

NTNU
Norwegian University of
Science and Technology
Faculty of Social Sciences
and Technology Management
and Department of Geography

Master's thesis

Mohammed Niyas Fathima Muneera

Public-Private Partnership (PPP) in Solid Waste Management

Literature Review of experiences from
Developing Countries with special attention
to Sri Lanka

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Abbreviations

ADB	Asian Development Bank
BETL	Burns Environmental Technologies (Pvt.) Limited
BOT	Build Operate Transfer
CBD	Central Business District
CBO	Community Based Organization
CEA	Central Environmental Authority
CMC	Colombo Municipal Council
EPA	Environmental Protected Act
GTZ	German Agency for Technical Cooperation
ISWM	Integrated sustainable waste management
LA	Local Authorities
LG	Local Government
LMG	Local Municipal Government
MC	Municipal Council
MFE	Ministry of Forestry and Environment
MG	Municipal Government
MOH	Medical officer of health
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NGO	Non Government Organization
PHI	Public Health Inspector

PPP	Public Private Partnership
PS	Pradeshiya Shaba
SOE	State Owned Enterprise
SW	Solid Waste
SWM	Solid Waste Management
UC	Urban Council
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNICEF	United Nations Children's Fund
USW	Urban Solid Waste
USWM	Urban Solid Waste Management
WM	Waste Management

Abstract

The study deals with the Public – Private Partnership (PPP) in solid waste management (SWM) in developing nations. In many developing countries, over the few decades partnership is taking more significant role in infrastructure development and providing services regarding SWM while government ownership has declined. At present PPP is considered as an important model for urban development. It has been found that privatisation or partnership can be used as a good policy to improve economic growth. PPPs is also said to enhance social infrastructure in a sustainable way. Therefore the purpose of the study is to find out practically how PPP works in SWM in developing countries and specifically in the Sri Lankan context.

An actor-oriented theory has been used, in order to explain the actors and their behaviour. New Public Management theory has been used to describe management of public services carried out by the private sector with management changes. Mainly, secondary data were used to get understanding of the PPP in SWM and to find out the developing nations' experiences in PPP.

The study reveals that due to weaknesses in the public sector such as inefficiencies, wastefulness, carelessness, weakness in service delivery and provision of low quality goods for high rates, developing nations face problems to manage the waste properly. So, governments in developing nations have increased the involvement of the private sector to provide SWM services. Thus developing countries have introduced PPP as an alternative solution to manage waste. Also the study found that the governments alone could not deliver effective and valuable services. With the introduction of PPP, the partner could supply SWM services more effectively and cheaply. However, it has been found that, if there is no good supportive environment, then the partner has difficulty to manage the waste leading to failure in the project.

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1 INTRODUCTION

1.1 Introduction

Due to rapid urbanization, urban solid waste has become a big crisis. More than half of the world's population are living in urban areas or towns. Cohen (2004) found that, at the beginning of the twentieth century, just 16 cities in the world contained a million people or more. Report of United Nations Environmental Programme (UNEP) states that all over the world nearly 3,000 million people live in urban areas and everyday approximately 160,000 people join them (GEO-2000, Global Environment outlook, 2000). Today, almost 400 cities contain a million people or more, and about 70 percent of them are found in the developing world. In the year 2025 worldwide urban population is expected to rise to 60 percent and it is projected that 90 percent of this growth will occur in developing countries, especially in Asia and Africa (U.S Roads, 1998). Over the last 20 years many urban areas in developing nations have experienced dramatic growth in urbanization, as a result of rapid population growth. Due to the devastation of rural economies and discouragement of agriculture, people migrate to cities with the hope of a better life. Facilities in urban areas such as job opportunities, education and health are the major reasons for rapid urban population growth in developing countries.

Urban population growth rate varies among countries and regions. In south Asian countries over the past 50 years, urban population has grown by about 300 million people. In 1950, only 18 percent (around 72 million people) of the region's population lived in urban areas. But by 2000, 27 percent (around 372 million people) of the region's population resided in urban areas. The latest UN projections suggest that an additional half a billion people will be added to urban areas in South Asia over the next 30 years, presenting a daunting challenge for urban management. As the region's population has become more urbanized, the number and size of the cities has increased (Cohen 2004) as well as production rate of urban solid waste (USW) or municipal solid waste (MSW). MSW define as a waste which is generated by households, commercial enterprises such as offices, hotels, supermarkets, shops, schools, institutions and municipal services such as street cleaning. This MSW does not include the waste from mining, construction or destruction activities and industrial manufactures (Ngoc & Schnitzer, 2009).

'Waste Management' includes, waste collection, transport, sorting, recycling or disposal, and monitoring of waste materials and includes the actors, people and organizations engaged in these processes (Baudouin et.al, no date). According to a survey done by United Nations Development Programme (UNDP, 1997) in 151 cities around the world, the second most serious problem that city dwellers face (after unemployment) is insufficient solid waste disposal. Typically one to two-thirds of the solid waste that is generated is not collected (UNDP 1997, Zhu et. al, 2007). Global waste management market report (2007) estimated that 2.02 billion tones of solid waste were generated in 2006 with seven percent annual increase since 2003. The report further noted that from 2007 to 2011 global MSW increased by 37.3 percent with approximately 8 percent annual increase rate. The failure of municipal solid waste management (MSWM) has resulted in serious health problems and environmental degradation. For instance, due to deficient collection services, uncollected waste is dumped in the streets and in drains, thereby contributing to flooding, breeding of insect and rodent vectors, and spreading of diseases. Furthermore, some collected waste is disposed off in uncontrolled dumpsites or burnt openly (Zhu et. al 2007). These have been identified to cause environmental, economic, social and cultural problems.

The rate of SW production is dependent on density of urban population, size of the urban habitation, consumption rate of commercial goods, income and lifestyles, its degree of industrialization, institutionalism and commercialism (Hope, 1998), geographical location, energy resources, climate, living standards and cultural habits. Typically low income countries produce around 0.4 to 0.6 kg/person/day, whereas developed countries generate about 0.7 to 1.8 kg/person/day (Zerbock, 2007).

The challenge of urban solid waste is particularly peculiar to developing countries, where resources are limited but urbanization is occurring rapidly (Ahmed & Ali 2004). The per capita of MSW generated daily in India ranges from about 100g in small towns to 500 g in large towns (SlideShare 2009). A report by the World Bank estimates that solid wastes in urban areas of East Asia alone will increase from 760,000 tons/day to 1.8 million tons/day within 25 years, while waste management costs will almost double from US\$ 25 billion to US\$ 47 billion by 2025. The SWM sector, therefore, deserves careful attention for striking a balance between quality of service and cost effectiveness. But due to institutional, regulatory, financial, technical, public participation shortcomings and inadequate collection facilities most of the cities are facing difficulties in managing the SWM problem.

In general, people in developing countries do not separate their waste unless they are saleable. This is one of the significant reasons which exacerbates the problem of SWM. In many developing countries, especially in Asian developing countries Local Authorities (LAs) or some private sectors collect the waste. The Main reason for the SW problem faced by developing countries is that authorities do not collect the waste effectively (Zurbrugg, 2003). Furthermore, of the total waste generated, about 20 percent is used for recovery and recycling and nearly 37 percent remains spread out and left lying around on roadsides, open spaces and in drains (UNEP, 2001a).

Generally municipal authorities in developing countries collect their SW in limited areas especially residential areas where rich people are located or where they find more political influence (Zurbrugg, 2003). As a result only some parts of the cities in developing countries are relatively clean. Slums or low income settlements are usually not reached by certain methods of transport vehicles due to the small roads, slopes and overcrowding. As if that is not bad enough, the municipal authorities dump the waste close to slumps or common places where people in the low income bracket live making these areas very filthy. The reason for this may be that central municipal budget is not enough to cover the entire city.

In order to reduce the waste, developing countries follow specific waste management or disposal methods. These methods include burning, composting, incineration, land filling, reuse and recycling. Unfortunately, still in most of the developing nations it can be observed that waste is dumped in an uncontrolled method without any environmental control measures (Zurbrugg, 2003). Open dumping is therefore a common waste disposal method in developing nations. Land filling is not a common disposal method in these countries. According to Visvanathan and Glawe (2006) sanitary land filling or engineered land filling of MSW is misunderstood in the developing countries. Third world countries also have inadequate incineration facilities, although Burning is used to reduce the smell of dumped or uncollected waste in such nations (Eawag, 2008). But this method has been identified to negatively impacts the environment by its contribution to the depletion of the Ozone layer in the atmosphere and its attendant consequences of global warming. Biodegradation of organic waste is used for compost in developing country. Some informal sectors are also engaged in recovery and recycling activities (Beukering et al, 1999). However, it has come to the notice of many that still lots of waste remain uncollected in public places and this causes environmental and health problems to the people. Hence in an attempt to reduce SW problems in recent years developing nations find public private partnership as an alternative solution.

1.2 Research problem

Due to problems face by developing countries to manage their solid waste in the cities, several countries decided to manage the waste by cooperating with private sector. PPP help them to manage the waste in several ways but if there is no positive environment such as support from public sectors and households, private sectors find difficulties to manage waste effectively. Although PPP in SWM works well in several developing nations such as India, Sri Lanka. In Sri Lanka PPP help to keep the city clean. The Private sector helps with investment, technology, vehicles and other equipments to collect the waste in the cities. Initially, the national government tried to manage the waste in the capital city of Colombo with PPP. After they got good experiences, the public sector started to handle the waste with the private sector in other cities as well. However, sometimes the public sector fails to manage the waste with the private sector due to several reasons such as carelessness and poor political support. It would be interesting to know whether partnership with the government could be the best way to address the problem.

1.2.1 Significance of the study

Many Developing countries face many challenges in managing SW. Inadequate collection, transport and disposal of solid waste in the cities gives more pressure to the municipalities. Economical problems and lack of awareness of the extent of the problem are some of the major reasons for the SWM issues in developing countries. But it is clear that inadequate SWM system create many socio cultural, economical and environmental problems including health problems. So without giving serious attention to this issue, it is difficult to achieve sustainable development. Therefore, some developing countries privatize their waste management system in the cities. However, some of the countries are still looking for good solutions to reduce the problem. Reviewing PPP in SWM in developing countries can give some insights about the problem and its management.

Moreover, most of the cities in developing countries do not have enough places to dump their waste, due to the dense nature of population in almost all part of the cities or towns. We can say that open dumping is a common activity in most of the developing nations. If private or municipal councils collect the waste they have to find a place to dump it. Commonly they throw this garbage close to the rivers or some public places which belong to the government sector. This is a big problem to the governing sectors as well. But most of the times

municipalities or other sectors who collect the waste do not think much more about the problems create by the nature of the garbage disposal. So looking for a current situation with possibilities and constrains of PPP in SWM in a developing country may give insight on how to handle the SWM in a proper way.

1.2.2 Research Objectives and Questions

The purpose of this study is to look at public private partnership in SWM in developing nations. While I am looking at this I would like to look at positive and negative experiences and situations of PPP in SWM in developing countries, specifically focusing on the situation in Sri Lanka.

1.2.2.1 Main objective

- Identify how PPP work in SWM in different developing countries.

1.2.2.2 Sub objective

- Addressing the PPP challenges of SWM in Sri Lanka.

I will look at the relationships between actors or roles of PPP in SWM using the actor oriented theory developed by Long (2001) in development studies. The following questions will help me achieve this:

1. How does PPP work in developing countries? (Experiences and situations).
2. What is the Impact of PPP on MSW management?
3. How does PPP in SWM work in Sri Lanka?

2 THEORETICAL FRAMEWORK

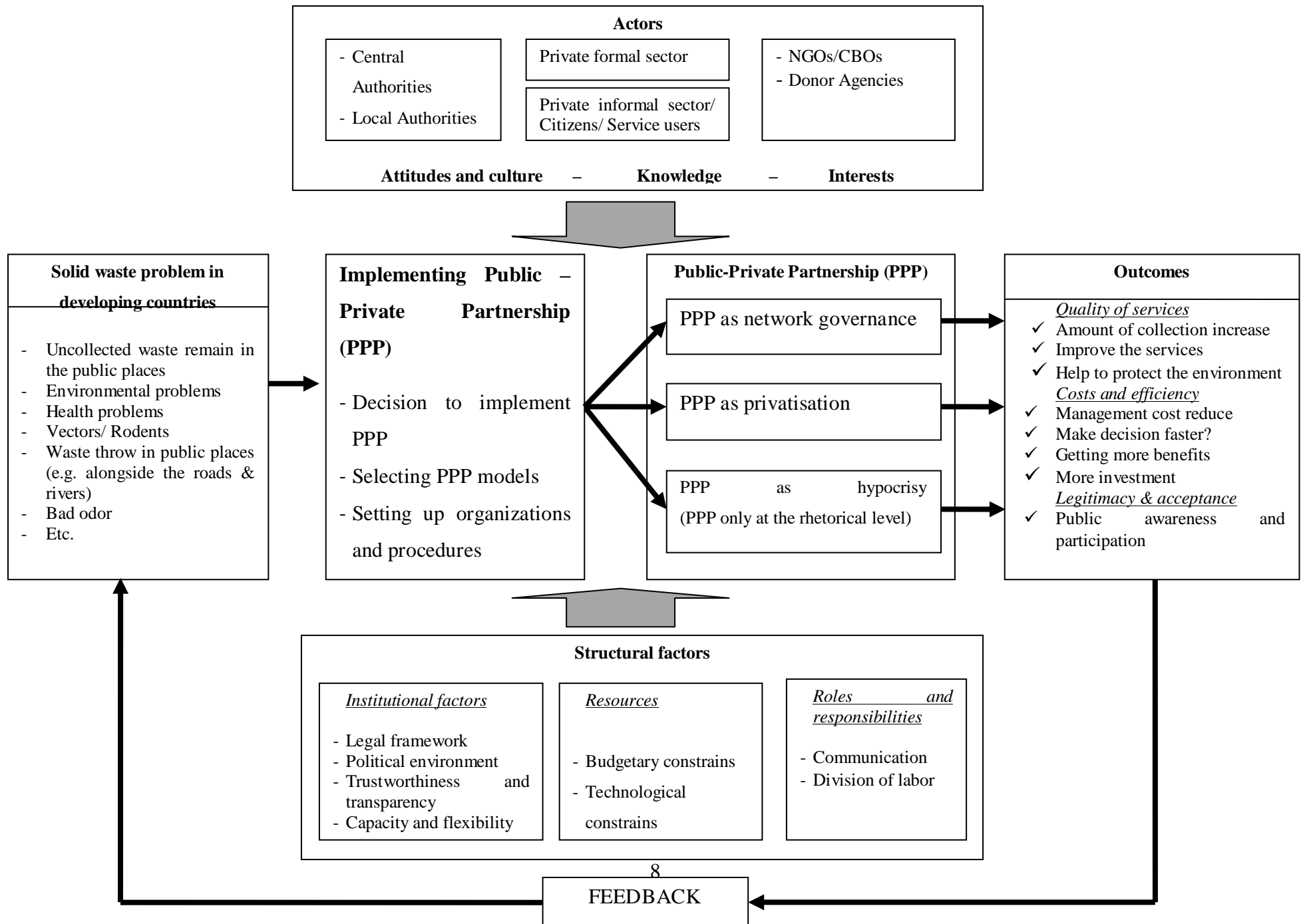
To get a better understanding of the possibilities and shortcomings of PPP in SWM it would be useful to base the review of the study on an analytical framework. Such a framework would also be useful when structuring the discussion of findings in the reviewed literature. I will therefore in this chapter identify and explain the framework used in analysing the reviewed articles and books selected for this study.

2.1 Analytical framework

When defining the analytical framework I looked at introducing PPP as an implementation policy where PPP is introduced as an organisational scheme to improve SWM. According to Pressman and Wildavsky (1984) a classical way to model implementation is to conceptualise it as a chain from problem identification action to results. Such conceptualisation has been used in project evaluation, but it is also criticised for lacking a process and actor orientation. Implementation is always influenced by involved actors and structures which makes the context of the implementation. In our specific model we have translated a model from Norwegian used by Baklien (2000). In this work I integrated the theory of PPP and that of involved actors into the total framework. The implementing framework will integrate theory of actors (as part of the context) and theory of PPP (as what should be implemented) into a single framework. Theory of actors and on PPP is therefore presented as part of the overall theoretical framework.

Using this framework first I looked at the problems related to SW faced by developing nations. Then I found PPP as a solution to the problem. If PPP is to work properly they need some support from the actors involved in such issues and support from the political side with laws among others. If these conditions support PPP, SW related problems can be reduced and the outcome should become fine. However if the PPP does not work properly, developing countries have to face the problem again or continuously.

Figure 1: Overview of the SWM system in Developing Nations



2.2 Public – Private Partnership (PPP)

Public – Private Partnership (PPP) is a tool of governance. All over the world many countries use this governance method to manage waste especially in the cities.

2.2.1 New Public Management (NPM) and Governance

New public management (NPM) can be define “as a body of managerial thought or as an ideological thought system based on ideas generated in the private sector and imported into the public sector” (Larbi, 1999, p.12). In general, public services are carried out by private sectors with structural, organizational and managerial changes. Palmer (2009) argues that NPM focuses on the management of public services carried out by the private sector with management changes. In this point of view, it is easy to link this to governance and PPP. The term PPP is simply defined as a tool of governance or management (Hodge and Greve 2005). Massoud & El-Fadel (2002) defined PPPs “as the transfer and control of a good or a service currently provided by the public sector, either in whole or in part, to the private sector”. Researchers noted that PPP is difficult to define because the term ‘PPPs’ is a broad term and includes many forms of partnerships. Most of the definitions reveal PPP as a co-operative scheme between the public and private sectors (Akintoye, Beck & Hardcastle, 2003). Jon Pierre (1997, p.31) has noted that “partnership obviously involves two or more actors, at least one of which is public”. Literature on definitions of PPP show there are some special features which includes;

1. Partnership involves both public and private actors.
2. All participants are most important in a PPP.
3. There should be good relationships between actors.
4. In a PPP each of the participants brings something to the partnership.
5. Partnerships mean there is some responsibility for both sectors in outcomes or activities (Peters, 1998).

According to Klijn and Teisman (2000), PPP is an ambitious governance arrangement, which falls within the context of the intense changes in the role of the state (in Sedjari, 2004). Governance can be define as, “governance concerns performance of the government,

including public and private sectors, global and local arrangements, formal structures, informal norms and practices, and spontaneous and intentional system of control” (Roy, 2006, p.5). Good governance is important to carry out public services with changes. UNCE (2008) argues that without good governance it is difficult to guaranteed the ‘effectiveness’ and ‘quality’ of public services. In economical viewpoint good governance in PPP should be effective (able to buy and deliver services in high quality with lower prices). Also PPP is a motivated governance arrangement and always fall into the intense changes the role of the state is currently experiencing (Klijn & Teisman, 2003). In general PPP is normally known as long term cooperative institutional arrangements between public and private sectors to achieve various purposes (Hodge and Greve 2005).

NPM basically discussed fundamental changes to the power relationships between the main players in the system of government and requires significant attitudinal changes on the part of bureaucrats (Samaratunge & Bennington, 2002). NPM tries to ensure better governance with less cost (UNCE, 2008). To deliver services in low cost, NPM emphasizes public managers roles’ in providing high quality services, identifies the importance of providing the human and technological resources which they need to achieve their goals (Samaratunge & Bennington, 2002). However without good governance it is very difficult to achieve goals. NPM theory states that, even if public services are delivered by the private sector, still government has a responsibility to guide them in addressing public issues (Miller & Dunn, no date). Normally public sectors have more responsibility to deliver public services to the citizens. Accordingly, the goal of the public sector, it is to deliver their services to the people. So NPM says public agencies should guide the private sector to achieve their goals (*Ibid*). However policies related to PPP are important to achieve the goals. Some governments carry out PPPs without PPP policies which create some problems in governance such as ill defined goals (UNECE, 2008). Studies show that it is very difficult to implement the PPP in many countries. The most important reason for this is, to deliver the PPP projects they have to improve institutions, processes and procedures (UNECE, 2008). If the countries do not build good governance in the PPP project, they may fail in their projects.

It is important to share the resources when public or private sectors face problems or shortages in their resources. NPM theory says agencies can share their resources when they need (Miller & Dunn, no date). Even in PPP there are two most important aspects. First, PPP is cooperation between organizations and second aspect is sharing risks (Hodge and Greve

2005). Risk sharing is viewed as an important incentive for both the public and private sectors, since it is assumed that risk-sharing could benefit both actors (*Ibid*).

Important matter in service delivery is decision making. If the decision is taken by high level managers who are not familiar with the problem, that decision cannot be implemented or when they try to implement they will face some practical problems that people may not like or it may not be a suitable decision to solve the problem. NPM explain that it is important to increase the number of people or institutions in the decision making process (Miller & Dunn, no date). The local community is a very important participant in the decision making process because the people decide how the service should be delivered. When making decisions it is better to involve the actors who are affected by the problem for example in SWM, local authorities, environmental ministries and most importantly households. Therefore when taking decisions it is better to inform and/or not only the high level managers who work in the environmental office but also staff working in the local authorities and householders. Participation means all actors should take active part to manage the problem. Without enough participation it is difficult to handle the project successfully. Meantime UNECE (2008) set up good governance principles in PPP and it focuses on policy, capacity-building, legal framework, risk-sharing, procurement and put people and the environment first.

UNECE (2008) states that there are some terms used in explaining partnership agreements. These include the following, Buy-Build-Operate (BBO), Build-Own-Operate (BOO), Build-Own-Operate-Transfer (BOOT), Build-Operate-Transfer (BOT), Build-Lease-Operate-Transfer (BLOT), Design-Build-Finance-Operate (DBFO), Finance Only, Operation & Maintenance Contract (O & M), Design-Build (DB) and Operation License (*See annex 1 for more details*). Some writers state these are the model of PPP. BOT and BOOT are the most common models in SWM but DBFO also emerge (Department of Economic Affairs, India, 2009). Under BOT contract, the private sector design, finances and constructs a new facility under long-term contract. During the term the private sector operates the facility after that ownership is again transferred to public sector (UNECE, 2008). BOOT means the government gives a permit to a private partner to finance, design, build and operate a facility for a specific period of time. At the end of the contract period the private sector transfers the ownership to the public sector (*Ibid*). In SWM, DBOFT model explains the private sector designs, finances and constructs a new facility under a long-term lease, and operates the facility during the leasing term. At the end of the lease term, the private partner transfers the new facility to the public sector (UNECE, 2008).

PPP is more related to New Public Management (NPM). NPM emphasizes more specific implementation approaches (Ewalt, 2001). Also NPM discusses particular types of management (*Ibid*). This means it talks about how to deliver public services with private sector cooperation.

2.2.2 PPP as Network governance

‘Network governance’ is accepted widely due to creations of significant economic benefits (Jones, Hesterly & Borgatti, 1997). Meier and O’Toole (2004) argue that “a network is a pattern of two or more units, in which not all major components are encompassed within a single hierarchical array. . . . Many of these complex arrangements are required or strongly encouraged by policy makers through interagency ties, intergovernmental links, or mandates for public-private partnership”.

Policy networks can be defined as “changing patterns of social relationships between interdependent actors which take shape around policy problems and/or clusters of resources and that are formed, maintained and changed by ecology of games” (Klijn & Teisman, 2003, p.1).

UNDP’s article ‘Public-Private Partnership for the urban environment’ describes some important conditions needed for PPP, these are; compatible goals accepted by both actors and which can be achieved, suitable political environment with legal framework for contract procurement and private sector environment, political and social acceptance, trustworthiness and transparency, sharing risk and rewards (resource obligations), capacity development, clearly define roles and responsibility, flexibility and enough time to achieve targets.

2.2.3 PPP as privatisation

Ramamurti (1992) refers to privatization as ‘the sale of all or part of a government's equity in state-owned enterprises (SOEs) to the private sector, or to the placing of SOEs under private management through leases and management contracts’ and PPP is somewhat equal to privatization. Savas (no date) states that privatization is reducing the role of government sector and increasing the role of private sector. This entails government privatizing their parastatals to satisfy people’s need (*Ibid*). It seems that, when it comes to privatization, the services are more dependent on private sector than the government sector. Some researchers argue that privatization and PPP are almost same. Savas (no date) further emphasized that both the public and private sectors play important roles in privatization, and it is increasingly

common to refer to ‘public-private partnerships’, a less contentious term. Palmer (2009, p.3) argues “privatisation, and public-private partnerships, fall in the NPM framework as alternative service delivery arrangements to traditional public procurement”.

2.2.4 *PPP as hypocrisy*

Cambridge online dictionary (2011) defines hypocrisy as “pretending to be what you are not, or pretending to believe something that you do not”. In PPP, the government believes that it can do something practically, but it could not due to some practical problems. Therefore it fails to manage the issue.

2.3 Actors

This section clarifies actor oriented theory which I used in the research. Generally actors play very important role in such problems like SWM. Actor oriented theory gives insight about involved actors and their behaviours.

2.3.1 *Actor oriented theory*

Normally there are many actors involved in a specific problem and these actors interact with each others. This interaction has become a socially construction system. The actor-oriented theory tries to identify the conflict on the basis of power, goals and information of the actor. The term ‘actors’ not only identify the class, gender, ethnicity, age group and status of the people but it also includes active participants who have different powers and various resources. It is important to think about the specific situation and the environment when the actors are identified. These active participants normally interact with some other local actors and some various actors in their social system. This interrelation is important to the outcomes of the action taken by the actors. Meantime, identifying the actors engaged in the conflict or the problem may help to find out their decision-making process and relationships of power.

At the heart of an actor-oriented sociology of development is the classification of social action as entailing both social meaning and social practice (Long 2001). Moreover the actor-oriented approach states that social life is a heterogeneous process. That means it includes all societies of various lifestyles and cultural forms. In general, we know that social practice is not an individual process, but it is a network of relations. So it is more complex. That is why Long and Long (1992) reveal that “it is important to understand intervention of new structures

among actors as a complex set of historically social encounters and battles over meanings and resources, since they are linked to particular historical events and processes”. But one advantage of the actor-oriented approach is that it focuses on clarifying differential responses to similar structural situations, even if the conditions seem to be the heterogeneous.

The approach conceptualizes knowledge as a way of involving construction and order, and not as a simple accumulation of facts, or as being unified by some underlying cultural logic, hegemonic order or system of classification. Knowledge emerges out of a complex interplay of social, cognitive, cultural, institutional, and situational elements. It is therefore always essentially provisional, partial and contextual in nature, and people work within a multiplicity of understandings, beliefs and commitments. An actor-oriented approach therefore states that one set of circumstances might be responded to in many different ways because of the diversity of actions undertaken at the local level (Long & Long, 1992).

The actor-oriented analysis emphasizes that generally the actors are controlled by the 'bounded rationality'. So their information set is not perfect when they make their decisions. However they can take normal decisions, but these decisions can be based on insufficient information and therefore it may lead to sub-optimal solutions.

Moreover, the actor-oriented analysis explains how the meanings, purposes and powers related with different modes of human agency intersect to shape the outcomes of emergent social forms. The Actor oriented theory tries to find out the complexity and connection between the actors' practices and their aims.

Biggs and Matsuert (2004, p.1) state that actor oriented “approach is concerned principally with mapping relationships and flows of information to provide a basis for reflection and action”.

Several actors are involved in SWM. The different actors who are involved in urban SWM practices can be grouped into four major groups which include: Public sector; Private actors-Commercial; Citizens and informal sector and NGOs and donor agencies.

2.3.2 Public Sector

Public sector refers to 'public own enterprises and/or institutions'. In SWM the public sector actors include Local Municipal Governments (LMG) or Local Government (LG) or urban authorities or city cooperation (Ahmed & Ali, 2004).

Public sectors in SWM get their responsibility by laws and regulations or by policies related to environment protection or health (Schübeler 1996). The urban authorities get their powers and obligations from the central government authority (Klundert & Lardinois, no date). Public actors are controlled by laws enacted by central government authority. Furthermore in SWM, the public sector do much of their works manually e.g. street sweeping, loading. So, generally a substantial number of people are employ in the public sector.

2.3.3 Private actors: Commercial (formal private sectors)

The formal private sector include registered enterprises carrying out SWM services e.g. collection, transport, disposal and recycling. The 'formal private sector' can be define as “private sector corporations, institutions, firms and individuals, operating registered and/or incorporated businesses with official business licences, an organized labour force governed by labour laws, some degree of capital investment, and generally modern technology” (Furedy, 1990; Klundert & Lardinois, no date, p.3). These enterprises may be large or small.

2.3.4 Private actors: Citizens and Informal sector

This category includes unregistered, unregulated activities undertaken by individuals, families, groups or small scale business waste pickers, itinerant buyers, traders in waste materials and non-registered small-scale enterprises. Informal waste collectors are not regulated or controlled by government agencies (Ahmed and Ali, 2004). “Informal sector entrepreneurs or enterprises do not pay taxes, have no trading license and are not included in social welfare or government insurance schemes” (Haan, Coad, & Lardinois, 1998: Wilson et al 2006, p.797). In the context of municipal solid waste management (MSWM), the informal recycling sector refers to those involved in picking up the recyclable and reusable materials from mixed waste or from communal bins. Generally these people are called scavengers and waste pickers. These activities characterize the informal sector as this is labour-intensive, low technology, low-paid, unrecorded and unregulated work, normally carried out by individuals or family groups (Wilson et al., 2006). Due to poverty, unemployment or under employment, many informal sectors are active in waste management process in developing countries (Klundert & Lardinois, no date). Generally informal waste workers face economical problems, health hazards, difficulties to access social services and social security (Schübeler 1996).

The people who carry out their works or services in small scale for daily income or subsistence are also included among the informal private actors. Some informal actors visit houses and collect reusable and recyclable materials from the householders such as bottles, and cans by paying a small amount of money.

Community Based Organizations (CBOs) are also included in the private informal sector. CBOs are formed by community members. In general, some communities which cannot access enough facilities to maintain their environments clean due to large amount of SW tend to form CBOs for their safety. Generally, these people mainly undertake primary collection and street cleaning (Wilson et al. 2006). Klundert & Lardinois (no date) argue that CBOs are formed when some communities do not receive enough services and so they try to improve their environmental conditions by taking technical and/or financial supports from different agencies. Some CBOs focusing on SWM mainly participate in primary collection and street cleaning.

Furthermore, informal sector includes some individuals who work as waste collectors or sweepers or scavengers due to their religious, caste or ethnic grouping (Schübeler, 1996). Low caste or ethnic people cannot find jobs easily. This situation makes them to find some informal jobs. Due to this some people in the low caste are involved in SWM services. Some rural immigrants also engage in SWM to get subsistence income (Klundert & Lardinois, no date). Madina (2001) states that individuals become scavengers because of lack of education, marketable skills, old age, drug or mental problem.

2.3.5 NGO's and Donor Agencies

National or international Non-governmental organizations (NGOs) are also considered as private actors. Geographical dictionary (2005) defines an NGO as “any charity or volunteer association which takes on responsibility for a particular cause often starting on a small-scale and in response to a particular need such as natural disaster”.

Some agencies which consider the environment or peoples' health try to help - the developing nations to keep the environment clean. SIL international (1999) defines “donor agency as an organization that gives funds for projects of a development nature”.

2.4 Structural condition

2.4.1 Institutional structures

A geographical dictionary defines institution as any established law or custom. Clear and well-defined institutional framework is important for SWM due to the complexity of the WM system and the involvement of many actors (Da Zhu et al. 2008). As a result authorities have to make possible institutional structures to handle SWM.

“Institutional arrangements can be formal or informal (i.e. supported by the rule of law), and these arrangements are set in to established social practices” (Obirih-Opareh & Post, 2002, p.100). To establish these social practices most developing countries set up some legislation or laws or policies and rules and regulations to handle the environmental problem including SWM.

Obirih-Opareh & Post, (2002, p.100) recognized that “the institutional arrangement that has materialized in a particular area depends on numerous factors, including wealth, physical characteristics, strength of community organization, and prevailing policy of the local authorities”. Institutions which focus on WM consider health and environmental issues as well. These arrangements can be adjusted according to the problems faced on the ground. Furthermore, “an institutional arrangement might be viewed as financially workable if it can sustain itself” (Obirih-Opareh & Post, 2002, p.100).

2.4.2 Resources

Resources related to SWM include finance, workers, equipments, vehicles and technology. These resources are identified under sub headings.

2.4.2.1 Financial resources

In general developing nations allocate money for most of the environmental problems such as water pollution and waste management. These nations allocate small amount of their budget for MSWM. Also municipalities get taxes from the general public for their services. On the other hand, the private sector has enough money or investment to carry out the services thereby satisfying public needs.

2.4.2.2 Infrastructures

In developing countries municipalities or public sectors use different kind of vehicles to collect waste. Normally the municipalities or public enterprises use open trucks, tractor-trailers, tipper trucks, dumper trucks, compactor trucks and animal drawn carts (generally in small towns and rural areas) to collect solid waste in the towns or city areas to transport waste to disposal sites. In Sri Lanka, handcarts, two-wheeled tractors, and four-wheeled tractors are commonly used for collections. However, some Local Assemblies have compactor trucks. Types of collection vehicles depend on road width and traffic condition (Vidanaarachchi, Yuen and Pilapitiya, 2006).

Generally, in developing countries there is no standardized containers design for waste pick up (Zerbock, 2007). Road plastic barrels or discarded oil drums may be used as waste containers. Also some municipalities keep some containers or build some concrete receptacles within the city or town areas. Householders and commercial sectors put their waste into these containers. To collect waste from commercial areas or shops, individual bins or containers are placed in front of the shops or roadsides. Generally MSW are emptied directly into the trucks/tippers (Environmental Management Centre (edi), 2007). Most of the time collected waste is dumped into open places.

2.4.2.3 Labours

Several workers engage in SWM services in the developing world. SWM need more workers to work in offices to make plans, to collect, to recycle, drive the vehicles and repair the vehicles. Higher level staffs are appointed to make plans or take decisions and they mostly work in the offices. Higher level staffs get some training to improve their work or work more efficiently. Other people are appointed for waste collection. Before collecting the waste these workers have to sweep the roads. Municipalities employ some people specifically to sweep roads. The waste collectors and sweepers are not well educated and work without any training.

Due to economical problems labours in SWM are people without skills. Further most of their work depends on human resources. This means generally many processes in SWM, carried out in developing countries are partly or completely manual processes such as road cleaning and waste collecting.

2.4.3 Roles and responsibilities

“The increasing volumes of waste being generated would not be a problem if waste was viewed as a resource and managed properly” (UNEP, 2001). According to UNEP (2001) to solve solid waste related problems actors’ roles and responsibilities are very important. Ngowi (no date) point out partnerships as institutional arrangement and under this arrangement it is important to define each actor’s roles and responsibilities. As a result it is easy to achieve the overall aim of PPP in order to meet the public needs.

Each actor involved in SWM has significant roles and responsibilities. It is very important to understand the roles and responsibilities of everybody or each sector in relation to the problem. Reddy and Srinivas (2009) noted that understanding the role of actors is imperative to coming up with the best solution in providing quality services.

3 RESEARCH METHODOLOGY

This chapter gives information about research methods which was used for this study. A research methodology is defined as “a system of ways of doing or studying something” (Cambridge dictionaries online, 2011). Methods are tools. The selection of research methods depends on the research topic or researcher’s interests. Silverman (2010), states that there is no correct or incorrect method to proceed. There are only methods which are suitable to our research topic and the working model.

I found Qualitative method more suitable for my research topic. It is easy to explain the ideas when doing such kind of research. Qualitative method is a suitable method for describing the ideas understudy and it is more critically astute (Silverman, 2010).

3.1 Data gathering

The study is based on existing literature (secondary data) on SWM. Data which have been collected by others for some other research purposes are secondary data (Montello & Sutton, 2006). I used literature from the library of the Norwegian University of Science and Technology (NTNU) especially the library belongs to department of geography in Dragvoll to collect more information related to my study. I read lots of articles and e-books using bibsys ask and database. I searched for literature especially in the ISI web of science, JSTOR complete, Springer Link and Wiley online library.

When I tried to get related information in the internet I used several key words. Among those words or phrases most used search words or phrases were: ‘*solid waste management*’, ‘*developing countries*’, ‘*waste management*’, ‘*public private partnership*’, ‘*public private partnership and waste management*’, ‘*governance*’, ‘*waste problem*’, ‘*collection and transport methods*’, ‘*open dumping*’, ‘*waste management and Sri Lanka*’, ‘*waste management and cites in developing countries*’, ‘*waste management and peoples attitude*’, ‘*waste collectors*’, ‘*municipalities and waste management*’, ‘*roles and responsibilities*’, ‘*householders and waste management*’, ‘*new public management and public private partnership*’ and ‘*waste management and private sectors*’.

When using secondary data or information to write a research report it is significant to mention the author. In this context these kinds of reports normally include quotations. That is

why Patton (1987, p.7) suggests secondary data analysis “yields excerpts, quotations or entire passages from records, correspondence, official reports and open-ended surveys”. As such I used several quotations in my research report.

To select the literature I used some criteria. Considering my topic I gave more attention to the developing nations; the partnership with formal private sectors, how PPP work in SWM in developing nations such as in Ghana, Tanzania, India, reasons for success and failure of PPP in SWM and actors involved in the problem. These criteria gave more insights about the problem and PPP.

3.2 Strengths and weaknesses

Qualitative methods are useful to describe, search or find out any phenomenon which does not explain or understand well so far (Strauss and Corbin, 1990). Furthermore qualitative data can give much more information which cannot get from statistical sampling techniques. Hoepfl (1997) states that “qualitative researchers seek illumination, understanding, and extrapolation to similar situations” and also qualitative research is known as ‘real world’ research (Endacott, 2005), because qualitative research uses a naturalistic approach to understand the phenomena and it try to reveal the truth (Golafashani, 2003).

Researchers noted that qualitative research helps to get insight into people’s attitudes, behaviors, concerns, inspirations, aspirations and culture or aspirations. In this context I think that it is better to use qualitative research method for this research, because in this research report I have to write more about people’s behavior, attitudes and their culture. It should be considered that qualitative method includes three types of data collection. These are in-depth, open-ended interviews; direct observation and written documents include personal diaries and programme records (Patton, 1987). Hoepfl (1997) states that, written documents or document analysis (secondary data analysis) are very useful to qualitative researchers. Furthermore, Montello & Sutton (2006) reveal that ‘generally human geographers use qualitative data in their research’.

When reviewing literature related to my topic, I found that some of the literatures were more helpful and relevant. Some of the information was common. In some related articles authors did not mention full references. This made it difficult to believe their points and in cases when I thought the information was important I was compelled to write the internet link as a

source. Further, in such cases I tried to find same data in reliable articles. This meant that I tried to find the data with reference. However, when I read some articles the author quoted some points from some authors. In such situations I found the main articles but in few cases I failed to find the main article. Then I mentioned the second authors' reference and also noted where he/she cited from. Moreover, in some articles I found that the author referred to some books or articles in other languages for example, Norwegian. In such situations as well I used second authors' reference and mentioned their source.

3.3 Testing Validity and Reliability

It should be noted that validity and reliability are very important concerns in research. But now the question is how to test the reliability and validity in the qualitative research?

Generalization helps to maximize or test the validity and reliability of a research. Golafshani (2003), observed that to generalize findings is the most common method to test validity in the research. He further noted that research quality depends on the generalisability of the result. Furthermore, triangulation approach also helps to improve validity and reliability of the research. Triangulation method is a combining strategy of multiple kinds of methods or data. The use of several methods to collect data for example, observation, interviews and recordings helps to make the research more valid, trustworthy and reliable (Bashir et al. 2008). This triangulation method strengthens the research or findings (Patton, 2001). Triangulation strategy is useful to control bias and establish valid propositions in qualitative research (Mathison, 1988).

Endacott (2005) reveals that using believable informants, continuous observation and data analysis, looking for negative cases and observe the situation at different times following strategies can enhance the trustworthiness or reliability and validity of the research.

It is important to have a look at how reliability and validity was tested in my research. I read several articles to write my report. In order to enhance or ensure that my results were as valid and reliable as possible, I always crosschecked the data. When I read completely different ideas, then I try to read more articles about such information until I was clear about the matter. I decided to read two or more related articles which give almost the same information to ensure trustworthiness. When I found government or official website I try to get data from these websites. But most of the time I cross checked this information with other information

written by private sectors. Moreover, I used credible sources where the writers used good sources or references or where they gave quotations. When I saw a very important fact with quotation I tried my best to find the main article to ensure validity and reliability in my findings.

4 PRESENTING RESEARCH ON PPP IN DEVELOPING COUNTRIES

4.1 Actors and their Relationship to PPP

4.1.1 Public Actors

Public actors play key roles in solid waste management. Anyhow in several countries the public sector faces many problems to manage waste. These problems can be identified as follow:

Public funding: Public actors face problem of funding to manage SW. This means their income is not enough to provide SWM services. Due to this special reason they fail to manage SW in entire cities or have limitation in meeting public demand (Ahmed and Ali, 2004).

Competence: Normally the public sector employs a substantial number of people, but most of them are not well trained. So public sector staff works with inadequate managerial skills (Ngowi, no date). In general, government appoints several labourers for SWM but due to lack of skills and training the public sector still does not have a good workforce. As a result municipalities face problems to handle the problems and have to appoint more skilled workers in SWM, for example, the Colombo Municipal Council (CMC). In Sri Lanka, 22.9 percent of the total municipality workers of 10,715 worked in SW department in early 2000 (Horen, 2004). Anyhow, even in early 2000s CMC used to mention that still municipalities face problems due to lack of staff (*Ibid*). In addition, many developing nations face problems with lack of mechanics. Levine (1994) reported that in developing nations several municipalities have one mechanic for 10 – 15 vehicles. It is difficult to repair around 15 vehicles by one mechanic and if the municipality wants to buy a spare part for vehicles they have to wait until they get permission from an upper manager. Therefore, many vehicles take about 2 – 6 days for minor repairs (Levine, 1994). The writer further noted that if the spare part for the vehicle has to be ordered from a foreign supplier, then it takes 3 – 6 months to repair and due to these reasons nearly 25 – 50 percent of the vehicles remain in disrepair for long time in developing nations. Accordingly municipalities fail to collect the waste properly.

Infrastructure and/or Resources: Public sector workers work with inadequate equipment. They have to work slowly with old vehicles and equipment. Most of the vehicles are very difficult to operate, maintain (Zurbrugg, 2003) and in bad condition or old. Generally municipalities encounter many problems to buy new vehicles and they also face problems to repair old or broken vehicle. Availability of vehicles and conditions of the vehicles are also some of the reasons why waste remains uncollected in public places. This means collectors cannot follow the collection schedule due to lack of vehicles or conditions of the vehicles (Kassim & Ali, 2006). Kasseva and Mbulingwe (2005) found out that many SW collection trucks in Dar es salam city, Tanzania are in bad condition. Even in Sri Lanka it has been observed that the collection trucks are not in good condition. Jayaratne (no date) noted that Colombo Municipal Council, in Sri Lanka has 38 compactor trucks, 50 tractor and trailers, 323 loaders and handcarts and several waste compactors, bull dozers, tippers and skip hoist trucks but Colombo municipality face problems to collect waste effectively in entire city due most vehicles are in bad condition.

Due to Local governments' (LGs') lack of budgetary allocation for SW the public sector cannot improve their service delivery with new technologies and train staff. Lack of vehicles or bad conditions of the vehicles and old equipments lead the public sector to collect waste from selected areas or sides. Ahmed and Ali (2006) found in their research on PPP in SWM in developing nations that the public sector does not have the skills or incentive to change the traditional mode of service delivery and build partnership with the private sector and citizens. They also do not have finances for experimentation along this line. So they have to do most of their works manually such as street sweeping, loading and unloading and drain cleaning and public sector have to provide the service with lots of workers (Ahmed & Ali, 2004).

Political interference also affects public sector activities. Massoud et al (2003), argue that the public sector or local government are motivated by political interests. Due to regular changes in the politicians in power, the public sector faces problems in implementing some project regularly. This means that if any politicians in power embark on a project it can be implemented when the same politicians are in power. However when a new political party comes into power through an election, the new ruling political party does not usually continue to implement the same project embarked on by the previous political party. This happens in SWM as well.

Public sector actors sometimes try to fulfil their responsibility in waste management system due to their mandate and obligation or due to the power and patronage conferred on the governments or its representatives. However they cannot do it properly because of unclear objectives, poor institutional structure, lack of trained staffs, inflexible work schedules, inadequate supervision and strong workers' unions (Klundert & Lardinois, no date). So it is generally said that government is weak in management and operations. Anyhow, the public sector cannot make necessary changes in their work procedures and thus changes are necessary to work with private sector (Massoud et al 2003).

4.1.2 Private Actors: Commercial

Efficiency: Commercial establishments, industrial enterprises and institutions are also interested in waste management. Due to their interests they cooperate with government and/or specialized private enterprises (Schübeler, 1996). Relatively speaking that the private sector is more effective and efficient than the public sector (Ngowi no date). The private sector is generally identified to be better at design, construction, and operations. The private sector's strength includes that 'they can make decisions fast and be creative in approach, design and the use of technologies' (Massoud et al. 2003). Ngowi (no date) states that compared with the public agencies, the private sector is more dynamic, flexible, creative, innovative and vibrant in their works. Moreover, the private sector usually meets certain performance criteria, while the public sector does not benchmark their own performance (Massoud et al. 2003).

In PPPs, "while the public sector has the ultimate responsibility for providing services, actual delivery becomes the responsibility of the private sector under contractual arrangements" (Awortwi, 2004, p.214). Literature shows that the purpose for entering into partnerships with private contractors was to improve service delivery (Awortwi, 2004). For example several SWM activities in developing nations show that after the contribution of the private sector SWM facilities have increased (See section 4.3.1 for more details).

Labours: Literature shows that private sector have strong well trained workforce and experienced workers. Private agencies have employee's compensation procedures as well but they pay lower wages to the employees than the public sector workers. Moreover, private sector works hard with skilled workers and new technologies.

Flexible work schedule: The private enterprises have flexible work schedules with better management (Ngowi, no date). Moreover they do not want to wait for decisions to come from

higher office manager and they can respond faster. They can make or change decisions fast (*Ibid*). Furthermore, they have clear objectives in their works. Due to flexible work schedule, fast decision making process and clear objectives the private sector work better than the public sector (Massoud et al. 2003). Their greater flexibility leads them to buy or sale their products (which they produce from waste) quickly (Ngowi, no date). For example, they can get facilities soon, such as if they do not have enough vehicles to collect waste or want to repair a vehicle they can repair it in few days with good workers (Levine & Coad, 2010).

4.1.3 Citizens and Informal Actors

Informal micro enterprises enter into the SWM activities due to the gap in service delivery (Ahmed & Ali, 2004). Insufficient collection, uncontrolled street collection points and over dumping in open dumps has led the informal waste collectors or scavengers or waste pickers to collect waste (Wilson et al., 2006).

There are millions of poor people living in cities in developing countries doing waste collection or recyclable waste as their job. For instance, over 20,000 women work as paper pickers in Ahmadabad city (Rose, 1992). It has been estimated that up to 150,000 waste pickers are active in Municipal Corporation of Delhi area (Chaturvedi, 1998). Anyhow, local government have a negative attitude towards the informal private sector. Hence, the local government tend to neglect the informal private sector or try to eradicate informal activities altogether (Horen, 2004). Furthermore, the informal private sector carry out their work in unhygienic conditions, they are poor and face economic problems, health hazards and do not get enough health services (Schübeler, 1996). Meantime, it is believed that the private informal sector work alongside the public sector in many developing countries. Sometimes informal workers work as recyclers of waste materials.

4.1.4 NGO's and Donors

In many developing nations NGOs and donor agencies are directly or indirectly involved in SWM services. NGOs act as intermediaries between the private and governmental realms by providing technical and financial support in order to improve their works or services (Schübeler, 1996: Klundert & Lardinois, no date).

Schübeler (1996, p.21) further argues that NGOs play important roles in waste management by contributing to,

- “people’s awareness of waste management problems
- organizational capacity and the formation of community-based organizations (CBO)
- channels of communication between CBO and government authorities,
- CBOs voice in municipal planning and implementation processes (decision making),
- technical know-how of locally active CBO, and
- Access to credit facilities”.

Furthermore, most of the time NGOs support the informal sector waste workers by helping them to organize their work themselves, to increase income and their working situations. NGOs have good cooperation with communities and work more closely with them. Their goal is not to make profit, but to enhance the poor environment (*Ibid*).

In Sri Lanka, after the UN conference on Development and Environment held in 1992, many local NGOs started to involve in urban environmental programmes. Failure in government programs, increase of urban environmental programs and donor funding encouraged the local NGOs to promote community based urban environmental programs. Since 1990 several local NGOs have gradually been engaged in environmental issues with grassroots level organizations (Jayaratne, no date). Based on previous studies, the privatization process in solid waste management was first carried out in Colombo (the capital of Sri Lanka). Initially, one of the urban environmental management NGOs named ‘SEVANATHA’ (local NGO) carried out its services in Colombo city. At present ten NGOs and several CBOs are engaged in urban solid waste management in Colombo urban area (Jayaratne, no date). Local Colombo-based firms, Abans Environmental Services, Burns Environmental Technologies (Pvt.) Limited (BETL) and Carekleen are example of some of the NGOs engaged in providing urban services.

NGOs help to improve WM programmes in several ways, For example, in Colombo, Sri Lanka Japan International Corporation agency (JICA) the local NGO provide money to build collection centres and another NGO ‘SEVANATHA’ conducts training programmes for the workers and engage in community mobilization work. Some NGOs engage in awareness programmes of the benefits of waste sorting and recycling for residents such as The CBO Federation of Badowita (CBOFB). CBOFB carries out awareness programmes by using street

banners, voluntary cleaning programmes, organizing small group discussions and community forums. NGO, Sethsevana, engages in environmental improvement activities. Some NGOs have started waste treatment practices e.g. composting of waste at household level, recycling of waste materials, incineration and landfills (Horen, 2004).

International and regional donor agencies such as UNICEF, World Bank, United Nation Development Programme (UNDP) help by giving finance or technical knowledge to enhance the environment and health and sanitary conditions. These donor agencies help in several ways how to handle the waste, for example, Asian development bank and bilateral donor agencies including Japan International Corporation agency (JICA). World Bank financially supported the Colombo Environmental Improvement Project (CEIP) to identify and improve a suitable waste disposal facility for Colombo Area (GCA).The Urban Bilateral donor agencies, Japan International Corporation Agency (JICA) and the Australian Agency for International Development (AusAID) have started programmes in waste transport and disposal (Horen, 2004; UNEP, 2001).

4.2 Structural factors affecting implementing PPP

Due to some institutional reasons, some resource related problems and lack of communication; some developing nations have difficulties to implement the PPP in SWM. These factors can be explained in the following subheadings.

4.2.1 Institutions

A clear and well-defined institutional framework is important for SWM due to the complexity of the WM system and the involvement of many actors (Da Zhu et al. 2008). As a result authorities have to make appropriate institutional structures to handle SWM. Therefore, municipalities in developing countries make some policies, rules and regulations to protect the people and the environment. To reduce the practical problems to implement these policies, they make some institutional arrangements.

Almost every developing country has organizations responsible for SWM. The table gives more information about the responsible organization and the current situation of MSW in selected developing countries.

Table 1: Responsible Organization & Current Situation of MSW in selected countries.

<i>Country</i>	<i>Responsible Organization</i>	<i>Current situation</i>	<i>Current action</i>
<i>Afghanistan</i>	<i>Ministry of Irrigation, Water resources and Environment and Afghan Assistance Coordination Authority</i>	<i>No environmental legislation</i>	<i>Start to develop legislation since 2001</i>
<i>Bangladesh</i>	<i>Ministry of Environment and Forest</i>	<i>No separate policy or handling rules for solid waste</i>	<i>Preparing a comprehensive solid waste management handling rules</i>
<i>Bhutan</i>	<i>Municipalities</i>	<i>Fails to enforce the law</i>	<i>enforcing the law</i>
<i>Cambodia</i>	<i>Ministry of Environment</i>	<i>n/a</i>	<i>Improving the waste management facilities and educating people</i>
<i>Laos PDR</i>	<i>Ministry of Communications, Transport, Post and Construction</i>	<i>n/a</i>	<i>Establishing a waste management system</i>
<i>Maldives</i>	<i>Ministry of Home Affair</i>	<i>n/a</i>	<i>n/a</i>
<i>Myanmar</i>	<i>Pollution Control and Cleansing Department</i>	<i>The regulation is out modelled</i>	<i>No action</i>
<i>Nepal</i>	<i>Municipalities</i>	<i>Fails to implement national policy</i>	<i>Improving the waste management facilities and educating people</i>
<i>Sri Lanka</i>	<i>Responsible institutes: Local Authorities (MCs, UCs, PSs). Responsible ministries: Ministry of Local Government and Provincial Councils, Ministry of Environment and Natural Resources, Central Environmental Authority and Provincial Solid Waste Management Authorities</i>	<i>No separate policy formulated for solid waste until 2000</i>	<i>The 1st National SWM Policy and Strategy was formulated in year 2000, The Second National SWM Policy and Strategy was formulated in year 2008, The Western Provincial Council has established a Provincial SWM Authority in 2007</i>

(Source: Glawe et al. no date, p.8, Chularathna, 2009).

Several policies related to waste management is available at international, national and local levels, for example, international Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (29 Dec 1972), Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes (22 Mar 1989). In most of the countries national governments try to protect the environment with common environmental laws such as India (Islam et al, 2001), Sri Lanka. It should be noted that India's environmental regulations are well developed among the most developed of the non-OECD nations (Islam et al, 2001). Sri Lanka has in place the Environmental (Protection) Act (EPA), 1986, which tries to protect the environment and in Uganda has some policies, legal and institutional

frameworks for environmental management. These are common for all environmental problems (Kirunda, 2009). These laws give low priority to the waste management, that is, they do not have separate laws for SWM. Kirunda (2009) states additional policies are needed for SWM.

In the case of SWM, higher level managers especially in the public sector cannot take the decisions. Decisions made by actors who are going to implement the project are likely to more effectively and efficiently resolve the problems they are intended to solve. Da Zhu et al. (2008, p.98) argue that “some decisions should be taken by the top level of management (such as planning and monitoring) and others by the middle and lower levels of management (such as day-to-day activities related to providing service)”. The writers further emphasized, “a medium or large city will obtain greater efficiency by dividing the municipality into zones or wards for service provision and by delegating some decision making powers. The powers delegated to the zones or wards will ensure more effective supervision of the workforce engaged in tasks like sweeping streets, door-to-door collection, and secondary storage of waste while the municipality takes care of transportation, treatment and disposal” (*Ibid*).

Literature shows that like some other developing nations, in Sri Lanka institutional arrangements for waste management have not been clearly defined (Da Zhu et al., 2008). This means there are no separate policies for SWM in Sri Lanka. UNEP (2001e) and Vidanaarachchi, Yuen & Pilapitiya (2006) state that the Acts below help to govern the SWM in Sri Lanka.

- The 13th Amendment to the constitution (1987)
- The Provincial Councils Act No. 42 of 1987; sections 129,130
- The Municipal Councils ordinance (1980), sections 129, 130 and 131
- The Urban Councils ordinance, No. 61 of 1989; Sections 118,119 and 120
- The Pradeshiya Sabah Act, No. 15 of 1987; Sections 41 and 93 to 95
- National Environmental Act (NEA) No: 47 of 1980

In Sri Lanka, the Municipal Councils (MC) ordinance, Urban Councils (UC) ordinance and the Pradeshiya Sabah (PS) Act LAs have sections that focus on the collection of the waste which is generated in their boundary. The Central Environmental Authority (CEA) does not have any regulations, standards or guidelines for solid waste disposal. The CEA deals with the license system for waste management and some guidelines and regulations for hazardous

waste (Zon and Sirirwardena, 2000). Before 2000, a three year plan for WM was made and responsibilities were shared between national government bodies including ministries, the CEA, LAs, the private sector and the general public (Zon and Sirirwardena, 2000). These WM strategies emphasize the importance of sorting waste at the source and reduction, reuse and recycle the waste (UNEP, 2001). Also implementation is co-ordinated at national, provincial and local levels. Anyhow, clear details and funding methods were unclear even after year 2000 (Zon and Sirirwardena, 2000).

Like most other developing nations, in Sri Lanka Local Authorities (LAs) in the country are responsible by law to collect MSW within their authority (Vidanaarachchi, Yuen and Pilapitiya, 2006). There are three types of local authorities (LAs) in Sri Lanka: Municipal Councils (MC), Urban Councils (UC) and ‘‘Pradeshiya Sabha’’ (PS) – rural LA of a smaller scale (Zon and Sirirwardena, 2000). Each LA in Sri Lanka is administratively independent, but for its funding, it depends on the Provincial Council and/or the national Treasury (Vidanaarachchi, Yuen and Pilapitiya, 2006). Also in the MCs the medical officer of health (MOH) is responsible for WM (*Ibid*). The PS, MC and UC are assigned a Public Health Inspector (PHI) by the Ministry of Health (Zon and Sirirwardena, 2000). Always PHI plays an important role in SWM. But at the national level, policies related to SWM are the responsibility of Ministry of Forestry and Environment (MFE) and the Central Environmental Authority (CEA) (*Ibid*).

On the other hand, in Sri Lanka policies related to WM are not well defined. Due to this there are overlaps in SWM responsibilities of government agencies which have led to arguments among the agencies. So waste remains in the public places without any action being taken (Zon and Sirirwardena, 2000). Furthermore, some sections of the National Environmental Act (NEA) currently remain unimplemented (*Ibid*). Also no regulations or guidelines have been made to govern dumping of solid waste by private companies or industries (Zon and Sirirwardena, 2000).

4.2.2 Resources

4.2.2.1 Financial

Public sector: Generally, national governments allocate small amount to the SWM. The World Bank reported that municipalities spend 20 to 50 percent of the total budget for SWM. For example, Sri Lanka national government earmarked 3.15 percent of the total budget for

the LAs for waste management. In this budget LAs spend more than four-fifth for collection and transport and the rest of the budget was used for processing and disposal and other management activities (Visvanathan and Tränkler, 2003). World Bank further noted that even if the municipalities spend 50 percent of their budget on SWM, still they can be able to serve less than 50 percent of the urban residents due to rapid increase in urban population and inadequate workers and vehicles. We can say that the reason for open dumping and open burning may be common in developing world, due to this budget issue. Furthermore, on the other hand LAs get money from tax, license fees, assessment tax (property tax), fines and service charges. But still it shows that investment in SWM is not enough.

Another important point is that developing nations' governments do not know how to use earmark money to make profit. This is because the government employ a lot of people in SWM pays them high wages (Da Zhu et al. 2008). Most of the allocated money is spent on staff wages and labour, fuel for vehicles and vehicles maintenance (Vidanaarachchi, Yuen and Pilapitiya, 2006). Also unskilled workers make such services more expensive and take more time (Da Zhu et al. 2008). Eawag (2008) states that in Sri Lanka only 40 percent of the total waste generated is collected, due to lack of investment.

Normally the national government allocate small amount of budgets for SWM. Thus it is not true to say that lack of budgetary allocation is also one of the major factors why municipalities cannot collect all the waste in the cities in developing countries. Day by day city dwellers are increasing in cities or towns in developing countries and yet the national governments do not increase their budgets for SWM proportionately. Due to the lack of budget and unable to manage waste in entire city several developing countries have tended to partner with the private sector to handle the problem of SWM.

Private sector: Private sector is profit oriented. As a result normally they do not face problem with budget. "Contracting-out service delivery to the private sector helps the government to reduce costs because the private contractors are free from civil service requirements and thus have greater flexibility to hire and fire workers" (Kettl, 1993, p. 161; Helmsing, 1997, p. 72).

The formal private sector's main goal is to generate profit from their investment (Klundert & Lardinois, no date). To get back returns from their investment most of the time they provide capital, management and organizational capacity, labour and technical skills to the public

sector (Schübeler, 1996). Also the private sector's has ability for good management with controlling costs by using technology and skilled workers (Massoud et al. 2003).

The formal private sectors enter directly into contracts with individuals, neighbourhood associations or business establishments for collection services and then buying the waste from them (Schübeler, 1996: Klundert & Lardinois, no date). They especially carry out these activities to continuously generate income. Also generally, the formal private sectors collects reusable or recyclable goods and try to make something from recyclable or reusable waste (Post et al. 2003). This activity creates a chance to recover valuable materials and to generate more income. Under partnership each of the actors think about benefits, but this does not mean equality among them (Post et al. 2003. p.46). Anyhow, due to their more effectiveness and efficiency, the private sector gets the most benefits in solid waste management by selling waste, transfer, treatment, recycling and disposal (*Ibid*). "Other fiscal arguments are that if public services are provided by the private sector, governments will be able to reduce subsidies to loss-making public agencies, increase tax revenue from private operators and reduce public borrowing by encouraging the private financing of capital expenditure" (Awortwi, 2004, p.214).

4.2.2.2 Infrastructure

In developing countries municipalities or the private sector use different kind of vehicles to collect waste such as tractor, compactor trucks. Most of the municipalities do not have enough vehicles to collect the waste in the entire city. However, it can be observed in Colombo area that there still remains uncollected waste on road sides. But the private sector can support by providing vehicles to collect waste and they prefer to use vehicles which are in good condition. If the vehicles break down, the private sector is able to repair them as soon as possible because they make decisions fast and do not have to wait for permissions from the higher level manager. Studies show that private sector involvement helps to reduce the service cost by half in Latin American cities with higher labour and vehicles productivity (Levine & Coad, 2010).

Lack of physical infrastructure creates problems particularly to collect all waste in the city areas. In Sri Lanka it has been observed that the collection trucks are not in good condition. Jayaratne (no date) discussed that Colombo Municipal Council, in Sri Lanka has 38 compactor trucks, 50 tractor and trailers, 323 loaders and handcarts and several waste compactors, bull dozers, tippers and skip hoist trucks. However, it can be observed in

Colombo area still lots of uncollected waste remain on road sides. Studies show that even in Sri Lanka most waste collection vehicles are well past their useful life and are in need of repair or replacement. Also available vehicles are inadequate for current necessities (Vidanaarachchi, Yuen and Pilapitiya, 2006). Furthermore, householders and shop owners throw their waste in community containers which are placed on the roadsides. Municipalities collect this waste by using carts or vehicles. Sometimes municipalities use open trucks to collect the waste. As a result bad odor spread everywhere. Furthermore the workers carry out the collection services without any safety equipment for example, without gloves or boots (Garg, Kumar & Verma, 2007). Unsafe working conditions expose them to health hazards.

Moreover, many developing countries face some problems of lack of some important equipment to collect waste properly. The equipment which they already have is old and ill maintained. For example, Eceberger (2006) reported that Sri Lanka uses old and ill maintained equipment for SWM.

4.2.2.3 Labours

Another problem faced by the municipality is lack of skilled of municipal workforces (Asian Development Bank Institute, 1998). Commonly in developing nations lots of people engage in SWM processes related work. Generally, training is given to senior staffs (Asian Development Bank Institute, 1998). However, most of them are not well trained labour thus they cannot work well. Furthermore, notable also is high absenteeism levels among municipal waste collectors. This absenteeism negatively affects the SWM processes. This means municipalities cannot plan their work thereby reducing their efficiency.

In Sri Lanka the medical officer of health (MOH) and the Public Health Inspector (PHI) also lack technical knowledge and most of the time they concentrate on other public oriented duties. Due to this MOH and PHI reduce their waste management duties by sharing them with the untrained staff (Vidanaarachchi, Yuen and Pilapitiya, 2006). In some Pradeshiya Shabas (PS) untrained officers are in charge of WM (*Ibid*).

Due to lack of skilled labour, even if the municipalities get expensive technologies, they face lack of human resources (experts) to use them. If the technologies are used in an incorrect way by unskilled labours, then the technology and the finance go to waste. Furthermore, most of the current workers are not aware of the negative environmental and health problems created by waste. Also due to urban poverty some workers carry out their work using old equipment. That is why Schübeler (1996) noted that workers are exposed to hazardous

situation. But the private sector have skilled workers who aware about the problem and knowledgeable about high technologies to handle the waste.

4.2.3 Roles and Responsibilities

SWM has some goals which are the protection of public health and well being, enhancement of the quality and sustainability of the urban environment, promotion of efficiency and productivity of the economy and employment creation and income generation (UNDP et al, 1996). To achieve these goals the municipality cannot shoulder these responsibilities alone. It is undoubtedly true everyone's roles and responsibilities are important. Also waste management policies can only be successful, if waste is continuously properly managed and there is co-operation from all involved partners.

Municipalities or Local Authorities (LAs) and Ministries: Generally, in most cities in developing nations municipal solid waste management is the responsibility of the public sector or municipalities (Addo-Yobo & Ali, 2003). So generally municipalities are the main responsible agencies for collection, transportation and disposal of solid waste (Baud et al., 2004).

Normally, waste in Asian cities is collected once a day (Environmental Management Centre, India, 2007). Commonly says that the areas where rich people live in the cities are cleaner than the place where poor people live. This means municipalities collect the waste on daily basis or twice in a day in the core area or central business districts (*Ibid*). The reason why they collect waste in core area is better access. Municipalities do not provide their services to some parts of the cities. Accordingly, waste is dumped alongside the roads, open drains, channels and open spaces (Addo-Yobo & Ali, 2003). Poor solid waste collection and the disposal cause health and environmental problems.

Moreover SWM is a labour-intensive activity (Mohan et al, 1998). Many workers are employed by municipalities. Street sweepers sweep the street and public areas by using simple tools. They sweep main streets daily and other streets two or three times in a week. Mohan et al (1998) further emphasized that eighty percent of municipalities' total budget is used for the salaries of sanitation workers engaged in road sweeping and related activities.

Another important point about municipalities is they use top-down approach to waste management (Addo-Yobo & Ali, 2003). Generally developing countries adopt inappropriate

technologies from developed countries. These technologies rarely reflect the problem and most of the time do not solve the real problem. Householders are the actors who directly connect to the problem, but they are not involved in the design and implementation. Due to this householders are unclear of their roles (*Ibid*). Most of the developing nations still use centralized solid waste management. Accordingly, the decision making process take long a time. This means that to make decisions have to wait until the senior manager gives his/her approval. This causes delays in the delivery of services. One of the main reasons for the delay decision making is, these public sector or municipalities act on behalf of government and respect the policies, laws, regulations, directive etcetera.

Municipalities and ministries such as environmental ministries have the responsibility to collect waste properly and make the public aware of issues of waste. LAs need to understand how SW affects environment, health and quality of life and to take appropriate actions to improve the system (Klijn & Teisman 2003). However most of the LAs fail to achieve these targets due to lack of budget, lack of trained workers and.

Formal Private sector (commercial): Massoud and El-Fadel (2002, p.621) explain the roles of private sector. Which are (1) “improved performance of the public sector by employing innovative operation and maintenance methods; (2) reduced and stabilized costs of providing services by ensuring that work activities are performed by the most productive and cost effective means; (3) improved environmental protection by dedicating highly skilled personnel to ensure efficient operation and compliance with environmental requirements; and (4) access to private capital for infrastructure investment by broadening and deepening the supply of domestic and international capital”.

Generally private agencies are profit motivated and charge for their services (Ababio, 2010). Thus they manage to provide the services properly.

Moreover, Mohan et al (1998) found that waste collection efficiency is a function of manpower and availability and transport capacity. These two factors have a huge influence on SWM. Generally, the public sector faces problems in these factors. The private sector which engage in waste management have higher operating efficiency. This means they have trained staffs, good vehicles and good equipments which give higher output and productivity (Kaseva & Mbuligwe, 2005). In this way they can employ cost reduction approaches. Asian Development Bank (no date, p.21 cited in Heather Skilling and Kathleen Booth, 2007) states

that investors or private partners follow rules and procedures of the project and carry out the service carefully for good result.

Informal Private Sector: In several developing countries, the informal private sector is directly engaged in waste collection. These people normally provide their services where people do not get municipal services (Wilson, Velis & Cheeseman, 2006). They collect secondary materials such as plastic, paper, cardboard, aluminium, steel, other metals, glass, textiles (Klundert & Lardinois, no date) and sale it to local industries and they also use some of the materials themselves (Madina, 2000).

In developing nations' cities the informal sector collects on average 10 - 15 percent of the waste from the formal waste cycle such as cities in India and Mexico (Horen, 2004). Naas and Rivke (2004) argue that informal scavengers can give economic and environmental benefits by producing raw materials for industry and artisans or by waste recycling. They have high skills to identify waste with potential value. They add value to thrown waste by sorting, cleaning and changing physical shape (Horen, 2004). Local manufacturing industries (e.g. papermaking and steel making industries) in several developing countries depend on these secondary raw materials because these raw materials can replace the more expensive imported raw materials. When they produce something using secondary raw materials, they can sale it at a low-price.

Generally informal recycling system plays a major role in economic benefits in developing countries. Informal actors collect economically valuable and/or reusable or recyclable waste thus takes part in reducing waste. Literature shows that informal waste collection system reduces the cost of formal waste management system by reducing the waste by collection. As a result informal actors' activity helps the formal sector to save money and time on collection and transportation. This means the formal sector does not have to separate the waste and they can easily use it to make composter, or to burn or bury et cetera (Ahmed & Ali, 2004: Wilson et al., 2006). The authors further write that informal waste collection system provides livelihood for poor and/or vulnerable people. Accordingly, it reduces unemployment rate, poor and economic crises (Madina, 2001).

Informal enterprises are profit-based and do house to house waste collection too. Citizens also help the informal sector to collect some waste. Normally women (mother and daughter) are interested in selling economically valuable things to the buyers. Also when informal

enterprises provide their services to the people, they charge for their services from the households (Ahmed & Ali, 2004). Bearing above facts in mind, the informal waste collectors and citizens take part in reducing the waste destined for disposal sites and they help the public and private sectors by reducing waste.

Furthermore, it is important to point out individual scavengers or waste pickers are more vulnerable people because they collect waste without any organized supportive network (Madina, 2001). Informal recycling happens in developing nations due to low levels of economic development. Normally poor people are engaged in waste collection activity (*Ibid*). Also these scavengers or waste pickers are in health and safety risk because they do not use protective cloth or equipment and they are manual workers (*ibid*).

NGOs and CBOs:

Community Based Organizations' (CBO) have a goal to improve their living conditions. Thus they collect waste and transfer it to the disposal site. Sometimes they directly involve themselves in WM by collecting reusable valuable materials such as bottles and use organic materials directly for their stock (Klundert & Lardinois, no date). In addition to this CBOs hire the formal or informal waste collectors whenever they need them, to transfer their waste to transfer points, or to separate waste at source. As a result they help to protect the communities in which these CBOs operate and their environment. These activities support the public and private sectors to collect waste easily. Otherwise some waste can be remaining in the city. For their services they get payments from the residents (Kassim, 2009). Some NGOs and CBOs try to improve the livelihood of the unemployed street children (Henry, Yongsheng & Jun, 2006). They try to make self-employment groups. Some of these groups collect recyclable materials and other groups collect composting or organic waste. These activities help them to get some income for example, in Nairobi – Kenya (*Ibid*).

NGOs try to keep the cities clean in several ways such as by awareness programmes, giving funds. In Sri Lanka especially in some big cities (such as in Kandy, Negombo and Matale) JICA (NGO) introduced the 'bell system'. This is whereby the garbage collection vehicle rings a bell as it goes on the road. Then householders and shop owners put their waste into the vehicle. Studies show this system has been successful so far in Sri Lanka (Environmental Management centre, India, Mumbai, 2007). The roles and responsibilities of NGOs have been discussed in detail in section 4.1.4.

General Public or Householders: Householders are the main actors in generating waste. The general public generates waste and to manage the waste they have to separate it at source. Also they must put this waste in proper places at appropriate times. Then it would be very easy to collect it and this would help to keep the neighborhoods clean. The household have the responsibility to pay for the services when it is needed. Participation in SWM by paying taxes or service fees helps the private or public sectors to mitigate their budget constraints and to improve their services to the people (Asian Development Bank, no date, p.21 *cited in* Heather Skilling and Kathleen Booth, 2007). “This participation and good relationship between the households and contractors suggest that an improvement of the service would be better through communications with the households themselves as the service recipients. Also, it would provide a reliable means of identifying bottlenecks in the service (Kassim & Ali, 2005). Both the cooperation of households and cost recovery would be enhanced if residents were more involved in the planning of schemes” (Addo-Yobo & Ali, 2003).

In general citizens would like to keep their environments clean for environmental health reasons. Therefore, most of the people in developing nations have expressed willingness to pay for SWM. For example, Kassim and Ali (2005) reveal that in Dar es-salam municipality (DSM) city council in Tanzania householders pay for solid waste collection according to their income level and every municipality has its own by-laws. The amount charged for SW collection is different between 200 Tanzania Shillings (TShs) and 3000 TShs between the municipalities. The private contractors also collect this same amount of money for their services. Around half of the householders pay this amount regularly but it is difficult to collect from the other half of the householders (*Ibid*). Lack of the awareness may be one of the reasons for this. However, 50 percent of the people support to the private sector by paying money for waste collection.

Most of the city dwellers in developing nations do not know who should collect the waste and why they should pay for such service. Kassim & Ali (2005) found out that the householders think that the waste collectors collect such amount of money from householders to run the organization. Householders think the private sector need the money to cover collection and transportation charge and to cover the wages. In cases where the private or public sectors have not been successful in the collecting charge or people not willingness to pay for the services then it is difficult to run the project.

Asian Development Bank (no date, p.21 cited in Heather Skilling and Kathleen Booth, 2007) discusses roles of different stakeholders in PPP. When writers argues about consumers (householders), consumers or householders to have the ability to communicate, have freedom to discuss priorities for quality and level of service and classify strength and weakness in service.

Political decision makers: Politicians are also important stakeholder in the SWM process, because they have power to make or change decisions. For PPP their role is to set up and prioritize goals and objectives of PPP and relay this information to the public, approve suggested or recommended PPP options and approve legal frameworks for PPP (Asian Development Bank, no date, p.21 cited in Heather Skilling and Kathleen Booth, 2007). Without politicians' approval and legal framework for PPP, it is impossible to carry out SWM services with private partnership.

In developing nations, generally there is not much communication between the actors involved in WM. Managers who are in high positions think that they have more power to do everything including decision making. Due to this attitude they make decisions without discussing with other actors who are affected by the problem. Commonly these decisions look like top – down approach and difficult to implement. Addo-Yobo & Ali (2003) noted that in several developing nations, the high level managers or politicians do not give others the chance to contribute in designing and planning the SWM process, which results in residents being unsure of their roles. To success with the project the householders should participate in the decision making process in order to make decisions about types of collection, arrangement for collection and fees charged (Kassim & Ali, 2005). If the householders are involved in decision making then the peoples' problems or attitudes can be understood and the decisions made can be implementable decisions. If the decisions taken take the top – down approach then the grass root level people are not aware about the services and information does passes very slowly to the householders. Lack of awareness and low level of involvement would lead to low participation in the project (*Ibid*).

4.3 Models of PPP

4.3.1 Introduction

As mentioned in *section 2.3* there are many different legal forms of PPPs. Normally those models function as network governance and privatization. Sometimes PPP seem like hypocrisy.

4.3.2 PPP as network governance

Network governance is complex and includes many different actors from different networks. Further they always influenced decisions made by other actors who are in high level (Klijn & Teisman 2003). Anyhow “each of the actors trying to choose their own strategy” (*Ibid p.138*) and it is difficult to choose their own strategy in PPP, because they have to obey the laws and actors are dependent on each other (Klijn & Teisman 2003). In SWM several actors such as national government, local government or municipality, the private actors, and ordinary people are involved. Each actor has a different strategy. For example, municipalities have different strategies and the private sector has various strategies. Anyhow, under the PPP arrangement they have to agree on a common strategy which is accepted by all the actors. Generally to manage the problems participation by all actors is important. In network governance to handle the problem it is better to have good communication among the different actors (Klijn, Steijn & Edelenbos, 2010). It should be noted that good connection or communication between the actors helps in the understanding of the situation and avoiding misunderstanding among actors. If the PPP build up under mutually favourable circumstances, PPP can be successful and can be carried out over a long period. Also, in network governance, it is more likely that different rules of behaviour will be needed (Erik-Hans Klijn & Geert R. Teisman 2003). This means that sometimes the public or private actors have to change their behaviour to continue their work or project.

Literature about SWM in developing nations shows, normally there is no good communication or connection between the actors involved. Due to lack of communication municipalities face problems to implement the policy and most of the time this leads to failure of the project. Moreover, lawmakers make laws themselves without first discussing with the people who are affected by the problems and municipalities and waste administrators do not meet the public or lawmakers directly (Agamuthu et al, 2009). Even law makers do not consider the people’s thoughts or attitudes when they are making laws. So they do not

know the real situation and thus make some ineffective laws. Studies show that Sustainable waste management must be grounded in local legislation that is geographically and culturally feasible, reasonable and far-sighted (*Ibid*). When law makers make laws they should consider the general public, real situation, international laws as well as regional example (such as EU council directive). Policy makers should work from grassroots level, not top – down approach. And also it is better to increase community-based approaches to waste management because it can promote more sustainable development (GDRC, 2012). Grassroot efforts can be more successful than top-down programs created by bureaucrats or experts with little or no community participation (*Ibid*).

Due to the connection of various actors network governance seems more complex. Because of the inter connection among the actors, few actors cannot make decisions alone nor can they achieve the goals without the support of the other actors (Klijn & Teisman 2003). Furthermore, “networks are characterized by a limited substitutability of resources, which ensures that sustainable social relations are created between actors” (*Ibid*, p.138). Inter connection between these people are important to achieve the goals.

Commonly actors in central network positions have more power. In SWM, municipalities have more power. However, if the PPP want to implement successfully power should be shared with the private sector and/or other actors with whom they cooperate. Brass et al (2004) state that, “actors in central network positions have greater access to, and potential control over, relevant resources, such as information in a communication network”. Even if power is shared with others it cannot be said that always the networks can lead to positive ends because it could also be negative (*Ibid*).

Normally to handle the waste management the municipalities and the politicians have the power to make laws or create a positive environment for the private sector to participate in SWM. That is why Schübeler et al (1996) argued that private sector participation cannot guarantee higher efficiency by itself. That means that some conditions are important for efficient private sector service delivery. A UNDP article on ‘Public-Private Partnership for the urban environment’ clearly describes the conditions which are needed for PPP: compatible goals which by accepted by both actors and which can be achieved; suitable political environment with legal framework for contract procurement and private sector environment, political and social acceptance, trustworthiness and transparency, sharing risk and rewards (resource obligations); capacity development; clearly defined roles and

responsibilities; flexibility and enough time to achieve targets. If there is no suitable environment, then it is difficult to manage the waste properly. As discussed in section 4.4, suitable environment is one of the reasons for successful WM in developing nations.

Furthermore, there are several advantages of network governance. The advantages of network coordination in both public and private sectors are considerable, including enhanced learning, more efficient use of resources, increased capacity to plan for and address complex problems, greater competitiveness, and better services for clients and customers (Brass et al. 2004; Huxham and Vangen 2005; Provan & Kenis. 2007). Under the network governance, SWM also have several advantages for public and private sectors. These advantages are discussed in details in previous sections.

4.3.3 PPP as privatisation

In most of the countries the government is still responsible for providing resources for services for example, financing of the services and to guarantee the quality of services, cost efficiency and convenience to public services (Lahdesmaki & Kilkki. no date). When governments believe that they cannot deliver some services properly to the people then they try to privatize some public services fully or partially. In general state enterprises in the developing world are normally two to three times lower than the private enterprises in several ways such as investment or access to capital, enhanced service delivery or efficiency in services (Kikeri & Kolo, 2004). Section 4.4 describes how private participation in SWM facilities increased in several countries.

NPM explains how management techniques from the private sector are now being applied to public services and/or how government provides services to the people (Lane, 2000). Yescombe (2007, p. 15) describes “The public-sector reform movement known as ‘New public management’ provides the theoretical background for PPPs, but in reality the main driver for growth is that PPPs avoid limitations on public sector budgets”.

Yescombe (2007, p. 16) argues that “PPP must be seen within the overall context of the public sector reform movement known as ‘NPM, which encourages:

- Decentralization of government;
- Separating responsibility for the purchase of public services from that of their provision;

- Output or performance-based measurement for public services;
- Contracting-out public services to the private sector;
- Privatisation of public services”.

NPM suggests a new approach to increase the efficiency in service delivery but NPM does not explain what goes on in public sector improvement. When Gaebler and Osborne describe the Characteristics of New Public Management, they describe NPM as ‘a Customer-oriented government’. This means the NPM viewpoint defines clients as customers and implores for offering those choices, making services convenient and seeking their suggestions for the improvement of services (Ankur, 2009). Anyhow, if the government would like to provide the services well, it is a good idea to cooperate with the private sector because they provide better services than public sector. This means evidently the private sector can make decisions fast and they are creative in their policy (Massoud, 2003). In addition to this Massoud (2003) argues that, private sector participation improve quality of municipal solid waste management services and decrease the cost of waste management.

Savas (2000) states that privatization reduces the role of government or increases the role of other institutions to produce goods and services and in owning property. Savas (2000) further emphasized that privatization means fully or partly transferring enterprises ownership from the state to private owners. According to Savas privatization and PPP are almost same.

4.3.4 PPP as hypocrisy

In developing countries there are several laws related to environmental protection or waste management. As pointed out earlier in the section ‘PPP as network governance’ (4.3.2) lawmakers make laws without knowing the real situation. Due to this waste administrators or municipalities face many practical problems to implement the laws. So, most of the laws are ineffective. Klijn & Teisman (2003, p.137) argue that “PPPs are less ideal than the idea. Partners have difficulty with joint decision-making and organization and tend to revert to traditional forms”.

The government believes that they can manage the waste problems by making laws. However, developing nations take long to make decision in SWM. For example, in Malaysia, solid waste management laws and the related issues have been discussed for many years but have not been put into practice. In many developing countries solid waste is mainly managed

by municipalities. This is because decisions have to be first approved by senior manager and this cause delay in the discharge of the services (Henry et al, 2005).

Generally, solid-waste management legislations are not well established, compared with other legislations such as those on water, and air pollution control (Environmental Management Centre, 2007). No separate laws or regulation to SWM in developing nations. Long-term approaches or strategies related to solid waste management also are still lacking in the developing Asian countries (*Ibid*). But legislation covering waste management (some other laws and legislations for examples environment protection laws tell something about WM) in developing countries do exists however; putting programmes into practice is the main problem. It is generally said there is Policies related to PPP are very important for successful partnership. If there are no suitable or related policies in short period projects would fail. Some governments carry out PPPs without PPP policies which create some problems in governance such as ill defined goals (UNECE, 2008).

Several countries would like the participation of the public sector in the provision of high level services. However, they fail to improve the conditions which lead to the need for partnership or PPP. UNECE (2008) noted that it is very difficult to implement the PPP in many countries. The most important reason for this is, to deliver the PPP projects they have to improve institutions, processes and procedures.

New public management reveals some important ideas which are influential, but Polidano (1999, p.1) describes “NPM ideas are more so at the level of rhetoric than practice”. He further emphasized that in practice NPM is only one of a number of current reforms in developing countries.

4.3.5 What models dominate?

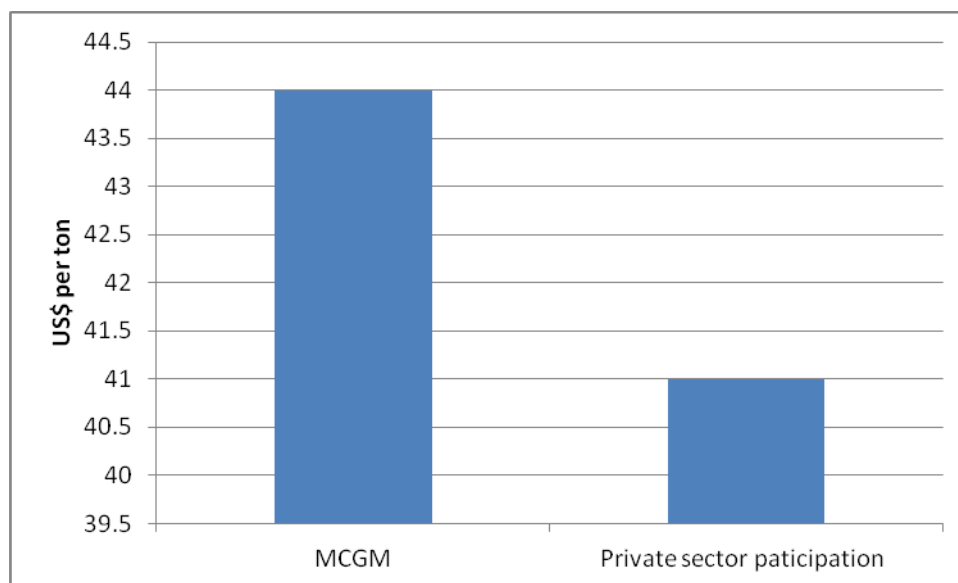
In SWM, PPP models BOT and BOOT are most common models and DBFOT model also emerge (Department of Economic Affairs, India, 2009). DBOFT model mostly emerged on disposal of waste (*Ibid*). These common models give responsibility to the private sector by fee contract to design, building, operation and maintenance while still the public sector owns the services. According to this it is argued that ‘PPP function as a privatization’. This privatization works as network governance. Anyhow sometimes PPP work as hypocrisy. Due to this hypocrisy PPP in SWM become a failure (see section 4.5 which discuss reasons for the failure of PPP in waste management).

4.4 Arguments of PPP in SWM in developing countries

In developing nations, PPP help to improve SWM services in several ways. These can be explained under sub headings:

4.4.1 Finding 1: Reduce the management cost

In general, developing nations allocate small budget for SWM and with this budget they can serve less than 50 percent of the urban dwellers. PPP help to reduce pressure on local government budget by investing private finance. Researchers noted that private participation saves between 30 to 50 percent of the local government budget (Zachary, 1996; Kamieniecki et al., 1999; Awortwi, 2004). PPP is an approach which reduces the cost of waste management and improves quality of service (Massoud et al, 2003). For example, in Indian studies about SWM revealed that PPP reduce the cost of waste management in Mumbai. Figure 2 indicates the comparison of net cost of waste management under Municipal Corporation and private sector participation. The figure shows SW has been managed by private sector with low cost.



MCGM - Municipal Corporation of Greater Mumbai.

Figure 2: Comparison of net cost of waste management under two approaches in Mumbai, India 2000 – 2001.

(Source: Rathi, 2006).

Studies show that, after involvement of the private sector in SWM, the cost per ton of waste management decreased. For example in Mumbai, India cost per ton of waste management is Rs. 1797 (US\$41) with PPP and its estimated cost per ton of waste management increased to Rs. 1908 (US\$44) when only Municipal Corporation of Greater Mumbai (MCGM) managed the waste (Rathi, 2006). Rathi (2006) further states that MSW is managed successfully in Mumbai by several private sectors such as by Excel Industry (Rathi, 2006).

Private sector involvement helped to reduce the service costs by half in Latin American cities with higher labor and vehicle productivity (Levine & Coad, 2010). Moreover, there are several private sector organizations engaged in MSWM in Malaysia. Studies about Malaysia SWM show that the cost of services reduced by around 23 percent after the incorporation of the private sector (Levine & Coad, 2010).

4.4.2 Finding 2: Improve the services and getting more benefits

PPP helps to improve the service and try to get more benefits from the waste. Most of the time the private sector try to make compost from the garbage for sale to generate income while municipalities just preoccupy themselves with open dumping. Figure 3 shows benefits gained by Municipal Corporation of Greater Mumbai (MCGM) and private sector. Figure 3 undoubtedly reveals that the private sector gets more benefits from the waste. If the Municipal Government (MG) or private sector get more benefits from waste (making compost or sanitary landfills), it helps to protect the environment as well as people’s health.

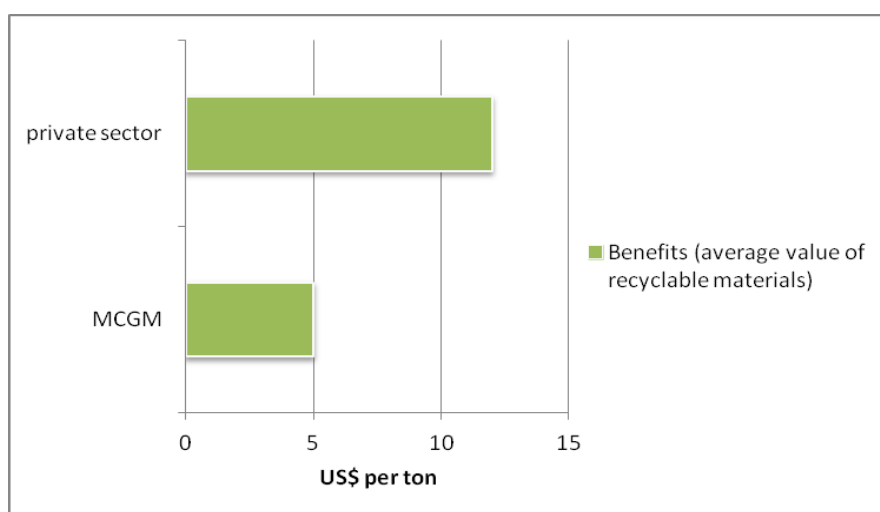


Figure 3: Benefits (average value of recyclable materials) get by MCGM and private sector

(Source: Rathi, 2006).

4.4.3 Finding 3: PPP helps to collect more waste

After cooperation with the private sector, municipalities are able to collect more waste than before because the private sector invests more money and acquire improved technologies. For example, in Sri Lanka, Colombo Municipal Corporation (CMC) has cooperated with the Burns Environmental Technologies (Pvt.) Limited (BETL) for two sanitary districts and engaged with Abans Environmental Services (AES) to collect half of the waste in the city. CMC signed a contract with BETL for processing and final disposal for a period of 25 years. BETL is functioning with the modern composting plant and they manage approximately 800-900 tons of waste daily (Visvanathan & Tränkler, 2003 cited in NRI-Sri Lanka, 2003).

In Colombo, Sri Lanka, due to private sector participation in urban solid waste management (USWM), in 2000, 45 percent of the waste was removed by the public sector and 55 percent of the waste was removed by the private sector. Meantime, service areas have increased. However, studies reveal that before municipal or private (formal) sector engaged in household waste collection, the informal sector was involved in household waste collection. This means that waste collectors or buyers buy some reusable or recyclable things such as cardboard, paper, plastics, glass bottles from householders to get money. Normally women (mother and daughter) are the ones interested in selling such things to the buyers. Waste buyers go house to house to collect such waste. So researchers noted that, in overall waste management process, the informal waste collectors and recyclers plays an important role. But total the amount of waste collected by informal sector is unknown.

In some countries, PPP help to fill the service delivery gaps availing more labor and vehicles. For example, in 1991 in the city of Dar es Salaam, Tanzania produced 1,400 tons of SW daily but the municipality was only able to collect 5 percent of the garbage, but after collaboration with the private sector, especially in 2005 and 2006 while the amount of waste generated increased to around 2,500 tons per day, the municipality managed to collect 48 percentage of the total waste. This study reveals that Tanzania's waste management ability increased with the involvement of private companies in waste management (Kassim & Ali, 2006).

In general most of the time, municipalities cover only CBD (Central Business District). Researches show that PPP in SWM increase service coverage area in several cities. For

example, in Accra, Ghana after involvement of the private sector approximately 25 percent of the collection increase was as a result of an increase in the coverage area (Ababio, 2010).

4.4.4 Finding 4: Waste management methods mechanized

Most of the municipalities are struggling to manage SW due to lack of equipment or machineries. Moreover, in many developing nations SWM is still totally a manual process. Due to these problems municipalities cannot collect the waste properly. If the process are manual, the management of SW takes too much time for (such as in collection and transportation). PPP help to mechanize the waste management process and increase the amount of waste removal. For example, Chennai and Mumbai which are main cities in India started the privatization of MSW collection several years ago. In 1999, after the Chennai Corporation issued a global tender for privatization of MSW in some regions, a French multinational, CES-ONYX company was given the waste removal contract for seven year period. Under this contract around 1,000 tons of waste is removed per day in Chennai and waste removable process is mechanized (Visvanathan & Tränkler, 2003 cited in NRI-India, 2003).

4.4.5 Finding 5: Increase public awareness and participation

Lack of environmental ethics and awareness would lead to unsuccessful implementation of the SWM plans (Visvanathan and Trankler (2003). So awareness about the problem or project is important for successful plans. In Bangladesh, waste management processes are successfully run by NGOs and CBOs in some parts of the country. In Bangladesh, one of the NGOs is involved in waste management with the help of UNDP and Lions Club in 1995. This NGO started public awareness programmes for waste separation. These awareness programmes increased the amount of waste collection by 2 tons per day. The number of householders' participation also increased due to awareness programmes and the NGO gets small amounts of money from the residents for door-to-door collection (UNEP, 2009).

In Sri Lanka, Seth Sevana (NGO) carried out some awareness programmes in Moratuwa area. Seth Sevana encouraged 1,280 families in Moratuwa area to separate the waste at source. Due to this separation the NGO was able to establish small scale composting units and biogas generation, recycling of paper, and sharing of information within the network for the benefit of the community. For this project they get funds from Community Environmental Initiatives Facility (CEIF) (Visvanathan & Trankler, 2003).

4.4.6 Finding 6: Increase the efficiency

PPP in SWM increase the efficiency. It helps to save time and energy because the private sector has some technologies and equipment. For example, the SWM study in Nairobi shows that the Kenya Refuse Handlers Limited (KRHL), Domestic Refuse Disposal Services Limited (DRDSL), and Bins (Kenya) Limited have been licensed to clean the CBD and some residential areas especially in upper class residential areas. After involvement of these private companies MSW collection and disposal services worked more successfully and as result have enhanced the efficiency (Henry et al, 2006).

4.4.7 Finding 7: More investment

The public sector face problems of budget constraints to provide WM services. Even if they collect taxes from the people, still that money is not enough to provide good services. The private sector has the ability to invest more funds. This helps municipalities to improve service delivery to the people. Moreover, the private sector brings in new ideas, technologies and skills which help to improve the SWM services (The World Bank, 2011). Normally the private sector make of these investments with the view of getting a return on their investment. Due to this they get new ideas and new technologies even from other countries. Sometimes they try out technologies from other countries. The private sector can manage to invest in technologies, new ideas etcetera.

4.4.8 Finding 8: Make decision fast

Generally poor coordination and delays in decision making causes delays in service delivery. Municipalities in developing countries usually face these problems. Commonly studies have revealed that the public sector take much more time to make decisions because permission has to be sought from managers who are working in the main office or central municipality or central government. But the private sector can quickly make decisions; they have the ability to manage the problem well and control costs and is creative in planning, approach and technologies.

4.4.9 Finding 9: Helps to protect the environment

It is important to note that recycling and reusing things helps to protect the environment and ensure human health. Anyhow due to partnership with the government agencies either

directly or indirectly the private sector has to work under public goals (Miller & Dunn, no date). The private sector's recycling and reuse activities help to achieve public sector goals as well that is, the protection of public health and the environment are very important goals for the LGs.

If countries collect the waste properly and if they reduce the amount of waste using technologies, this could certainly lead to improvements the protection of the environment. "The private sector can help to improved environmental protection by dedicating highly skilled personnel to ensure efficient operation and compliance with environmental requirements" (Ramanadham, 1991). Massoud et al (2003) state that in Greater Beirut Area (GBA), Lebanon PPP in SWM undoubtedly enhance the protection of environment.

Risk sharing is viewed as an important incentive for both the public and private sectors, since it is assumed that risk-sharing could benefit both actors. The third prospect is that these types of cooperation can result in some new and better products or services that no single organization either the public or the private could produce better alone. Finally, it has been noted that in a PPP a partnership involves a longer term commitment which can continue for a number of years, such as 10 to 30 years (Khanom, 2010).

4.5 Reasons for the failure of PPP in SWM in Developing Nations

Most of the time the involvement of the private sector in SWM enhance the SWM services. However, the failure of PPP in developing countries is attributed to poor conditions (laws, lack of public participation etc). So it is important to look at why PPP in SWM fail in some developing nations.

Public-private partnership can be the solution to the problems of coverage and inefficiency in SWM. Bennett (1998) argues that public-private participation is a good solution to the management of the environment. Some of the reasons for this may be public-private partnership give benefits to both the public and the private sectors in terms of dynamism, finance, knowledge of technologies, managerial efficiency, and entrepreneurial spirit combined with the social responsibility, environmental awareness, local knowledge and job generation concerns of the public sector (Ahmed & Ali, 2004). However, PPP need certain conditions to deliver services successfully. Without some of these important conditions (such

as trusted environment, time, flexibility and legal acceptance) it is difficult to handle waste successfully. Sometimes PPP end negatively. Many reasons lead to this negative end.

Finding 1: The political culture of the country (interest of political parties) or political will, bureaucracy and/or legal and institutional framework to build PPP are also determined to ensure the effectiveness of PPP (CBI, 2007). Bureaucracy is the main managerial support of the government to convert the policy into reality (Khanom, 2010). If some politician parties are not interested in PPP or if the countries' laws do not encourage the PPP, then it is very difficult to achieve the private sector goals.

Finding 2: Some legal acceptance or trusted environment is needed to achieve the PPP goals (Ahmed & Ali, 2004, cited in Kolzow, 1994). Legal barriers such as rejecting to take legal action when need arises causes problems in PPP. For this flexibility is important. In Dar es salam, Tanzania government started SW collection services with only one contractor (Multinet Africa Company Limited). After few years the government registered more improvement in SW collection. To achieve this improvement the government took up certain responsibilities. This means that the Dar es salam city council started charging the SW generators an amount approved by the Dar es salam city council. In this case the municipalities charges their own amount determined by laws and this charge was arrived at after taking into account the city residents' income level. Studies showed it was impossible to manage the waste successfully without this charge (Halla & Majani, 1999b).

Finding 3: The private sector needs more money to handle waste. When the private sector handles the waste, the people are more willing to pay for a good environment. However, MSW management is the responsibility of every inhabitant and waste is an unavoidable product from human activities. So if people need a good environment and healthy life they are willing to pay for SWM. For instance, in Nairobi, 47 percent of the city dwellers pay US\$ 1.25 per month for good waste management services (Henry, 2006). But if people do not cooperate with the public sector then it is very difficult to manage the garbage well and the private sector cannot ensure the clean environment.

Finding 4: People's participation is very important for better SWM, most of the people in developing countries are not well educated and they are not aware about issues related to SW. In general most of them do not cooperate with the private sector to manage waste. Rathi (2006) states that those people in the communities who do not participate create problems for

CBOs and NGOs. Kassim & Ali (2006) noted that people's participation, awareness of the problem and satisfaction level of the service has an influence on service delivery. If there more non-participants in the society, managing waste becomes very difficult.

Finding 5: The private sector always tries to improve the services and get more profits. So they try to find skilled labor for service delivery. But unfortunately many unskilled labors are engaged in SWM in developing world. So it has been found that private sector participation in SWM can decrease unemployment in the sector (Schübeler, 1996). Commonly it is known that skilled labor can work better than unskilled workers. However, to reduce the number of jobs negatively affects the people.

Finding 6: The projects must be carried out under good monitoring systems. Otherwise it may lead to wrong way of doing things or utter failure of the projects. Ramamurthi (1999) states that PPP can produce good results in delivering public services but it is difficult to achieve good result without good monitoring and evaluation.

Finding 7: Competition, transparency and responsibility are very important for efficiency and cost reduction of SWM (Massoud et al, 2003). If the private sector does not take more responsibility in the project, or if there is no competition and transparency, the private sector cannot run the project well. So it cannot be said that always PPP run successfully in all countries.

Finding 8: Weakness in laws and regulations (it is commonly said that laws and regulations are weak in developing world) and inability to handle the problem is also one of the major issues to PPP (Ahmed & Ali, 2004). However, good monitoring practices should help to achieve the PPP goals. So at present it is accepted that PPP is one of the important approaches to deliver public services and it is appreciated by international, national and community level.

Finding 9: Due to careless or irresponsibility some opportunities become wasted in developing nations. Commonly some donor agencies help developing nations to handle such problems. In general governments or municipalities in developing nations do not know how to get benefits from the earmarked money. For instance, in Sri Lanka in 1998, World Bank funded SWM Project. This project was to design and construct a fully engineered sanitary landfill and a 100 tonne per day pilot composting plant. This facility was designed to treat

and dispose 1200 tonnes of waste per day. The land for the project was selected. An Environmental Impact Assessment was also carried out for the project and it also approved by the Central Environmental Authority. However, due to lack of political support the project was cancelled. Anyhow, the sanitary landfill which was to have been operational by 1999 never got underway. So the World Bank loan of US \$ 12 million which was given for the construction of the sanitary landfill was withdrawn. Apparently this was the second time that a World Bank fund for solid waste management project for the Colombo area was cancelled (State of the environment, 2001).

5 DISCUSSION: LESSONS FROM EXISTING STUDIES

City dwellers in developing countries produce less SW compared to their counterparts in the developed countries. However most of the waste does not separated at source and mixed waste makes difficult to manage waste. It is seems hazardous waste is (e.g. industrial waste) also mixed with MSW in developing nations (UNEP, 2005). This creates more problems to collect or recycle the waste. The main problem is waste management method is still inadequate in developing countries. Overall poor enforcement, insufficient funds, no master plan, lack of awareness and lack of practical approaches on various recycling industries are the main reasons for giving less priority to SWM. Though, PPP in SWM help them to improve their services.

PPP in SWM in Developing Countries - Experiences and Situations

According to the literature, before participate with the private sector municipalities' face many problems to handle the waste in the cities. It is seems, when public sector alone manage the waste they face problems in their resources. Because of lack of resources for example budget, they could not manage to buy enough vehicles, equipments etcetera. Also due to frequently breakdowns of operational vehicles, municipalities do not collect entire waste effectively (Zerbock, 2007).

Generally waste collecting process in developing countries is completely manual process (UNEP, 2001d). Therefore need more time to collect the waste in public places. Also wastes from developing countries are with high proportion of moisture and high density. As a result more water levels in the waste, equipment is becoming weak in short period (Zurbrugg, 2003), therefore have replaced the equipment in a short period. On the other hand, public sector has to spend lots of money for wages, due a lot of workers employed in the municipalities. Researchers noted that private participation save between 30 percent to 50 percent of the local government budget (Zachary, 1996; Kamieniecki et al., 1999; Awortwi, 2004). As a result after corporate with private sector, public sector manage to collect the waste in entire city. Accordingly PPP tries to ensure better government with less cost.

If think about the resources, it is commonly said that state enterprises in developing world are generally two to three times lower than the private enterprises in several ways such as in investment or access to capital, enhancing service delivery (Kikeri & Kolo, 2004). Most of the

time the public sector face problems to enhance the service delivery with less trained or untrained workers. So they have to spend more money and time for their project. However private sector have strong workforce with trained workforce. As a result the compared with the public sector, private sector does not spend more time and money for their project. Also in general, private sectors are profit oriented. Therefore, the private sector improves service delivery by doing selling, transferring, treatment, recycling and dispose. In brief PPP reduce cost of waste management and improve quality of services. To get more benefit from waste private sector make compost from the waste for example Mumbai (India), Moratuwa (Sri Lanka). Also to get their investment back, normally private sectors have clear objectives in their projects and flexible work schedules. Also private sectors can make decisions fast. NGOs help informal waste workers as well by organize their work themselves, to increase income and their working situations. To collect more waste private sectors carry out door to door collection too and share their resources such as vehicles, equipment, labors etcetera with public sector to keep the city clean. As a result amount of waste collection increased and coverage area increased such as in Colombo, Sri Lanka, Mumbai (India).

Moreover, public actors feel difficulties to make decisions fast due to long waiting to get permission from the higher level manager. Reason may be always they have to obey the laws. However private sectors are not like public sector. Private sector can make decisions fast. For example in Colombo, Sri Lanka when public sector handles the waste, several vehicles are stopped several days for repairing, but when they corporate with private sector they could manage to repair the vehicles soon, due to fast decisions making system.

Actors' roles and responsibilities are very important to manage waste. Within the participate actors, householders are more important because they are the producer of waste. If the householders separate the waste at source, it helps more for collectors and recyclers and/or reuses. However lack of the knowledge about SWM makes difficulties to the collectors. Due to lack of knowledge householders could not participate to manage the waste. Rathi (2006) states non-participants who are in the community are making problems to CBOs and NGOs. People's participation, awareness of the problem and satisfaction level of the service is influence in the service delivery. Lack of environmental ethics and awareness should lead to unsuccessful of the SWM plans. However literature about WM shows, after corporate with private sectors, in Bangladesh and Sri Lanka householders participation also increased due to awareness programmes carried out by the NGOs. Awareness programmes help to collect money for services. For example in Nairobi people are willing to pay for SWM services.

An institutional factor is also very important in WM. Of course suitable political environment is very important. Previous studies about WM reveal that, if the government does not support by laws, flexibility etcetera private sector cannot manage the waste effectively. Also support from politicians is significant. Due to careless or irresponsibility of politicians some opportunities become wasted in developing nations. For example due to careless in the project Sri Lanka government had to returned the invested money to WM to World Bank several times. Good governance also play key role in WM. Ramamurthi (1999) states that PPP can produce good result in delivering public services but it is difficult to achieve good result without good monitoring and evaluation. Without good governance it is difficult to guarantee the 'effectiveness' and quality of public services. When good governance system does exist, then waste could be managed effectively.

Weakness in laws and regulations and lacking to handle the problem is also one of the major issues to PPP (Ahmed & Ali, 2004). Commonly known that laws and regulations are weak in developing world and there are no separate laws for SWM. Some legal acceptance or trusted environment is needed to achieve the PPP goals (Ahmed & Ali, 2004, cited in Kolzow, 1994). Legal barriers such as in reject to take some legal action when it need cause problems in PPP.

Studies show that high-level administrative and political support and assigning key roles to the community and nongovernmental organizations are crucial if the government wants to manage the city well. Proper monitoring system and responsibility are also important to carry out successful PPP in SW. When the above factors are not supported to manage the waste under PPP, then the projects become fail.

On the other hand, if the national government does not make suitable environment with the laws and regulations for the private participation, then PPP in SWM fail. It has been found that national policies may have several perspectives: that may assist to develop SWM with respect to local situations and/or they may help to meet the terms with international treaties and agreements and also it is a local problem which can be dealt with by the local governments. Obviously the private sector's main aim is to make profit but to get more profit they provide good services such as efficient collection, transportation and disposal of garbage. Because of the people's satisfaction they earn more money. Also the private sector helps in sharing risk with the government.

If there is no suitable environment to the PPP in SWM, then again it leads to the problem. This means if SW is not manage properly again waste can remain in the public places, spread

bad odour and arise environmental and health problems. In Sri Lanka, Tanzania, India and Bangladesh sometimes politicians did not allow to manage the waste with PPP or did not agree to make changes in the laws. Therefore, after terminate the contracting period waste related problems continued again.

Impact of PPP on MSW management

The participation of the private sector has helped public sector to improve their services in several ways. If the conditions help the private participant, the PPP works well and helps the waste management process in several ways. According to the literature, after cooperating with the private sector, the public sector is able to provide their services to the people better than they would without the cooperation. Literature shows after through cooperating with private sector, the service delivery has improved, the amount of waste collected has increase, efficiency, environmental awareness; investment and public participation has increase in SWM. Further, WM process has become mechanized.

On the other hand private sectors are normally profits oriented. So they have strong workforce with trained workers. As a result they help public sector to save money in several ways. On the other hand, to collect more waste and keep the city clean, in several countries door-to-door collection is carried out by community based private sector, whereas landfills and incinerators have been under BOT (build-operate-transfer) based private sector (UNEP, 2009). These door-to-door collection, landfills and incinerators activities help to achieve public goals such as protect the environment and ensure human health. Meantime, Davis (1986) states most of them believe that partnership can be able to solve more problems and create success by providing jobs and incomes and also it can improve urban life.

The private sector participation in SWM can decrease the jobs in the sector (Schübeler, 1996) because private sectors always looking for skilled labors. Private sector experience is skilled labors does not take more time and money to carry out their project. Anyhow skilled labors help them to improve the service delivery by saving money and time.

PPP in SWM in Sri Lanka context

In Sri Lanka, experiences about PPP in SWM show both positive and negative impacts. Like some other developing countries local government in Sri Lanka faced problems to manage the waste alone. In Sri Lanka there are no separate laws for SWM and some laws which say about SWM are still inactive. For example Sri Lanka has in place the Environmental (Protection)

Act (EPA), 1986, which tries to protect the environment. This act is common for all environmental problems and gives low priority to the waste management, that is, they do not have separate laws for SWM. Also institutional arrangements for waste management have not been clearly defined in Sri Lanka (Da Zhu et al., 2008). As a result waste remains in the public places. Therefore, public sector decided to cooperate with the private sector to handle the waste.

On the other hand, in Sri Lanka policies related to WM are not well defined. Due to this there are overlaps in SWM responsibilities of government agencies which have led to arguments among the agencies. So waste remains in the public places without any action being taken (Zon and Sirirwardena, 2000). Furthermore, some sections of the National Environmental Act (NEA) currently remain unimplemented (*Ibid*).

Furthermore, one of the reasons why public sector face problems in SWM is, government appoints several labourers for SWM but due to lack of skills and training the public sector still does not have a good workforce and have to spend more money for wages. As a result municipalities face problems to handle the issue and have to appoint more skilled workers in SWM. For example, the Colombo Municipal Council (CMC), Sri Lanka 22.9 percent of the total municipality workers of 10,715 worked in SW department in early 2000 (Horen, 2004). Anyhow, even in early 2000s CMC used to mention that still municipalities face problems due to lack of staff (*Ibid*). So PPP help them to improve their services.

Eawag (2008) states that in Sri Lanka, before public sector participate with the private sector, they could managed to collect only 40 percent of the total waste generated is collected due to lack of investment, vehicles, equipment etcetera. Jayaratne (no date) noted that Colombo Municipal Council, in Sri Lanka has 38 compactor trucks, 50 tractor and trailers, 323 loaders and handcarts and several waste compactors, bull dozers, tippers and skip hoist trucks but Colombo municipality face problems to collect waste effectively in entire city due most waste collection vehicles are well past their useful life and are in need of repair or replacement. But after cooperation with the private sector, municipalities able to collect more waste than before because the private sector invests more money and acquire improved technologies and share resources such as vehicles. For example, Colombo Municipal Corporation (CMC) has cooperated with the Burns Environmental Technologies (Pvt.) Limited (BETL) for two sanitary districts and engaged with Abans Environmental Services (AES) to collect half of the waste in the city. CMC signed a contract with BETL for processing and final disposal for a

period of 25 years. BETL is functioning with the modern composting plant and they manage approximately 800-900 tons of waste daily (Visvanathan & Tränkler, 2003 cited in NRI-Sri Lanka, 2003).

NGOs try to keep the cities clean in several ways such as by awareness programmes, giving funds. In Colombo, Sri Lanka Japan International Corporation agency (JICA) the local NGO provide money to build collection centres and another NGO 'SEVANATHA' conducts training programmes for the workers and engage in community mobilization work. Some NGOs engage in awareness programmes of the benefits of waste sorting and recycling for residents such as The CBO Federation of Badowita (CBOFB). CBOFB carries out awareness programmes by using street banners, voluntary cleaning programmes, organizing small group discussions and community forums. NGO, Sethsevana, engages in environmental improvement activities. Some NGOs have started waste treatment practices e.g. composting of waste at household level, recycling of waste materials, incineration and landfills (Horen, 2004). Especially in some big cities (such as in Kandy, Negombo and Matale) JICA (NGO) introduced the 'bell system'. This is whereby the garbage collection vehicle rings a bell as it goes on the road. Then householders and shop owners put their waste into the vehicle. Studies show this system has been successful so far in Sri Lanka (Environmental Management centre, India, Mumbai, 2007).

Seth Sevana (NGO) carried out some awareness programmes in Moratuwa area. Seth Sevana encouraged 1,280 families in Moratuwa area to separate the waste at source. Due to this separation the NGO was able to establish small scale composting units and biogas generation, recycling of paper, and sharing of information within the network for the benefit of the community. For this project they get funds from Community Environmental Initiatives Facility (CEIF) (Visvanathan & Trankler, 2003).

On the other hand, political interference and carelessness are also direct to unsuccessful waste management. Due to carelessness and uninterest in managing waste several times they had to return the investment. For instance, in Sri Lanka in 1998, World Bank funded SWM Project. This project was to design and construct a fully engineered sanitary landfill and a 100 tonne per day pilot composting plant. This facility was designed to treat and dispose 1200 tonnes of waste per day. The land for the project was selected. An Environmental Impact Assessment was also carried out for the project and it also approved by the Central Environmental Authority. However, due to lack of political support the project was cancelled. Anyhow, the

sanitary landfill which was to have been operational by 1999 never got underway. So the World Bank loan of US \$ 12 million which was given for the construction of the sanitary landfill was withdrawn. Apparently this was the second time that a World Bank fund for solid waste management project for the Colombo area was cancelled (State of the environment, 2001).

Literature shows that especially in Sri Lanka inadequate political will, too many players, jealousy among agencies and villagers, mistrust of new ideas, and misspent the money are also the problems faced by municipalities. When the government sectors of Sri Lanka participate with the private sector to manage the waste they could collect the waste better than before. It has found that after participation with the private sector public awareness and participation has been increased, amount of waste collection increased, more efficiency and private sector enable to carry out a composting plant.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

In general, developing nations face several problems to manage the waste in the cities. Due to the increase in the environmental and health issues create by waste; developing nations were looking for an alternative solution to manage the problem. In recent years PPPs engaged in SWM increased rapidly as PPP found good strategies to ensure environmental protection or to provide urban environment services. So my study is based on PPP in solid waste management in developing countries. And also this study gives more attention to Sri Lanka.

For this study I used an actor-oriented theory and new public management theory. This theory helped me to consider the different cultural, economical and political structures. Furthermore this theory enabled me to explore actors involved in waste management. New public management theory helped me to explained governance method of PPP.

Accordingly, mainly secondary data was used to carry out the study. The study reveals that PPP have helped to manage solid waste in many cities in the developing world. As a result it was quite easy to find literature related to my topic and those books, journal articles and internet sources helped me a lot to write my thesis.

The findings show that PPP are a good governance method and it can be applied to SWM. PPP engaged in SWM have are several advantages to both the public and private sectors. However, without some special conditions necessary for PPP, it is difficult to carry out the partnership successfully. It is the government's responsibility to create a conducive environment for handling the waste with private partnership. Of course it may take some time but it is possible.

In most of the developing nations, the public sector tries to find the solution to SWM but there usually adopt a top – down approach. This approach presents some practical problems for the implementation of the project. The householders should be involved in decisions making programmes for example arrangement for collection, fees charged. This would help to handle the SW issue successfully.

Public awareness about SW is a major factor in handling the SW with PPP. The public sector or private sector can also carry out some awareness programmes. Most of the NGOs do these awareness programmes to the school children and the people. And also governments have introduced some subjects related to environment in schools. However, the public and private sectors should advertise more in papers and on televisions. But these advertisements should be easily understandable to both the educated and uneducated people.

Undoubtedly it is true that people like healthy a environment. So time should spared to teach the people about SW and its related health and environmental issues. Anyhow if anybody teaches the people they would understand the problem and will cooperate with the public or private sectors to manage the problem well. Not only the people but the workers and staff also should take responsibility. If there are more players involved, then there could be big barrier to the SWM. So every actor must take their responsibility because if everybody does not take responsibility it is difficult to achieve the goal.

With the rapid urbanization occurring in cities in developing countries the production of SW also is increasing rapidly. So the public sector has to take action very quickly. The national government should take other developing world experiences in SWM to make healthy environments in their countries. The government should also make policies which they can implement in the country. Separate policies or rules or regulation for SW would help to handle such problems well.

Waste reduction is a very important activity. Generally it is known that waste in developing countries contain more organic waste and can be recycled easily. Making people aware, enacting separate laws or practicable laws and putting them into practice would help to reduce the amount of waste and protect the environment and the people. To ensure the scheme's success the government or the private sector or both of them should carry out the above mentioned activities. Even if the government and/or the private sector take time, it will be success in the future. Furthermore, Public-private partnerships may not seem to be a good or effective solution at first but in the long run they may help to handle the issue successfully provided there is a conducive environment.

6.2 Recommendations

In SWM every actor's roles is very important. However, householders are the main actors who produce more waste day by day and they have some ideas about which is the suitable collection method or how they can help to reduce the waste. Further people are more affected by the problem in several ways such as they suffer with health related issues due to SW or they get bad odour from the waste. So it is important that people should be involved in decisions making programmes. People should share their ideas and previous experiences with the public or private sectors. Then both the public and private sectors can decide which would be the suitable method to handle the problem. This scheme would be successful due to the people's ideas.

Generally it is said that laws in developing nations are weak. The government should make the laws more effective and implementable. When they make laws it is better to know the practical problem as well. Normally government follow the top – down approaches. But practically it is the down – top approach which is the successful way to achieve the goals because the people who are on the ground are more connected to the problem and laws are going to be applicable to these basic level people. Further people must know about laws or regulations about waste. If there any new laws, they should be explained to the people.

The government should make laws or regulations which state that SW should be handled with public sector participation without any disturbance. Meaning that even if there are any changes in political parties the work should be carried out continuously.

To improve the service, SWM needs to be professionalized, and solid waste department should be managed by trained staff. Giving wages without training is not important. It is important to employ people with the required expertise. This is the best way to achieve efficiency of service. Enough training is needed not only for the senior staff but also for all workers. This would help to handle the waste properly. In annual budget municipalities should allocate some money to cater for good training of the workers. Skilled workers are better than unskilled workers. Making the workers more skilled means that few of them can work well thus there would be no need to have a large workforce. This would also help in saving money.

Lastly, generally developing nations established laws and regulations for such issues but they do not take many actions to implement the laws. Commonly they keep it in written version. If

there are any laws or regulations it should ensure their implementation. Otherwise it is difficult to protect the environment and difficult to ensure people's health.

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8 APPENDICES

8.1 Common forms of PPP

There are many different legal forms of PPPs. UNECE (2008, pp.2-3) states that the following terms are used to explain partnership agreements.

Buy-Build-Operate (BBO): *Transfer of a public asset to a private or quasi-public entity usually under contract that the assets are to be upgraded and operated for a specified period of time. Public control is exercised through the contract at the time of transfer.*

Build-Own-Operate (BOO): *The private sector finances, builds, owns and operates a facility or service in perpetuity. The public constraints are stated in the original agreement and through on-going regulatory authority.*

Build-Own-Operate-Transfer (BOOT): *A private entity receives a franchise to finance, design, build and operate a facility (and to charge user fees) for a specified period, after which ownership is transferred back to the public sector.*

Build-Operate-Transfer (BOT): *The private sector designs, finances and constructs a new facility under a long-term Concession contract, and operates the facility during the term of the Concession after which ownership is transferred back to the public sector if not already transferred upon completion of the facility. In fact, such a form covers BOOT and BLOT with the sole difference being the ownership of the facility.*

Build-Lease-Operate-Transfer (BLOT): *A private entity receives a franchise to finance, design, build and operate a leased facility (and to charge user fees) for the lease period, against payment of a rent.*

Design-Build-Finance-Operate (DBFO): *The private sector designs, finances and constructs a new facility under a long-term lease, and operates the facility during the term of the lease.*

The private partner transfers the new facility to the public sector at the end of the lease term.

Finance Only: *A private entity, usually a financial services company, funds a project directly or uses various mechanisms such as a long-term lease or bond issue.*

Operation & Maintenance Contract (O & M): *A private operator, under contract, operates a publicly owned asset for a specified term. Ownership of the asset remains with the public entity. (Many do not consider O&M's to be within the spectrum of PPPs and consider such contracts as service contracts.)*

Design-Build (DB): *The private sector designs and builds infrastructure to meet public sector performance specifications, often for a fixed price, turnkey basis, so the risk of cost overruns is transferred to the private sector. (Many do not consider DB's to be within the spectrum of PPPs and consider such contracts as public works contracts.)*

Operation License: *A private operator receives a license or rights to operate a public service, usually for a specified term. This is often used in IT projects.*

The options available for delivery of public services range from direct provision by a ministry or government department to outright privatization, where the government transfers all responsibilities, risks and rewards for service delivery to the private sector. Within this spectrum, public-private partnerships can be categorized based on the extent of public and private sector involvement and the degree of risk allocation. A simplified spectrum including the above models for public-private partnerships follows.

8.2 Basic Project Delivery Options

	Own	Conceive	Design	Build	Operation & Maintenance	Financial Responsibility
Design-Bid-Build	Public	Public	Private by fee contract		Public	Public
Design-Build	Public	Public	Private by fee contract		Public	Public
Build-Operate-Transfer (BOT)	Public	Public	Private by fee contract			Public
Design-Build-Finance-Operate (DBFO)	Public	Public or Private	Private by fee contract			Public, Public/Private, or Private
Build-Own-Operate (BOO)	Private	Public or Private	Private by contract (concession)			

Source: ADB (<http://www.apec.org.au/docs/ADB%20Public%20Private%20Partnership%20Handbook.pdf> p.38) cited in United States Department of Transportation, Federal Highway Administration. Available: www.fhwa.dot.gov/ppp/options.htm