system encourages competition between private, public – as in Kenya Water Holding Company, please refer to section above - or hybrid companies, to compete over the operation of the system, and their replacement is not tied to the assets ownership or life span. The operator shall be responsible for:

(a) Operating the water system
(b) Maintenance and repairs, which is pre-quantifiable based on the life span of the assets.
(c) Provision of chemicals.
(d) Billing, collection and disbursement of returns through automated means.
(e) Implementation of asset management plan.

The intricacies of the Model lie in the details, especially when looking at the secondary distribution system. There might be an opportunity to divide geographically the existing informal operators, to build operate and collect.

However the only drawback is the financial credibility of such operators, they collect all the rents from a certain street or geographic area, yet fails to pay back to the main operator. However this may be overcome by credit facilities to be established prior to operation and also by making sure that one operator dies not get an area exceeding his creditworthiness.

Figure 5.3 below describes the mode of application of the SMSM which can be applied on its own for new schemes, or jointly with CATME for the existing expanding or upgrading of existing schemes.

We shall discuss here each of the above items and the envisaged way to implement.

A. Collection and Storage:

A.1 Ownership:

As explained in Chapter 2 above this represent the major cost component. Accordingly it is necessary to either tender ownership, co-ownership (with government) or ownership financing over a stretched period of time to reduce the financial burden on the end users. The return period may vary then between 30 to 50 years for major works, such as a dam. Works depending on aquifer recharge-based supply schemes could be less in case of ground water supply schemes, in a manner that will allow less impact on the end users. Periods of such cost overruns should be envisaged in the beginning during the preparation of tender and set out by the governing body based on preliminary estimates. The Owner shall responsible for the renovation after each operator term lapses, and upgrading at least every 15 years.

The bids should be based on a short-list tender after a prequalification exercise for interested bidders, by which the financial capacity and operating zones should be a major factor in the qualifying criteria.

A.2 Operation, Maintenance and Management:

With pari-passu tendering for the Collection and Storage works, another tender should be launched for the operation and maintenance of such proposed works amongst qualified operators that can undertake the operation of such equipment and maintain it. The contract period should be on a 3 to 5 years renewable contract based on the performance of the selected operator. The fact that it is 3 to 5 years allows variation in the cost of the contract after term period as equipment age impacts on its operation and maintenance cost. The bidder should come up with a maintenance schedule, operation teams and his fees per cubic metre disbursed from the storage facility.

B. Bulk Supply network:

B.1 Ownership:

The Bulk Water supply can be the second major component costwise. Accordingly the need to either tender ownership or ownership financing over a stretched period of time is necessary to reduce the financial burden on end users. The return period may stand at 15 to 20 years due to the life span of the conduits, during which replacement and rehabilitation works should be undertaken. The owner shall be responsible for the maintenance, replacement and rehabilitation costs of his line in order to extend the life span of his network, including all accessories. He should be selected based on his fees per cubic meter of water measured at the end of his line, to make the owner accountable for the transfer losses which is directly proportion to the condition of the conveying conduits. In addition his rehabilitation and operating activities should be monitored, performance-wise and a scoreboard implemented. The type of materials used for the conduits should be stipulated at the planning stage with possible alternatives negotiated, based on the post contract condition of the asset identified by the governing body.

We recommend that this item of works remains in the hands of the owner in term of operation, as it requires minimum operation but extensive maintenance along the life span of the conduits.

C. Treatment, rising main and primary distribution system:

C.1 Treatment Plant Ownership:

The treatment plant on its own may constitute a minor cost in the overall cost of the scheme, depending on the quality of water to be treated, while its operation is extensive. In addition based on the plans there might need to be different lines supplying different products quality-wise. Owners shall be responsible for the, replacement and rehabilitation of his line to extend the life span of his network, including all accessories. He should select based on his rent per cubic meter of water measured at the beginning of his line. This can be handled over a return period of 5 to 8 years after which full renovation and upgrading may require to be carried out. Usually specialized companies are interested in such ownership. Accordingly; it might be acceptable that the owner of the asset is allowed to compete over the management-ship contract of the facility, amongst others but on the basis of the contract below. The rents shall be based on water measured and disbursed from clear water tank(s).

C.2 Ownership of Rising main and primary distribution system:

The Primary Water supply can be a considerable component of the cost when targeting the poor, as they are usually on the periphery of the urban centers and metropolitans. Accordingly the need to either tender ownership or a stretched return period of time is necessary to reduce the financial burden on end users. The return period may stand at 10 to 15 years due to the life span of the network, during which replacement and rehabilitation works should be undertaken. The owner shall be responsible for the maintenance, replacement and rehabilitation costs of his line to allow extended life span of his network, including all

accessories. He should select based on his rent per cubic meter of water measured at the end of his line, to make owner accountable for the transfer losses which are directly proportional to the condition of the conveying conduits. In addition his rehabilitation and operation activities should monitored, performance wise with a scoreboard implemented. The type of materials used for the conduits should be stipulated as per the original planning stage.

C.3. Operation and Maintenance Assets Manager:

Due to the fact major parts of the controls rests within the boundaries of the treatment plan The operator may be responsible for the operation of the treatment plant, supply of chemicals and running cost of the plant, in addition to repair and attendance to client complaints along Primary supply main line. The Asset manager shall be responsible for the periodical maintenance of the plant itself, including of replacement of minor defected items. He shall be subject to the periodic supervision and testing of his water quality on regular basis to ensure product compliance. The contract period should be on 2 to 3 years renewable contract based on the performance of the selected operator. This is to help develop the water operators market and the evolution of companies within the community to compete over the management of the schemes, with possible lower fees along the course of the works. The bidder should come up with a maintenance schedule, operating procedure and teams and his rest per m3 disbursed from his primary network. Accordingly the need to install metering at the beginning and the end of the network is envisaged.

D. Secondary piping and house connections:

D1 Ownership: geographic unbundling of all elements of the network

This operation can be limited to lines tied to number of treatment plants as the node, and the water network linked to it, while other operators can administer another node within the overall network. This can be easily implemented for

ground water based systems, however for surface water system, the operation of each network can be separated, the only draw back be increased overhead per network.

5.4.1.2. Scheme's Governing Body (refer to Figure 5.4 below)

Applying this model requires strict monitoring, and precise recording of assets and asset ownership. Also the monitoring unit should be entrusted with the quick dispute resolution mechanism otherwise and its decisions should be final.

(i) It has to undertake the following functions:

(a) Receiving and reviewing the planned proposed tenders from governments in unbundled forms to meet the model requirements.
(b) Custodian of water rights.
(c) Tender announcements, Undertaking Prequalification exercises, tendering, negotiation and engaging successful bidders.
(d) Ensure that no Asset operator has more than two tenures.
(e) Keep asset and ownership register.
(f) Periodic water auditing and monitoring of water quality.
(g) Issuing of periodical monitoring reports and checking compliance with performance scoreboard
(h) Stock taking and asset condition certification at the end of each operation contract and fining the defaulters.
(i) Termination of Operators Contracts, based on performance.
(j) Keeping financial records and disbursement of collected funds in an automated manner.
(k) Dispute resolution and community liaison.

5.4.2.Risks allocation

The above proposed model of water supply has eliminated certain risks for the financier/owner, and increased risk sharing amongst the system. In our belief it also expanded the market for participation of the community, as it increased the possibility of creating companies to manage the water expansion system.

Governments have to participate as they are responsible for planning and design, which enhance financier confidence and eliminates the unknown factors in the water systems.

Supply risk and Technology Risks rest with the Government which was responsible for the planning of the system, thus reducing the risk portfolio of the asset owner and enhancing the ability to use cheaper technology that can be labour based, thus increasing employment in the sector with no finance restriction.

On the other hand the community risk of lack of control over the operator is reduced, due to the short term of the operation contract, which can be renewed or terminated easily as it not tied to asset.

The only risk that stays constant in all cases is revenue risks, by which the anticipated returns do not meet the targets. This is a fact that rests over community participation and the operator efficiency in collecting revenue.

Table 5.1 herein after details the risk structure for the proposed SMDM

TABLE 5.1. RISK STRUCTURE FOR THE PROPOSED SMDM

RISK STRUCTURES	RISK ALLOCATION	VERIFICATION
1. Operating - technical	Shared – Asset Operator and Government	Technology risk rests with the government as they are the planners or designers (through Service Provider
2. Operating – cost	Shared – Asset Operator and Asset Owner	Asset replacement cost by Asset Owner, while repairs and rehabilitation by Asset Operator
3. Operating – management	Asset Operator	
4. Participant	Scheme's Governing Body (unit)	Prequalification of Operators and Owners
5. Completion	Asset Owners	
6. Supply	Asset Owners	
7. Market	Governing Body	As custodian of Water Rights, and licenser
8. Infrastructure	Governing Body	Responsible for Tendering and expansion of Secondary networks and house connections
9. Environmental	Shared – Government and Asset Operators	As government is the planner (through service provider), EIA shall be issued and mitigated, while asset operator shall ensure compliance
10. Political	Scheme's Governing Body (unit)	The creation of jobs and possible evolution of operators and owners for secondary network would definitely reduce possible communities eruption, however the general stability of the country is a constant factor in any case
11. Force majeure	Handling mechanisms should be envisaged in contracts	
12. Foreign exchange	Asset Owners	Its impact is reduced for Asset Operators due to the short term of the operators' contract,. while for Asset Owners, it is subject to fluctuation equation to be agreed based on asset life span,
13. Engineering	Shared – Government and Asset Owners	Shared – Government as designers and Asset Owners as builders
14. Syndication	Asset Owners	
15. Funding	Shared – Asset Owners and Operators	
16. Legal	Scheme's Governing Body (unit)	

5.5 CONCLUSION

There are several factors affecting the selection of water management model, depending on the nature of the community, its ability to pay, and participation in the proposed water supply system.

This has complicated the commercial approach to water supply and management, coupled with inherent fear for the any foreign colonial form of management, and distrust, as the governments were not able to meet the ideological and swift change from public ownership model to private ownership form, and economical viability approach to public service provision.

The problem of water provision is complicated as it involves major investments yet the market risk is difficult to assess (due to lack of precise demographic and socio-economic data) and conceived as great (as result of the low income pattern of beneficiaries) . in addition the high political risk due to lack of participatory approach in governance and sole leadership governance model in most of the African (3rd world countries).

In our approach to solving water supply management model we recommend two models, the first model is a cognitive approach to management enhancement (CATME) of existing system in a poor community, while the second is a stratified management and development model directed towards private sector participation.(SMDM) in new or upgrading and extension of new system.

The First Model is to enhance increase credit worthiness for the water existing water institution through

- Capacity Building of existing water units.
- Water Operations to enhance assets through developing assets management plan and proper inventory and documentation of its assets base.
- Prepare grounds for expansion and creation of new extensions for the scheme.

5.5.1 Towards increased private sector participation

As Water Assets can be separated from Water Asset Management, by which all vertical component of the system can be identified from collection, storage to house connections. On separating the ownership from management the possibility of creation of competition exist, by which the operator do not have to have custody rights of the assets and can be replaced every certain period of time – (short term).

This will lead to creation of competition in quality and fees for the operator and enhance capacity of owner or beneficiary to remove operator in case of none performance.

In that regard we recommend the following approach to implement in developing countries.

5.5.2 Stratified Management and Development Model (SMDM) for Water Supply:

The above method is based on the following:

(i) Separation or unbundling of various components of water system to:

- Collection and Storage.
- Bulk Water Transport System (BRTS)
- Water Reticulation Transport System (WRTS)
- Treatment Processes:
- Operation and Maintenance.
- Sewage collection and treatment progressive system.

(ii) The Model aims to:

- Increase competition on all components of the water scheme either horizontally or vertically.
- Increase risk sharing among participants
- Increase participation among private sector flattening the risk organogram
- Avoid long term monopolies in water supply sector, by reducing concessional periods over the unbundled components of the water supply
- Enable competition over various components of the water supply components.
- Allow local competition to emerge over the years of the water schemes, and due course of the operation of the water scheme.

(iii) Model Participants:

- Asset's Owner: for every component of the water scheme selected by tendering process,
- Asset's Manager: for every component of the water scheme selected by tendering process,
- Scheme Governing Body (unit): with set of tasks, including monitoring, custodianship of water rights, hire and fire operators, Asset registering and dispute resolution.
- Government: responsible for planning and design of the water scheme including preparation of tender documents for various components of the water scheme.

(iv) Application of this method requires:

- Strong Governing unit.
- Strong law and existence of a mechanism for quick dispute's resolution, as friction may evolve and tangencies of ownerships.

(v) Risks allocation:

The model of water supply has a eliminated certain risks for financier/owner, and increased the risk sharing among the participants, in our belief it also expanded the market for participation of community, as it increased the possibility of creation of companies of managing of the water expansions system.

5.6 RECOMMENDATIONS:

(i) It is recommended that further research be conducted on the application of the new approach with detailed recording of transaction and the structure of each contract. The results should be able to record the possible disputes that may occur and stakeholders' performance in execution.

(ii) Further research is need developing a performance scoreboard for each asset manager and the Governing Unit(s) participating in the implementation of the SMDM.

(iii) A suitable model for privatization in developing areas is yet to be tried.

FIGURE 5.1: WATER SYSTEM COMPNENTS IN URBAN SCHEME

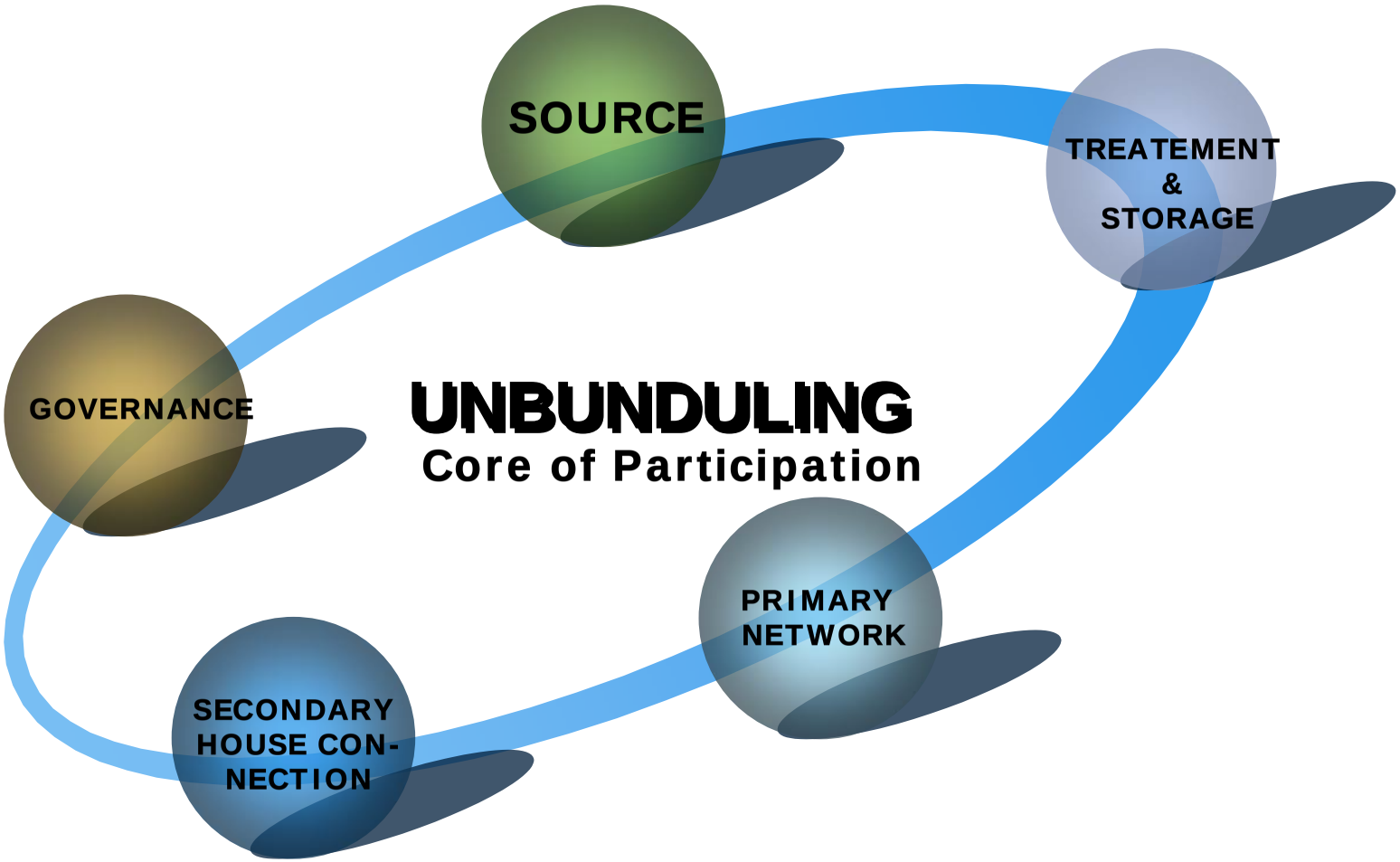


FIGURE 5.2: SMDM MODEL COMPONENTS

Phase 1 GOVERNANCE

- Creating an anonymous water management unit
- Water operations review and sub-units scoreboard setting.
- Water Audit, zoning , consumer enumeration and planning a staged installation of bulk or consumer meters
- Water assets Management plan setting.
- Tariff Review and enhancement of water revenues plan
- Ground Preparation for unbundling and SMDM

Phase 2 UNBUNDULLING

- Preparation of various Tenders for Assets Ownership, based on a shortlist after a prequalification exercise.
- Preparation of Tender Packages for Operation of Headworks, based on performance contract and periods not exceeding 2-3 years. Renewable only once, for various for Treatment Plants, Primary Network.
- Preparation of secondary network design and tendering among informal sector operators for construction and ownership of pipelines including house connections; based on No. of streets, financial capability and geographic locations

Phase 3 EFFECTIVE PSP

- Periodical water auditing and monitoring of water quality.
- Issuing of periodical monitoring reports and checking performance scoreboard compliance.
- Stock taking and asset registrations.
- Termination of Operators Contracts, based on performance.
- Keeping financial records and disbursement of collected funds in automated manner.
- Dispute resolution and community liaison

FIGURE 5.3: SMDM APPLICATION AND PRIVATE SECTOR PARTICIPATION

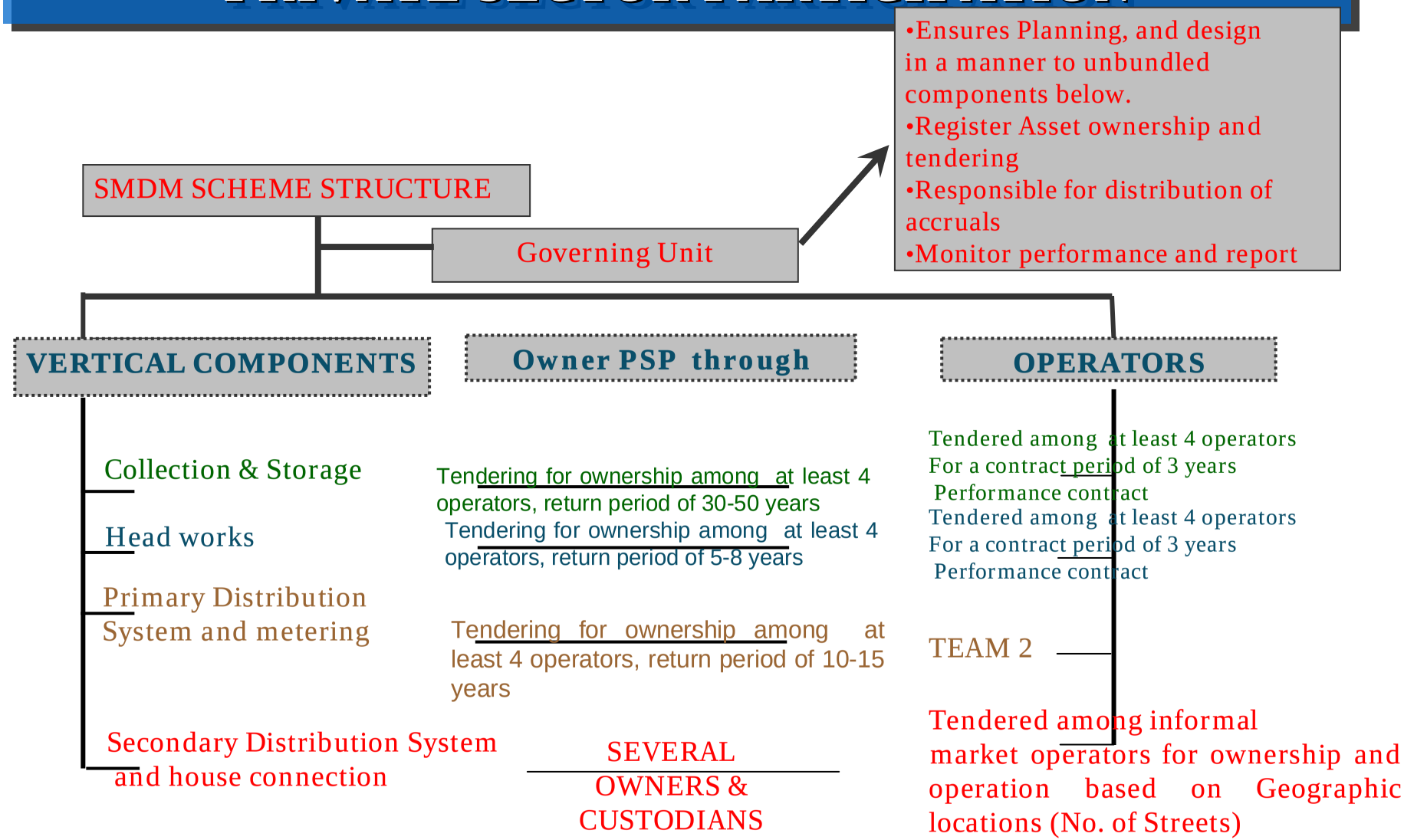
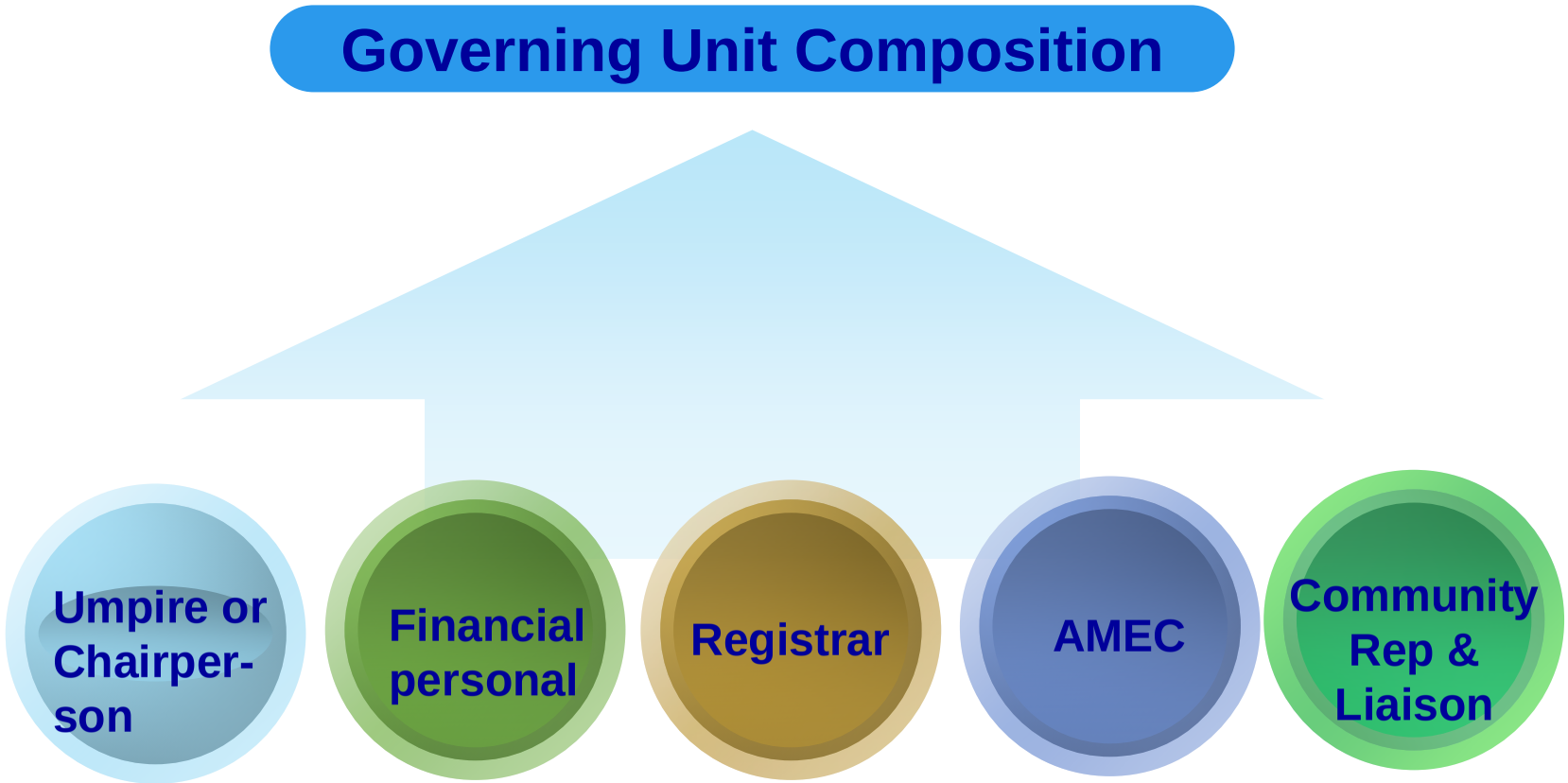
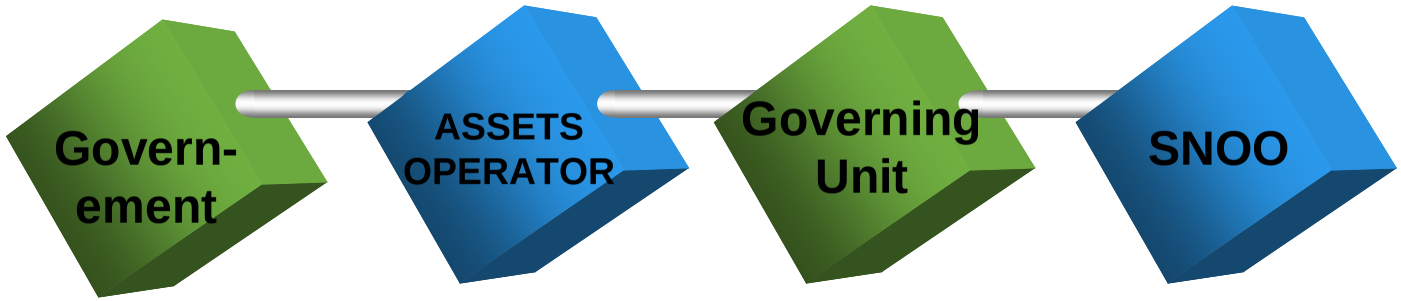


FIGURE 5.4: GOVERNANCE PER URBAN SCHEME



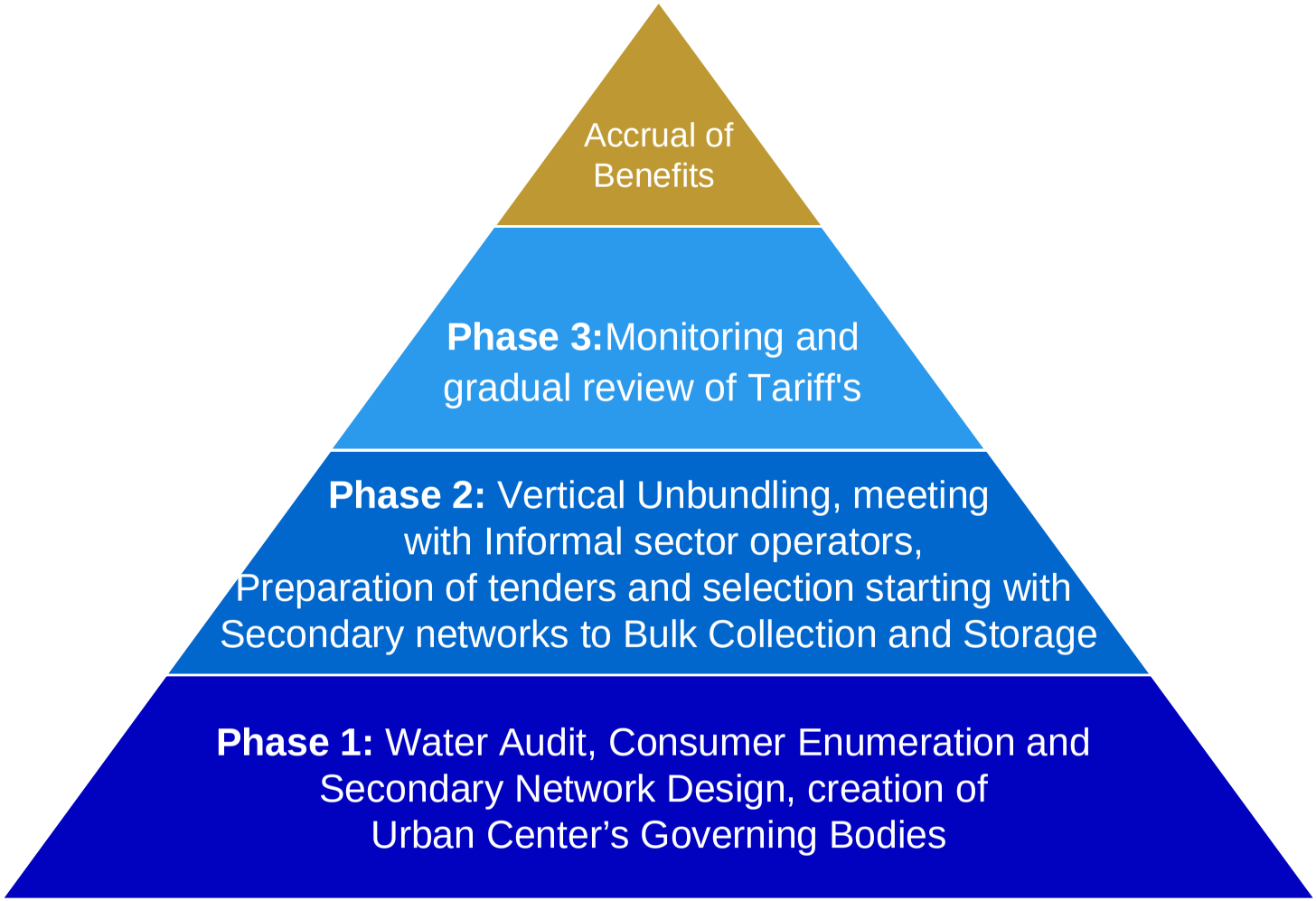
AMEC: Advisor and Monitoring External Consultant

FIGURE 5.5: STAKEHOLDERS ROLES



•Prepare Planning and design for existing System CREATING THE GOVERNING BODY	•Only 2-3 Years contract, renewable only once •Responsible for operation and Maintenance including and running costs.	•each water scheme has one governing unit •Serves only 2 tenures of 3 years each. •Responsible for set of tasks, including tendering for asset owners and operators •Asset register and monitoring •stock taking of existing and private water sources and levy collection	•Construction of secondary network and house connections •Collection of connection fee as per ceiling •Maintenance of secondary system •Billing on behalf of AKWC and posting payments accordingly

FIGURE 5.6: STAGES OF SMDM IMPLEMENTATION



References List:

- *Alázar, L., Xu, L. C. and Zuluaga, A. M. (2000) Institutions, Politics, and Contracts - The attempt to Privatize the Water and Sanitation Utility of Lima, Peru, pp. 3-6.*
- *Aryeetey, E. (1998) Informal Finance for Private Sector Development in Africa, pp. 2-15.*
- *Asian Development Bank (1999) Developing Best Practices for Promoting Private Sector Investment in Infrastructure: Water Supply, pp. 18-66.*
- *Asian Development Bank (1999) Specific Best Practices For Promoting Private Sector Participation, Vol. 2, pp .28-40.*
- *Asian Development Bank (2000) Handbook for the Economic Analysis Of Water Supply Projects, pp. 4-5.*
- *Bayliss, K. (2001) Public Services International Research unit (PSIRU) Water privatisation in Africa: lessons from three case studies, pp. 3-6.*
- *Bosch, C. , Homman, K., Rubio, G. , Sadoff, C. and Travers, L. (2002)* ***World Bank Source Book,*** *Chapter 23: Water and Sanitation*
- *Boubakri, N. (1999) Does Privatization Meet the Expectations? Evidence From African Countries, pp. 24-26.*
- *Briscoe, J. (1996)Water As an Economic Good, The idea and what it means in Practice, pp. 4-10.*
- *Collignon, B. and Vezina M. (2000) Water and Sanitation program: Independent Water and Sanitation Providers in African Cities, pp. 14-25.*
- *Cowen, P. B. and Cowen, T. (1998) Deregulated Private Water Supply: A Policy Option for Developing Countries, Cato Journal Vol 18, pp. 23-29.*
- *Dalhuisen, J. M., De Croot, H. L. F. and Nijkamp, P. (2001) Economic Policy Instruments and Sustainable Water use, pp. 3-10.*

- *Dinar, A., Balakrishman, T. K. and Wambia J. (1987) Political Economy and Political Risks of Institutional Reform in the Water Sector, pp. 8-18.*
- *Dr. Muhairwe, W. (2002) The Challenges of Managing a Public Enterprise- A case of National Water and Sewerage Corporation, pp. 7-10.*
- *Gardener, D. C. (2000) Project Finance :Risk Analysis and Allocation, Euromoney, pp. 2-19.*
- *Hailemariam, S. (2001) Corporate Value Creation, Governance and Privatisation Restructuring and Managing Enterprises In Transition: The Case Of Eritrea, pp. 35-49.*
- *Hall, D. (1999) Public Services International Research Unit University of Greenwich, Privatization, multinationals, and corruption, pp. 15-17, 31-32.*
- *Holden, P. and Thobani, M. (1996) Tradable Water rights: A Property Rights Approach to Resolving Water Shortages and Promoting Investment, pp. 2-3*
- *ICWE (1992) The Dublin Statement, World Meteorological Organization, Geneva, International Conference on Water and the Environment.*
- *Kerf, M. (2000) Do State Holding Companies Facilitate Private Participation in the Water Sector? Evidence From Côte D'ivoire, The Gambia, Guinea, and Senegal, pp. 18-19*
- *Kerf, M. and Smith, W. (1996) Privatizing Africa's Infrastructure: Promise and Challeng, pp. 14-55.*
- *McKinley, D. T. (2004) The Struggle Against Water Privatisation In South Africa: Case Study.*
- *Megginson, W. L. and Netter, J. M. (2001) From State To Market: A Survey Of Empirical Studies On Privatization, pp. 8-28*
- *Ménard, C. and Clarke, G. (2001)Reforming Water Supply in Abidjan, Côte d'Ivore: A mild Reform in a Turbulent Environment, pp. 14-15.*

- *Narayan, D., Chambers, R. , Shah, M.K. and Petesch, P.(2001) Voices of the Poor- Crying out for Change World Bank Report, pp. 180-205.*
- *Noll, R. G., Shirley, M. M. and Cowan, S. (2000) Reforming Urban Water Systems in Developing Countries, pp.14-24.*
- *Onjala, J. (2002) Good Intentions, Structural Pitfalls: Early Lessons from Urban Water Commercialization Attempts in Kenya. Pp 7-12.*
- *Perry, C. J., Rock, M., and Seckler, D. (1997) Water as an Economic Good: A Solution, or a Problem, pp. 7-10.*
- *Rogers, P. (2002) Water Governance, pp. 4-17.*
- *Pouliquen, L. (2000) Infrastructure and Poverty, pp. 2-29.*
- *Lee, R. and Jouravlev, A., Private Participation in the provision of Water Services.*
- *Saleth, R. M and Dinar, A. (1999) Evaluating Water Institutions and Water Sector Performance, pp. 4-9*
- *Smith, A.J. (1999) Privatized Infrastructure: The Role of the Government, pp. 51-61.*
- *Ulrich, E. , Edwards N. ,Gladstone D. , Gregory P. and Holt, T. (1999) Assessing the impacts of privatization: The experience of Morocco, pp. 46-62.*
- *Yves Bee Ltd, World Bank and GTZ (2000) Informal Providers, pp. 57-58.*