

ECONOMIC POLICY NETWORK

Policy Paper 15

**PROSPECTS AND CONSTRAINTS OF
PUBLIC PRIVATE PARTNERSHIP FOR
URBAN WASTE MANAGEMENT**

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May 2006

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This report has been prepared by Mr. Badan Lal Nyachhyon, Infrastructure Specialist, under the guidance of the Society of Consulting, Architectural and Engineering Firms (SCAEF).


Inputs from various stakeholders during interactions at the SCAEF, Advisory Committee meetings, and the workshop organized by the EPN Focal Unit have been incorporated in the report. The names of people met during the interactions are included in annex 5 in this report.

Foreword

Economic Policy Network (EPN) is an undertaking of the Government of Nepal since August 2004 with an Asian Development Bank (ADB) technical assistance (TA) to develop and institutionalize an open, responsive and result oriented economic policy formulation process based on sound economic analysis and dialogues with the partnership of public and private sector, academia, and independent professionals, to support and consolidate the Government's economic policy reforms on poverty reduction strategy. The initial focus has been in the areas of macroeconomic management, trade, investment, employment, infrastructure, tourism, agriculture, and regional development through four thematic advisory committees chaired by the secretaries of the respective implementing ministries, and guided by a high-level steering committee. The present study is an outcome of the initiative under the Advisory Committee for Economic Policy on Infrastructure Development chaired by the Secretary of the Ministry of Physical Planning and Works.

The study reviews public private partnership (PPP) modalities and recommends appropriate policy interventions to enhance PPP in urban waste management in Nepal. The recommendations are the outcome of consensus reached among major stakeholders through various consultations and the EPN workshop. I hope the findings and recommendations will be helpful for policy makers for future reforms.

I would like to thank the Society of Consulting, Architectural, and Engineering Firms (SCAEF) for leading the study, and Mr. Badan Lal Nyachhyon for carrying out the study on their behalf. I also thank all those who have provided inputs for the report during the interactions at SCAEF, the advisory committee meetings, and the EPN workshop. The work of the Advisory Committee for Economic Policy on Infrastructure Development is to be commended for selecting the issue and for following through with the study. I would also like to appreciate the entire EPN team for their hard work. I also thank the former Steering Committee chairperson (former Member of National Planning Commission) Dr. Champak Prasad Pokharel, for his guidance during his tenure. Last but not least, I would like to thank the ADB for supporting this initiative.



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Preface

This paper is basically a summary of various experience gained at national and international practice and is prepared with extensive reference with various papers, articles and policies adopted by regional and overseas governments and private sector. This is not a reinvention of the old wheel, but policing and trying to recast to suit the conditions of the country. In doing this, the experience of various organisations working in UWM in Nepal including private sector is extensively used.

Over the last few years, the topic of Public Private Partnership (PPP) for Sustainable Development was one of the hot issues on the national and international agenda. In an era of globalization and particularly with accession of Nepal into WTO and with highly constrained national resources and increasing public expectations, the Government alone was not able to fulfill the complex tasks of UWM. Today, the governments are obliged to seek more innovative ways of attracting private investments to meet the objectives of Development Plans.

Historically, PPP in Nepal is not new. The entire cityscape of Kathmandu Valley Towns and many townships in Nepal comprising of the cultural monuments and amenities as temples, stone spouts, and shelters are good examples of PPP. During calamities and disasters, the private and public sector cooperate with each other based on the dire necessity of the time. The idea of PPP in modern context, as we understand today, is more comprehensively targeted for extending cooperation in a more systematic and institutional manner. Both sectors work together based on mutual interest. Each partner brings his specific experience and abilities for resolving the common interest.

Advantages of PPP for the public sector are: improved access to private capital, dynamic and efficient management, easy access to know-how, and principles. But there are also advantages for the private sector like investment security as a result of extensive preparations and clear-cut public decisions.

There is no specific form and size of PPP that fits for all. The UN's "Global Partnerships Initiatives" is an excellent form of PPP. In general, PPP attempts to bridge the gap of understanding and trust between the public and private sectors. This paper examined the various aspects of the prospects and constrains of PPP for UWM in Nepal including prerequisites for sustainable partnership and widely discussed with various stakeholders through consultative meetings organized by SCAEF, and Economic Policy Network (Appendix-5).

Many thanks go to all those who have made direct or indirect contribution in preparation of this paper including EPN and SCAEF for the wonderful opportunity given and initiation of the consultative meetings with selected stakeholders. Sincere gratitude is extended to the Ministry of Finance and Asian Development Bank for the new approach adopted in the process of preparation of this paper by recognising and entrusting civil societies as SCAEF and developing the new model of partnership.

This paper primarily deals with Public Private Partnership issues in the context of UWM. Hence, more focus is given to the issues of PPP and particularly on the Institutional Arrangement that is expected to be practically functional. The paper also suggests certain activities of short-term nature that will contribute and visibly improve the conditions of UWM, if practically carried out. This particular recommendation was based on the in-depth understanding and guidance provided by Mr. JR Joshi, Secretary, MOPPW, and Mr. DP Dhakal, coordinator, EPN/MOF.

Acronyms and Local Terms

ADB	Asian Development Bank
AEPC	Alternative Energy Promotion Centre
B2C	Business to Community
BM	Bharatpur Municipality
BMC	Biratnagar Municipal Corporation
BOOT	Built, Own, Operate and Transfer
BOT	Build, Operate and Transfer
BSP	Biogas Support Program
CBO	Community Based Organisation
CBS	Central Bureau of Statistics
CBSWM	Community Based Solid Waste Management
CDM	Clean Development Mechanism
CE	Carbon Emission
CEC	Carbon Emission Credits
CES/Multi	Consulting Engineers Salzgitter, Germany/Multi Disciplinary Consultants (P) Ltd,
CKV	Clean Kathmandu Valley Project
CFC	Chloroflorocarbon
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COM	Council of Ministers
DANIDA	Denmark International Development Agency
DBO	Design Built and Operate
DDC	District Development Committee
DM	Dharan Municipality
DoliDar	Department of Local Infrastructure and Agricultural Roads
DWSS	Department of Water Supply and Sewerage
EIA	Environmental Impact Examination
EMS	Environmental Management Systems
ENPHO	Environmental and Public Health Organisation
EPA	Environmental Protection Act
EPC	Environmental Protection Council
EPN	Economic Policy Network
FINNIDA	Finland International Development Agency
gr/Km	Gram per Kilometre
G2B	Government to Business
G2C	Government to Community
GHG	Green House Gas
GVW	Gross Vehicle Weight
HPCBASIP	High Powered Bagmati Area Sewerage Improvement Project
HCF	Himal Cement Factory
HH	Households
HIDM	Hetauda Industrial District Management
HMGN	His Majesty's Government of Nepal
HSU	Hartridge Smoke Unit for Opacity Test of Diesel Exhaust
ICIMOD	International Centre of Integrated Mountain Development
IEE	Initial Environmental Examination
ILO	International Labour Organization

INB	Industries and Businesses
InSWM	Integrated Solid Waste Management
IPCM	Industrial Pollution Control and Management
ISO	International Standard Organisation
ISWM	International Solid Waste Management
JICA	Japanese International Cooperation Agency
Kg	Kilogram
KL	Kilo Litre
Km	Kilometre
KMC	Kathmandu Municipal Corporation
KU	Kathmandu University
KVM	Kathmandu Valley Municipalities
KVMP	Kathmandu Valley Mapping Project
Kwh	Kilowatt Hour
LSGA	Local Self-Governance Act
MFPR	motivator, facilitator, policy maker and regulator
MLD	Million Litres per day
MLD	Ministry of local Development
MOE	Ministry of Environment
MOF	Ministry of Finance
MOFE	Ministry of Forestry and Environment
MOPE	Ministry of Population and Environment
MULTI	Multi Disciplinary Consultants (P) Ltd.
MPPW	Ministry of Physical Planning and Works
NAAQS	National Ambient Air Quality System
NCSWM	National Council for Solid Waste Management
NCUWM	National Council for Urban Waste Management
NGO	Non-Government Organisation
NLSS	Nepal Living Standard Survey
NORAD	Nordic Organisation for Regional Development
NPC	National Planning Commission
NPK	Nitrogen, Phosphor and Potassium
NPR/NRs	Nepalese Rupees
NS	National Standards
NWSC	Nepal Water Supply Corporation
OECD	Oversees Economic Commission for Development
PAYTA	Pay As You Throw Away
PEIP	Pokhara Environmental Improvement Project
POPs	Persistent Organic Pollutants
PPM	Parts per Million
PPP	Public Private Partnership
PSMC	Pokhara Sub-Metropolitan Corporation
PWD	Public Works Directives
R&D	Research and Development
RCME	Rotary Club of Mount Everest, Lalitpur, Nepal
RCN	Rotary Club of Nepal
Saagah	Composting courtyard in Newari Households in Kathmandu Valley
SACEP	South Asia Centre for Economic Program
SAEFL	Swiss Agency for Environment, Food and Land.
SCAEF	Society of Consulting Architectural and Engineering Firms, Nepal

SEAM-N	Strengthening Environmental Administration Nepal
SILT	Silt Consultants (P) Ltd., Nepal
SOE	State of Environment
SPCC	Computer for Statistical Analysis
STP	Sewerage Treatment Plant
SWM	Solid Waste Management
SWRMRMC	Solid Waste Management and Resource Mobilisation Centre
TOR	Terms of Reference
TP	Treatment Plant
UN PPPUE	United Nations Public Private Partnership for Urban Environment
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
US	United States
USA	United States of America
USEPA	United States Environmental Protection Agency
UWM	Urban Waste Management
VDC	Village Development Committee
WHO	World Health Organisation
WMA	Waste Management Approach
WMS	Waste Management at Source
WTO	World Trade Organisation
WW	Wastewater
WWTP	Wastewater Treatment Plant
ZWN	Zero Waste Nepal

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(in closewise order from top left- all photos by Badan Lal Nyachhyon)

Photo 1: Solid waste dump in Kathmandu Streets

Photo 2: Solid Waste Dump in Bagmati River Banks at Balkhu

Photo 3: Dust and Vehicle emission at Kathmandu streets

Photo 4: Incineration of Solid and Hospital Waste and air pollution

Photo 5: Wastewater pollution in Bagmati River

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Executive Summary

1. In Nature, every thing is perishable. Every thing is recycled back to its source of generation and no waste is generated that create environmental hazard.
2. Urban Waste comprising of Solid Waste, Wastewater and Air pollution emerged with the development of consumerism, development of Vehicular Transport and Industrialisation. Haphazard disposal of Solid Waste at household and municipal level is the source of environmental and health hazard created by Solid Waste whereas direct disposal of wastewater and industrial effluent to the river system is the source of river pollution. The combustion of firewood, petrol, diesel, coal, solid waste and hospital waste is the prime source of air pollution inside and outside the households in Nepal.
3. Currently, the waste products are not consumable and fundamentally thrown away into Nature as unuseful waste.
4. In Nepalese context, the attention on Environmental Issues and UWM was given only since the Seventh Plan. The Solid Waste Issues were considered from 1978 with the initiation of the Solid Waste Management Project with the cooperation of the Federal Republic of Germany. The Wastewater Issues were considered from 1976 with the cooperation of UNDP and the World Bank. The issues of Air pollution were considered only in 1995 with the cooperation of DANIDA.
5. The current practice of Solid Waste Management is shortly known as “Throw Away” practice with municipalities collecting, transferring and disposal partly into landfill site otherwise in open Nature as riverbanks, forests, ponds, and open places. Solid waste produced in the country exceeds 7,500 Tons per day with 1,489 Tons/day produced in 58 municipalities alone.
6. The Wastewater is mostly discharged to the river systems or ground water through the septic tanks. The total wastewater produced in the country ranges to the tune of 370 MLD, out of which the installed WWTP account for only 37 MLD (10% of total demand) and functioning WWTP accounts for 17.5 MLD < 5% of total demand.
7. The production of black carbon is accounted for 5-21 million Ton per year (refer Table 1-6), mostly the result of combustion of firewood and fossil fuel as diesel, petrol, kerosene and coal.
8. The sub-sectors Solid Waste and Wastewater in Nepal practically failed with the withdrawal of the donor support inviting huge environmental hazard and damage to human health. Today, the river systems were permanently polluted with wastewater discharge and solid waste dump on its banks that destroyed aquatic life, contaminated the ground water and emitting huge volume of methane gas trapped in the dumping yards. This will continue for over next 20 years and more. Apparently, there is no easy way to bring back the rivers into their original natural conditions. It is obvious the combined effect of solid waste disposal and wastewater in Bagmati and Bishnumati rivers require joint policy programs.
9. The community based Solid Waste Management in Pokhara, the Public-Private Partnership for ISWM in Biratnagar, paper and plastic recycling by certain private sector

enterprises, displacement of diesel three wheelers from Kathmandu, introduction of electrical three wheelers, Eco-labelling of Export Oriented products, introduction of biogas plants, use of alternative energy as solar energy, use of improved cooking stoves are few examples of good practices.

10. The closure of Teku sorting and composting plant, the closure of Gokarna landfill site, the loss of tree plantation along Satdobato-Gwarko section of the Ring Road, the closure of Himal Cement Factory, defunct wastewater treatment plants at Dhobighat, Sallaghari and Hanumanghat, and down fall of tourism industry are some of the cases induced by past failures in UWM.
11. The lessons learnt from good and bad practices experienced in Nepal suggest the need for radical change in the planning process and reforms in UWM. It is clearly established that management of Urban Waste alone for the Government or municipalities is practically a impossible task and the participation of the stakeholders is very essential.
12. Nepal has made very important policy changes and is a signatory to a number of international environmental conventions including Kyoto Protocol. Nepal also has had prepared plans and programs related to UWM. Some of the important policies, international conventions and plans are as follows:
 - a. Constitution of Nepal that guarantees the civilian right for clean environment
 - b. Environmental Protection Act 1997 that requires IEE/EIA studies for major projects,
 - c. Local Self-Governance Act 1999 that authorises the local authorities for SWM, environmental protection, pollution control),
 - d. SWRMRC Act 1987 and Solid Waste Policy, 1996 that require pollution free disposal of SW, prevention of Air, Water and Soil pollution by Solid Waste Disposal,
 - e. Emission Standards, 1999 (Euro I and II) provides permissible emission levels for vehicles
 - f. Ratification of Child Labor Law (eliminating child labour with age below 18 in hazardous works), Basal Convention (Control of trans-boundary movement of hazardous waste and their disposal) , Rotterdam and Stockholm convention (preventing long distance movement in environment of highly toxic elements), Millennium Development Goals Agenda 21 (Environmentally sound management of SW), ISO .
 - g. Kyoto Protocol that limits disposal of SW on land, waste water handling, waste incineration and emission of greenhouse gas as methane and carbon dioxide, and encourages carbon trading from developing countries to developed countries,
13. The implementation of the plans, programs and policies is the weakest part in UWM in Nepal and is aggravated by the lack of will power and commitment. There is a visible gap in Policy, Legislation and Commitments.
14. SWM National Policy, 1996 has not been followed up with plans and programs; no policy was made for dealing with hazardous waste; WW management is given least priority with almost all wastewater discharged to the river systems; no policy guidelines exist on Air Pollution Management.
15. UWM is not considered in par with other urban infrastructure as water, electricity, telephone, roads and not considered as a part of corporate or institutional or household responsibility.

- 16 The rehabilitation of Dhobighat, Sallaghari and Hanumanghat WWTP are bundled with Melamchi Water Supply Project apparently without any rationale. This matter may be considered for unbundling from Mega Projects that are difficult to implement and could be a good case for developing PPP.

The wetland wastewater treatment methods as Reed Bed applied in certain municipalities as Dhulikhel and as proposed in Urban Environment Improvement Project financed by ADB requires careful consideration and clearance for further application since this type wastewater treatment plant is not technically and economically sustainable. The treatment plant is not functioning during monsoon period since there is not system to retain the rain water and waste water is over flooded without treatment, the pipe systems and gravel filter media is choked with accumulated sludge, the reed bed plants do not absorb other elements (Sulphur, heavy metals) than NPK. Waster water remains polluted. More rationale of the installed plants is required to seek and operational aspects required more serious consideration. This system shall not be promoted without further investigation and adequate technical justification.

17. All stakeholders including individuals, communities, business houses, industries, and institutions produce waste. But the management responsibility is vested on the Municipality or the central government alone beyond its capacity. This is one of the reasons for mismanagement and environmental hazards created.
18. The lessons learnt from the good practices indicated that the responsibility of UWM is vested in various organizations in a scattered manner. The plans and programs are not coordinated and not agreed with. At the same time, it is observed that the waste management has relatively better performance where community/stakeholder participation is strong. The gap in policy implementation and advantage of community involvement has advocated the need for establishment of an exclusive and dedicated organization as the proposed National Council for UWM, strengthening Public Private Partnership, clearance of proposed methods of waste management and surveillance of performance of the stakeholders.
19. There are few National Councils as National Council for SWM, Environmental Protection Council, Tourism Development Council, High Powered Commission for Bagmati Area Sewerage Improvement, High Level Commission for ICT and some more. Many of these institutions are chaired by high-level authorities as Prime Minister, Ministers and other authorities. The accessibility to these authorities is very difficult because they are Chairs in many institutions and they have little time for these councils. Their priority and responsibility are mostly related to the greater national and international issues, political issues and definitely spread beyond the limits of UWM. For them, giving more time to UWM or Environment is not affordable. It is suggested that the higher authorities, and particularly the politics, shall not be involved in these councils since they are final authorities and it is not dignified and polite for any body to raise question on the performance these high level authorities. For practical purpose, the institutions dealing with UWM should be free of politics and empowered properly in order to allow the stakeholders to abide by and implement the decisions.
20. The proposed NCUWM will be a partnership of representatives of stakeholders without limitation and strengthened with establishment of local level executing councils, and will be supported by the proposed parliamentary committee, environmental audit committee,

civil societies for surveillance of activities, and UWM Fund. In the initial period, an Ad Hoc NCUWM will be nominated for undertaking pilot programs, preparatory works and drafting initial documents as updating of Policies, Reforms and changes in Acts, Rules and Regulations, defining roles and responsibilities of stakeholders, identifying measures to strengthening PPP, preparing Manual of Procedures including methods of procurement of services and franchise, preparing business plan, developing motivation plan for community actions and initiation of Data and Information Centre. The Council will facilitate to prepare plans and programs for all stakeholders based on consensus.

21. One of the immediate program of UWM shall be to create UWM fund with contribution diverted from Taxes and Revenues, various other funds derived from benefits of UWM, government commitments, saving to municipalities derived from the policy reforms and penalties to polluters.
22. In the long term, the activities of the Council will include strengthening Legislative and Regulatory Framework, building implementation capability of the stakeholders at various levels, developing strategy for marketing of waste products and services, developing PPP Programs, supporting R&D and innovative works.
23. A Policy Action Matrix for the initial period is reproduced below. It has been developed based on constrains and issues related to UWM based on the category of UW components as SW, WW, and AP. The matrix also indicates the list of activities, measurable indicators, the potential responsible organization and time period. More detailed matrix is provided in Appendix-4.

Constrains	Recommendation	Proposed Activities	Responsible Organisation	Timeframe
Institutional Framework	Establish an Exclusive and dedicated organisation	<ul style="list-style-type: none"> - Establish and Empower Ad Hoc NCUWM, - Establish Local Councils for UWM, - Establish Performance Audit Organisation - Empower Civil Society; 	Council of Ministers, NPC	Immediate
Vision, Goal and Objectives	Develop Vision, Goals, Objectives and Purpose	<ul style="list-style-type: none"> - Carry out Objective analysis - Consolidate Purpose - Develop Consensus 	NCUWM, Stakeholders	Immediate
Activities	<ul style="list-style-type: none"> - Define Approach - Monitor Environmental Performance - Adopt UWM as Institutional Culture 	<ul style="list-style-type: none"> - Define Roles and Responsibilities - Prepare Detailed Programs and Implement Pilot Programs by sub-sectors (Appendix-4) - Develop Financial 	Cabinet of Ministers, NCUWM, Stakeholders	Immediate

Constrains	Recommendation	Proposed Activities	Responsible Organisation	Timeframe
		and Investment Framework - Develop PPP Models - Develop Manuals of Procedures and Procurement Framework - Establish Data and Info Centre - Establish UWM Fund		
Motivation, Incentives	Introduce Motivation for Good Practices	- Develop Scheme for Motivation, Incentives and Awards - Support Innovation, creative Ideas and RD	NCUWM	Intermediate
Sub-Sectorial Actions	Carry Out limited activities	- Carry out some activities listed in appendix – 4 for each sub-sectors - Prepare programs for next phase	NCUWM	Immediate/ Intermediate

I. Background and Introduction

1. Cultural aspect of Waste Management

The ancient Hindu Culture has made a deep sense of belonging to the Waste Management concept. It says, “Lawanam Samudra Davatayoh, Phalam Vanaspati Devatayoh, Pakwanam Vishnu Devatayoh, Jalam Varun Devatayoh” meaning “ Salt belongs to Ocean, Fruits belong to Botanical World, Sweets belong to Lord Vishnu, and Water belong to Neptune. Similarly, Gautam Buddha in his teachings referred to the reuse of the Saffron robes Chibar as bed cover, pillow cover, sitting mat, and foot wrap and finally as floor wipe. The Islam says, “Kullu Saiya Yarju Ila Islahi” meaning Send Back To Its Source of Origin”. Waste Management was part of the traditional societies following the Nature where there is no waste material that creates environmental hazard. Every thing is perishable. Every thing is recycled back to its origin - the Panch Mahabhuta Tatwoh (the five fundamental elements): the Earth, Water, Fire, Sky, and Light.

2. Initiation of Waste Management

In 1970 for the first time in Nepal, the problems and issues of UWM of Kathmandu were addressed by F. Flintoff from WHO and followed by Professor Tabasaran from University of Stuttgart in 1976. These two reports became the foundation for cooperation between HMGN and the Government of the Federal Republic of Germany in Solid Waste Management with the establishment of Solid Waste Management Centre under the Ministry of Housing and Physical Planning in 1980.

3. Waste Management - a local issue

Prior to 1970, the solid waste in municipal areas was locally managed. Almost all the waste was of organic nature. Only little volume was disposed and almost everything were reused, recycled or assimilated into the soil. The organic waste easily biodegradable was either used as animal feed or widely recycled into the compost manure. Traditionally, a composting pit called “Saagaah” was a part of every household setting that was not continued in the modern urban planning context due to lack of in-depth studies and aptitude.

4. Change in consumption habit

Rapid urbanization, change in consumption habit and negligence towards preservation of environmental condition brought new scenario of urban and rural areas where dumping of solid waste, emission from vehicles and industries, disposal of waste water and industrial effluent in the river systems have become regular phenomena. Despite of significant efforts in the last decades, the majority of the municipalities including Kathmandu and Lalitpur could not manage the growing volume of waste. As a result of following the steps established by Kathmandu and Lalitpur Municipalities, the whole nation imitated the waste management procedures creating numerous environmental and health hazards. The problems are aggravating from day to day due to the increasing volume of urban waste dumped over land, water masses and air (by incineration) from Terai to Himalayas, from urban to rural areas, from farmland to nature. Practically, the efforts were concentrated for diversion of waste from urban areas to the rural areas without much value added benefits.

5. Components of Urban Waste Management

UWM has many facets of environmental issues that include:

- Solid (domestic waste, municipal mixed waste, business and industrial waste, hospital waste, electronic waste, mechanical equipment, vehicle waste, nuclear waste and debris from space science activities)
-

- Liquid (waste water, industrial affluent and sludge, combined sewage and drainage),
- Gaseous Waste (firewood emission, vehicular emission, industrial emission, incineration emission, landfill emission) and
- Dust Pollution (unpaved and unrepaired roads, crusher and cement plants, construction industry, street cleaning).

6. Sources of Waste

Table 1-1: Sources of Waste

Sources of Waste		Waste Categories				Remarks
		Solid	Liquid	Gaseous	Dust	
Households		✓	✓	✓	✓	Included in the paper
Street		✓		✓	✓	
Business/Institutions		✓	✓	✓	✓	
Healthcare		✓	✓	✓	✓	
Industries		✓	✓	✓	✓	
Construction		✓	✓	✓	✓	
Agriculture		✓	✓	✓	✓	
Nature	Earthquake	✓		✓	✓	Not included in the paper
	Volcano	✓		✓	✓	
	Forest Fire	✓		✓	✓	

7. Solid Waste Generation

The solid waste generated in various cities as reported by various projects are as summarized below:

Table 1-2: Average Waste Generation

Population	Estimated waste generation rate per person per day	Reference Area
Less than 20,000	0.25 kg	
20,001 to 50,000	0.30 kg	
50,001 to 100,000	0.35 kg	Dharan
1 00,00 1 to 400,000	0.40 kg	
More than 400,000	0.50 kg	Kathmandu
Average	0.34 Kg	

Source: SOE/NEPAL 2001, MOPE/ICIMOD/SACEP/NORAD/UNEP

Total Solid Waste generated all over the country (for a population of 25 million) is believed to be around 3,100,000 ton/year (8,500 T/day), out of which 29% belong to Kathmandu alone. IPCM project in 1995 estimated a total of 219,000 tons of solid waste generated by industries of Nepal employing 10 or more labour.

Over 64% of Solid Waste comprising of Biodegradable could be composted. The Recyclable and Market Waste comprising around 20% are packaging materials, plastics, glass, paper, wood, cans, and metal. The balance waste comprising of 16% is the inert materials as construction debris, earth, sand and dust that require sending to landfill sites or to land reclamation sites. Table 1-3 summarizes the waste composition as estimated by various projects.

Table1-3: Solid Waste Generation

Category of Waste	KVM (1)	KM C (2)	KM C (3)	PSM (4)	BIDC M (5)	58 Municipalities (6)	Generation Rate, Kg	Quantity for 58 municipalities, Tons/day	Average
Organic and garbage	82 %	68%	70%	65%	65%	62%	0.217	951	64%
Recyclable	17%	26%	24%	28%	23%	22%	0.068	297	20%
Inert and Others	1%	6%	6%	7%	12%	16%	0.055	241	16%
Total							0.340	1489	100%

Source: (1) CKV JICA 2004, (2) RESTUK/KMC 2001, (3) KVMP/KMC 2001, (4) PSM/PEIP 2000, (5) SEAM-N 2004, (6) SWMRMC 2004

8. Indicative quantity of Recyclable Solid waste generated

Based on above figures, the indicative quantity of waste generated could be summarized as follows:

Table 1-4: Recyclable Solid Waste Generation in 58 Municipalities

Category of Waste	Average Generation	Quantity for 58 municipalities, Tons/day
Plastics	5.9 %	86
Paper/Carton	7.9 %	117
Glass	2.1%	32
Textile/Jute	2.6%	39
Metal	0.8%	12
Rubber/Leather	0.7%	11
Total	20%	297

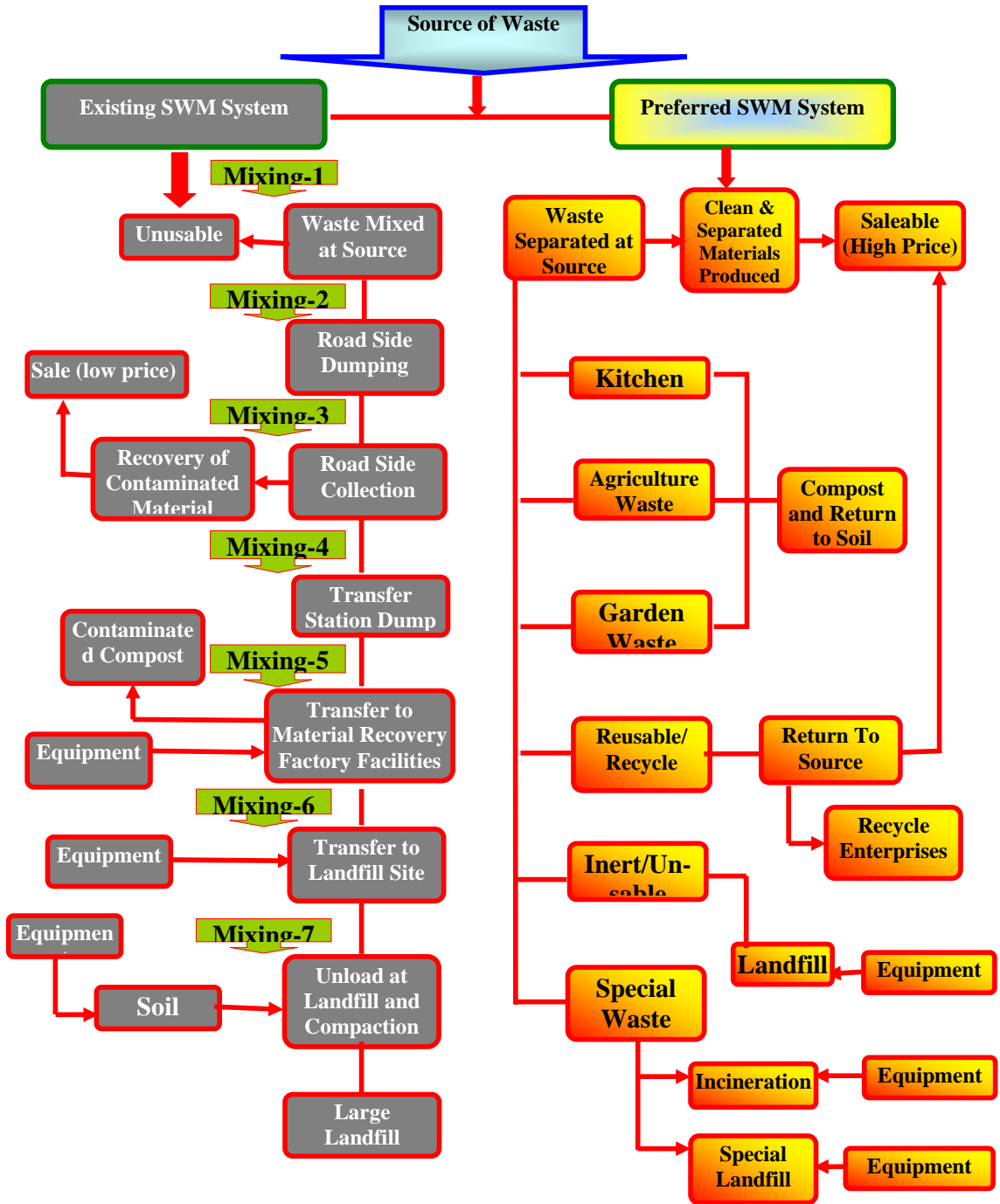
Source: SWMRMC 2004, PEIP/PSM 2000, SEAM-N 2004, CKV/JICA 2003, RESTUK/KCM 2000, KVMP/KMC 2001

9. Current Practice of SWM and proposed system of WMS

The current practice of SWM comprises of producing mixed waste, through a series of mixing activities from the source of generation at household level until it reaches the final disposal site (Figure 1). There are at least seven operations of mixing i.e. at household, at street where it was dumped, during collection and loading in collector vehicle, unloading at transfer station, partial recovery of recyclable materials, loading on a transfer vehicle, unloading at landfill site, and spreading at landfill site. A lot of capital resources is spent for mixing procedures during the process of collection, transfer and dumping.

In the contrast, the proposed method of WMS production of clean waste at source including composting, recycling, reduction of waste to land fill site. This method provides ample opportunity for developing PPP for delivery of waste management services and operating landfill site by private sector. If somebody wants to pay for disposal of waste without applying WMS and pay for it, it should be allowed.

Figure 1: Comparative Chart of Current and proposed SWM Systems



10. Liquid Waste Generated

The liquid waste generated in the country has not been studied and recorded as such. The liquid waste generated from the disposal of wastewater from households and industries is directly diverted to the natural river system without proper treatment.

The efforts for treatment of liquid waste, particularly, of domestic waste water is concentrated in Kathmandu Valley, to some extent in Pokhara and treatment of industrial waste water in Hetauda. The wastewater treatment plants established upto date is summarized in Table 1-5. The total installed capacity is less than 10% of the total demand for the 58 municipalities.

Table 1-5: Existing Waste Water Treatment Plants

Existing WWT Plant	Type of Plant	Capacity	Condition	Remarks
Dhobighat	Oxidation Pond	15 MLD	Not in working condition	Bundled with Melamchi Project
Kodku	Oxidation Pond	1.1 MLD	Working	Bundled with Melamchi Project
Sallaghari	Activate Aeration Ponds	2.4 MLD	Not in working condition	Bundled with Melamchi Project
Hanumanghat	Oxidation Pond	0.4 MLD	Working	Bundled with Melamchi Project
Guheswori	Oxidation Pond	16.4 MLD	Working (Effectiveness?)	Industrial and Domestic waste mixed
Hetauda ID	Oxidation Pond	1.1 MLD	Working	
Dhulikhel hospital	Reed Bed Plant	< 0.2 MLD	Working (?)	Pipes and Filter media chocked, dead zones created
KU	Reed Bed Plant	< 0.2 MLD	Working (?)	Pipes and Filter media chocked,
Pokhara	Reed Bed Plant	< 0.2 MLD	Working (?)	
Thimi	Reed Bed Plant	< 0.2 MLD	Working (?)	
Total installed capacity		37 MLD		

Source: ICIMOD/MOPE, CES/Multi 1993, HIDM 2004, HPCBASIP

11. Gaseous Waste Generation and Sources

The gaseous waste is generated from following particular activities:

- Burning of fossil fuel, firewood, coal for household purpose
- Burning of fossil fuel as a result of operation of vehicular transport,
- Burning of fossil fuel, firewood, coal for industrial purpose
- Incineration of Solid Waste, particularly plastics and paper,
- Incineration of medical waste
- Emissions of dust and ash from industries.

The gaseous waste generated is attributed to sources as indicated in Table 1-6:

Table 1-6: Total Carbon Emission, Sources of Emission and Fuel Consumption

Emission Sources	Unit	Quantity	Source
Households	Nos.	3,500,000	
Vehicles	Nos.	305,395	
Industries	Nos.	3,500	
Total Carbon Emission from Fuel wood	Ton	21,570,000	MOPE 2001
Total Carbon Emission (Emission Rate 0.04 T/C/A)	Ton	1,048,000	CDIAC 2002
Total Carbon Emission (Emission Rate 0.2 T/C/A)	Ton	5,000,000	UN HDR 2005

Source: NPC/CBS, AEPC, UN HDR 2005

Table 1-7: Fuel Consumption

Fuel Type and Source	Unit	Consumption by all stakeholders		Consumption by households in % (NLSS, 2004)
Firewood (MOPE 2001)	Ton/Annum	15,400,000	80%	69.1 %
Fossil Fuel	KL	785,000	4%	
Biogas plant (NBSP, 2002)	No	135,000	1%	
Cow Dung/thatch/	Ton		13%	15.7 %
Kerosene				4.7 %
Coal	Ton		2%	
LPG				8.2%
Other Types				2.3 %
Total			100%	100%

Table 1-8 Fuel Purchased by Industries and emission rate (ton of C/TJ)

SN	Type of Industry	No. of Industries	Fire Wood, (Ton)	Charcoal (Ton)	Diesel (KL)	Petrol (KL)	Kerosene (KL)	LPG (T)
1	All Industries	3,213	99,912	130,599	32,746	2,045	10,960	347
	Emission rate			25.52	19.992	18.71	19.2	17.03

Source: Census of Manufacturing Industries, 2002, CBS

12. Dust Generation

The dust generation in Nepal has not been studied as such. The prime sources of dust emission could be attributed to:

- Road conditions – Unrepaired blacktop roads, unpaved shoulders of blacktop roads, gravel roads, earthen roads,
- Construction Industry – Production of road surfacing materials as bitumen mixes, demolition of structures
- Mining Industry – Stone mining and crushers, stone material grading and sorting industries, cement plants,

13. Waste Treatment Methods

The treatment methods used for the various category of urban waste are indicated in Table 1-8 to 1-10.

Table 1-8: Solid Waste Treatment method and Degree of Hazards

Waste Category	Methods of Treatment	Degree of Hazard to Environment and Health							Cost Implication
		Ground Water	Source Water	Earth Surface	Vegetation	Air	Environment	Human Health	
Solid Waste	Dumping	H	H	H	H	H	H	H	H
	Landfill	M	M	M	M	M	M		H
	Incineration of except Cl, Fl, Br compounds	L	L	M	M	H	H	M	H
	Incineration Cl., Fl., Br Compounds	M	M	H	H	H	H	H	H
	Source Management			L			L		L

Key: H-High, M-Medium, L-Low

Table 1-9: Waste Water Treatment methods and Degree of Hazards

Methods of Treatment	Degree of Hazard to Environment and Health								
	Human Health	Ground Water	Source Water	Water Supply	Earth Surface	Vegetation	Air	Environment	Cost Implication
Dumping	H	H	H	H	H	H	H	H	H
Septic Tank	L	H	M	M	L	L	L	H	H
Oxidation Pond	L	M	L		L		L	L	L
Wetland (Reed Bed)	H	H	H		H		H	H	H

Key: H-High, M-Medium, L-Low

Table 1-10: Air Pollution Treatment methods and Degree of Hazards

Methods of Treatment	Degree of Hazard to Environment and Health								
	Human Health	Ground Water	Source Water	Water Supply	Earth Surface	Vegetation	Air	Environment	Cost Implication
Dumping	H	H	H	H	H	H	H	H	H
Source Reduction	L	L	L	L	L	L	L	L	L
Closure of Source									VH

Key: H-High, M-Medium, L-Low

14. Waste Induced Health Hazard

Many people think waste goes away when it is dumped. In practice, the fact is different. Waste does not go away easily, it comes back to us through various chains of recycle. The emission from vehicles, industries, incineration activities and households that include black carbon, green house gases (carbon dioxide, carbon monoxide, methane, Nox, Sox) and dust pollution comes back through air we breathe and food chains we get from farm land and water bodies. The emission is believed to be the prime cause for global climate change as result of global warming, ozone layer depletion, ice melting and brown cloud formation. The waste water contaminates the ground water, surface water and farmland, and creates foul smell in the neighborhood. The solid waste has direct effect on urban infrastructure, pollution

of land, soil and air, and degradation of aesthetics. These all have direct effect on human health. Particularly, the increase in diseases as hepatitis, typhoid, asthma, diarrhoea, dysentery, skin cancer, eye and throat sore is attributed to the environmental hazards created by urban waste.

All types of waste has the potential to affect health and environment depending on the collection system used, the location where waste is generated, the waste management strategy employed and where and how it is finally disposed off. The health hazard has territorial effect and nobody is spared. This fact calls for consolidation of all stakeholders into a strong partnership and acting in an integrated and cohesive manner.

15. Need for Review of Waste Management Approach

The global effect of waste hazards invites us for review of Waste Management Approach. The review approach is particularly defined by a popular approach known as 5R that signifies for:

- **Rethinking** on what we do, **Refraining** from indiscriminate **Throwing Away of Waste**,
- **Reduction** of Waste at Source, **Reuse, and Recycling**.

There is tendency that people want to add more R... to strengthen the review approach.

16. Effectiveness of Waste Management Approach

As defined by the University of West of England, the waste management is broader than just the disposal of waste. It includes the generation, collection, processing, transport, minimisation of the production, the reconceptualising of waste as an economic resource, mobilising the communities in the process, and protection of human health and environment.

The effectiveness of the waste management system is influenced by the overall strategy adopted locally, regionally and nationally and the effectiveness of Partnership Approach adopted in the Waste Management.

17. Initiatives by Informal Sector

Based on the actual demand observed in the waste management in urban areas, various formal and informal sector organizations and individuals have taken initiatives for collection and disposal of waste including source segregation, composting at sources, reuse and recycling. Though the formal PPP in waste management is still not called for, the demand has created environment for private sector to take initiatives. The waste market has created employment for over 17,000 individual waste workers in Kathmandu Valley, and several NGO are operating.

II. Review of Policies, Legislation and Development Plans

18. The Governmental and Sector Policy

With realization of the facts, the Government of Nepal formulated and enacted sector policies and several legislative measures highlighted below.

19. The Constitution of Nepal, 1991

The Article 26(4) proclaims: “The state shall give priority to the protection of the environment and also to prevent its further damage due to the physical development activities by increasing the awareness of the general public about environmental cleanliness and the State shall also arrange for the specific protection of rare wildlife, forest and vegetation”. Article 88 (2) has conferred a right where any person can directly move an appeal to the Supreme Court on any issue of public interest or importance, including environmental issues”.

20. National Policy on Solid Waste Management, 1996

The policy has the following five objectives:

1. To make solid waste management system simple and effective
2. To minimize adverse effect of solid waste on environmental and public health
3. To mobilize solid waste as a resource
4. To privatise solid waste management
5. To promote public awareness for greater public participation on solid waste management

21. Strategies of National Policy on SWM

In order to achieve the above objectives, the strategies adopted in the national policy include:

- Development of Expertise in local bodies and institutions, and
- Launching of solid waste management and sanitation as priority programs
- Technological development for final disposal system as per the nature of waste and local, social and economic situations
- Launching of public awareness programs in close association with NGOs and social organizations to ensure greater public participation,
- Enhancing financial self-sufficiency of institutions in solid waste management particularly involving private sector in the business of waste management, and
- Promotion of waste reduction at source and utilization of generated waste as resources promoting reuse and recycling activities.

22. Solid Waste Management and Resource Mobilization Act, 1987

Solid Waste (Management and Resource Mobilization) Act 1987 has had given the responsibility for pollution free disposal of solid waste to SWMRMC. The center is empowered to take necessary measures to stop Air, Water and Soil pollution caused by solid waste. While doing this, it has to coordinate with local municipalities. Now the roles and responsibilities of SWMRMC are partially transferred to Kathmandu Municipality and the center is now functioning under the Ministry of Local Development.

23. Drinking Water Corporation Act, 1989

The Act mentions the expediency of maintaining public welfare and health by distributing pure drinking water and to make proper arrangement for drainage [Sewerage] systems. Section 5 of the Act imposes rights and duties on the Corporation: to prevent pollution in drinking water systems.

24. Nepal Standard for Mass Emission Euro I, 1999 and Euro II, 2005

Based on the provisions made in the of Pollution Control Act and complemented by Article 15 of the Environment Protection Rules 1997, the Standards have characteristics given in Table 2-1 with inspection provision and green labeling every year.

Table 2-1: Mass Emission Standards (selected parameters)

Parameters for Inspection	Year 1995	1998	Year 2000	EURO I	EURO II
				2000	2005
Carbon Monoxide for all engines	3% by volume				
Carbon Monoxide for 2-stroke engines	4.5% by volume				
Carbon Monoxide for Petrol Engines				2.72 gr/Km	2.2 gr/Km
Hydrocarbon for Gasoline Engines all			1,000 ppm	0.97 gr/Km	0.5 gr/Km
Hydrocarbon for Gasoline For 2-Stroke Engines			7,500 ppm		
Diesel Vehicles >3.5 T GVW, CO				4.5 gr/Kwh	
Diesel Vehicles >3.5 T GVW, HC				1.1 gr/Kwh	
Diesel Vehicles >3.5 T GVW, NOx				8.0 gr/Kwh	
Opacity Test for Diesel Exhaust	65 HSU				
Opacity Test for old Diesel Exhaust		75 HSU			

Source: MOPE

25. Environmental Protection Act 1997

EPA 1997 requires all projects to review and carry out environmental studies for all proposed projects. The basic provisions of the Act are as follows:

- A proponent shall submit a proposal for implementation along with a report on Initial Environmental Examination and Environmental Impact Assessment of the proposal as prescribed for approval by the concerned agency
- Prohibition on implementation of proposals without approval from the concerned agency or the Ministry.

26. Local Self-Governance Act and Regulation, 1999

The Part 2, Part 3 and Part 4 of the Act have given ample power to the local bodies (Village Development Committees, Municipalities and District Development Committees respectively) in relation to the environmental and sanitation issues. The duty for arrangement for street cleaning, disposal of wastes, dirt and rotten materials, and to make arrangements to encourage the inhabitants of the Ward for maintaining sanitation is given to the Ward Committee under Village Development Committee and Municipalities. The local bodies are given authority for preparation of programmes on primary health, education, sanitation, and collection, transportation, disposal of wastes and garbage in the village development area. Accordingly, the Local Self-Governance Regulation has prescribed the procedures for formulation of plans, programmes and resource maps and procedures for their implementation.

27. Public Private Partnership Policy, 2060 (2004) and Guidelines, 2061 (2005)

The two major factors upon which the concept of PPP is based are: **Value of Money and Project Structure**. Based on the above broader framework, His Majesty's Government of Nepal has shown increased interest in involving the private sector in upgrading the level of

services locally and included the concept of Public-Private Partnership (PPP) as part of the 10th plan. To create an enabling environment and introduce PPP as a viable development alternative, HMG/UNDP Nepal launched the Public-Private Partnership for Urban Environment (PPPUE) in March 2002-2007. The development objective of PPPUE is to increase the access of the urban citizens to basic services, and therewith, to contribute to the creation of a healthy environment and the improvement of living conditions in the urban and peri-urban areas, by promotion of partnerships between public and private sectors for the sustainable provision of urban services.

The PPP Policy provides the Framework for Private Sector to provide basic services. Key features are provision of Central Coordination Unit, Partnership Models for various projects and programs, Committee of Representatives and provides conditions of joint ownership of assets by the partners. The PPP Guidelines provides the Framework for implementation including scope, principles and priorities, institutional arrangement, project identification and project clearance procedures.

28. Kyoto Protocol

The Kyoto Protocol, ratified by Nepal by accession on Dec 5, 2005, is known as Framework Convention on Climate Change. It has had focused on following points related to UWM:

- Increased use of new and renewable forms of energy, use of CO₂ reduction technology and environmentally sound technologies
- Established quota for carbon emissions for each country with the objective is to bring down the emissions in industrial countries to 8 per cent below the level of 1990, by 2012.
- Reduction of methane emissions through recovery and use in waste management
- Provisions made for Transfer of Carbon Emission Credits (CEC)
- Provision for Clean Development Mechanism (CDM) funds for utilizing CEC
- Imposing fine for exceeding the quota of carbon emissions, by a unit, is EUR 40 a ton
- Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments;
- Encouragement of appropriate reforms in relevant sectors aimed at promoting policies and measures which limit or reduce emissions of greenhouse gases not controlled by the Montreal Protocol;
- Measures to limit and/or reduce emissions of greenhouse gases not controlled by the Montreal Protocol in the transport sector;
- Limitation and/or reduction of methane emissions through recovery and use in waste management, as well as in the production, transport and distribution of energy.

The Protocol focuses on limitations of solid waste disposal on land, wastewater handling, and waste incineration.

29. Millennium Development Goals Agenda 21

The Millennium Development Goals have focused on waste management issues very strongly. Particularly, Chapter 20 deals with environmentally sound management of hazardous wastes, Chapter 21 with environmentally sound management of solid wastes and sewage-related issues, Chapter 22 with safe and environmentally sound management of radioactive wastes.

30. International Standard Organization 14001

ISO promotes the development and implementation of voluntary international standards, both for particular products and for environmental management issues. ISO 14000 refers to a series of voluntary standards in the environmental field including ISO 14001 related to Environmental Management Systems (EMS) and other standards in fields such as environmental auditing, environmental performance evaluation, environmental labeling, and life-cycle assessment. The ISO 14001 standard requires that a municipality, community or organization put in place and implement a series of practices and procedures that, when taken together, result in an environmental management system. ISO 14001 is not a technical standard and as such does not in any way replace technical requirements embodied in statutes or regulations. It also does not set prescribed standards of performance for organizations. The major requirements of an EMS under ISO 14001 include: A policy statement at corporate level that includes commitments to prevention of pollution, continual improvement of the EMS leading to improvements in overall environmental performance, and compliance with all applicable statutory and regulatory requirements.

31. Other Important Policies, Regulations and Conventions

Some of the other important Legislation, Regulations and Conventions are listed below. The major provisions of these policies are summarized in Appendix-2:

- Industrial Policy Act, 1992
- Town Development Act, 1988
- Water Resources Act, 1992
- Public Infrastructure (BOT) Policy, 2000 (Construction and Operation)
- Private Investment in Construction and Operation of Infrastructure Ordinance, 2003
- Procurement Act, 2004 (Draft)
- Foreign Investment and Transfer of Technology Act,
- Child Labour Laws
- Minimum Age Convention 138 (C138), 1973
- Worst Forms of Child Labor Convention 182 (C182), 1999
- Basal Convention 1989
- Rotterdam Convention 1998
- Stockholm Convention, 2001

32. Use of EMS by Municipalities

Municipalities and Business houses typically oversee a number of activities, facilities and operations. EMSs can be used as a framework to help these operations to improve their environmental performance and make greater use of pollution prevention approaches. Use of the standard by municipalities and businesses is not well established at this point, but its use will help for pollution prevention and production of cleaner production, cost saving and enhance public image.

33. Environmental Pollution Not Priority Issues

The problem of environmental pollution from industries or urban sectors was not a priority issue of the government in its initial phases of development planning. Main focuses of development in the early planning stages are seen revolving around development of infrastructures, human resources and productivity. It is only after the Sixth Plan (1980-85) that the issue of environmental pollution and its social costs has been realized at least in the policy level. By the turn of Eight Plan (1992-1997), environmental pollution has been one of the key priority policy concerns.

34. Ninth Plan

The Ninth Plan included the following objectives in solid waste management:

- To make legal provisions for mobilization of non-governmental and private sector effectively in environmental public health and garbage management;
- Promotion of private sector and joint venture investments by making active participation of local bodies,
- Recycling will be promoted by motivating people engaged in recycling business.
- Enabling of the local bodies for effective management of waste with increased efficiency and reliability,
- Reduction of the volume of waste to be treated at the point of generation,
- Conduction of public awareness campaign to promote people's participation,
- Involvement of NGOs,
- Development of cleanliness concept as per the local, social and economic conditions
- Management of the waste and their disposal according to their volume and types,
- Recycling and resource recovery in waste management, especially for the production of organic fertilizer, energy and other products with market demand,
- Use of cost-effective appropriate technology enabling recycling and materials recovery, and environmental consideration.

35. Tenth Plan

The 10th Plan has dealt the policy and the strategy related to the Waste Management in a comprehensive manner. The major considerations are as follows:

- Provision for establishment of **An Environment Management and Promotion Center** under the Ministry of Population and Environment
- Provision for **Establishment of focal points** in each ministry for coordination of various programs related to international treaties
- Prioritizing ratified international treaties
- Integration of the environment protection and the development
- Prohibition of drainage [Sewerage] connection to the rivers and encouragement to the local authorities for establishment of Sewage TP
- Mobilization of non-governmental NGOs and private sector and general people for control of pollution in the urban and rural areas Strengthened Enforcement of NS (Air, Water, Noise, Waste Management)
- Provision of subsidy to Local Authorities through Environment Protection Fund
- Provision for establishment of Environment Council or Commission

36. Review of International Practices

The review of international practices in UWM was carried out for certain selected countries as India, China, Japan, USA and Switzerland and compared with the status in Nepal. The practices adopted could be attributed as the reflection of the development status and image of the countries. A brief summary of international practices applied is given in Table 2-2.

In respect to Solid Waste Management, the developing countries as India, China and Nepal remained at primitive level based on mixing, collection and dumping in Nature creating considerable damage to environment and human health whereas the developed countries as Japan, USA and Switzerland are practicing Prevention, Minimization and Resource Recovery methods and initiated Producer Responsibility methods. Several companies as Hewlett Packard, Nike, Toshiba, and many more had benefited millions of dollars from reforms in waste management and application of Free Lifestyle approaches.

In respect of waste water, India, Nepal and China are basically disposing the wastewater in the nature whereas the developed countries practicing high-tech methods for prevention of water pollution and recycling waste water.

The progress in Air and Dust Pollution control has been significant in all countries. Many countries have moved towards air pollution control through application of Cleaner Production Approach, Reduction of Green House Gases and Clean Development Mechanism following Kyoto Protocol. Many countries as China and India are benefiting with trading of carbon with developed nations as Japan, Finland and other developed countries. Every Ton of Carbon reduced counts for Euro 40.

Table 2-2: International Practice in UWM

Countries	Solid Waste	Waste Water	Air Pollution	Source
India	Mixing, Collection and Dumping	70% Untreated	US NAAQS, Reduction of GHG, CDM	MOFE/UNEP
China	Mixing, Collection and Dumping	70% Untreated	Cleaner Production, CDM	ADB/OECD
Japan	Minimisation and Producer Responsibility	30% Untreated, Recycle	Air Pollution Control Law, CDM	MOE
USA	Prevention of Mixing and Dumping and Resource Recovery	Clean Water Act, Recycle	Clean Air Act, Right to Clean Air	Constitution, USEPA
Switzerland	Separation in HH Chambers, Recycling and Incineration	High Tech Treatment	Geneva Convention Ordinance on Air Pollution Control	SAEFL
Nepal	Mixing, Collection and Dumping	90% Untreated	Cleaner Production, Vehicle Emission Control	MOPE

III. Review of Good Practices

37. Current Good Practices in Solid Waste Management

The review of the current best practices in UWM is carried out and presented in Table 3-1 to 3-3. The best practices in SWM is evaluated with consideration of following factors as a) contribution to Policy Support, b) contribution to Pollution Reduction, c) Reduction of Burden to municipality and Government, d) Reduction of cost to customers, and e) Creation of Opportunity for Reforms. Though the evaluation method is based on the perception of the evaluator, it gives certain indication on the status of level of overall improvement in waste management. This method may be further elaborated as a good tool. The brief assessment of the solid waste management practices indicated that there is large scope for improvement in the practices applied currently. It may be noted that dumping at road side has lowest value whereas the proposed waste management at source has highest value. The community based SWM in Pokhara and Biratnagar have relatively highest values but have a lot of scope for further improvement.

Table 3-1: Best Practices in UWM

Location	Solid Waste Practices	Organisation	Relative Index	Remarks/Achievements
	Dumping in Street	Municipalities	0%	Assumed Bench Mark
Kathmandu	SW Collection by Municipal Vehicles	Municipalities	12%	
Kathmandu	SW collection from Street Containers	Municipalities	6%	
Kathmandu	WEPCO/WEG Approach	LSMC	17%	MOPE awarded a cash prize of Rs. 50,000
Kathmandu	Clean Kathmandu Valley	KMC/JICA	21%	
Biratnagar	BMC-Siltes PPP in ISWM	BMC/SILT	44%	
Bharatpur	ISWM	BM	35%	
Pokhara	CBSWM and Landfill	PSMC	48%	Cleanest City
Dharan	Dumping in Forest	DM	25%	
Dharan –Itahari- Biratnagar Corridor	Strengthening Environmental Administration	FINNIDA		
Mount Everest	Waste Free Everest Program/SPCC	ZWN/ RCME	70%	Waste collection by Everest Expedition Teams
Local Communities	Community Based SWM (40 HH)	ZWN/ RCME		Domestic Composting
	Composting at Source		77%	
	Suiro Campaign	RCN		Collection of waste plastic and paper
	Incineration		40%	
	Waste Management at Source		83%	

Source: BMC-SILTES ISWM Project, ADB/Pokhara Tourism Development Project, SEAM-Nepal Project

The wastewater treatment is found to be given least priority and is grossly neglected. Three plants remained defunct for various reasons whereas wetland waste water treatment (Reedbed)Plants are grossly found inefficient. The treatment plant is not functioning during monsoon period since there is not system to retain the rain water and waste water is over flooded without treatment, the pipe systems and gravel filter media is choked with accumulated sludge, the reed bed plants do not absorb other elements (Sulphur, heavy metals) than NPK. Waster water remains polluted. More rationale of the installed plants is required to seek and operational aspects required more serious consideration. This system shall not be promoted without further investigation and adequate technical justification.

Table 3-2: Best Practices in UWM-Waste Water

Current Best Practices	Magnitude	Remarks
Waste Water Treatment Plants in Kathmandu (Guheswori – 16.4 Mld, Dhobighat 15 Mld, Kodku 1.1 Mld.)	3 Nos (32.5 Mld)	Dhobighat Plant Defunct, Guheswori receives mixed waste
Waste Water Treatment Plants in Bhaktapur (Sallaghari – 2.4 Mld, Hanumanghat 0.2 Mld)	2 Nos (2.6 Mld)	Sallaghari and Hanumanghat Plants Defunct
Waste Water Treatment Plants in Hetauda Industrial District (1 Mld)	1 No (1 Mld)	
Reed Bed Plants (Dhulikhel 2 Nos, Thimi 1 No, Pokhara 1 No,	4 Nos	Overflow in Monsoon, Filter and Piping system choked
Environmental labeling of Export Oriented Industries		FINNIDA Supported

Source: CES/Multi 1993, ENPHO, HIDM, COWI

In the context of emission control including reduction of black carbon, green house gases, and CFC, certain works had been accomplished. They include alternative energy projects, use of solar energy, introduction of electrical vehicles and Eco-Labeling of Industrial Projects. All these projects are based on PPP with local communities, private and public sectors.

Table 3-3: Best Practices in UWM- Emission Reduction

Current Best Practices	Magnitude	Remarks
Alternative Energy- Installed Biogas Plants, No	152,373	Ashder Award for 2004
Alternative Energy- Improved Cooking Stove	150,000	
Alternative Energy- Solar Home Systems	50,000	
Alternative Energy- Wind Energy		
Alternative Energy- Solar Tuki	US\$ 143,000	WB Award, 2005
Electrical Vehicles – Trolley Bus System, No	20	
Ban of Diesel engine 2-stroke three wheelers	450	Improved air quality of Kathmandu
Electrical Vehicles – 3 Wheelers (DANIDA)	600	
Eco-Labeling for Export Oriented Products		FINNIDA Supported
Environmental Sector Program Support		Collapsed after withdrawal of DANIDA Supported

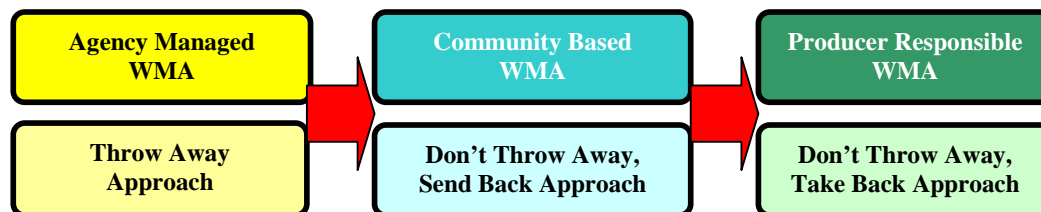
Source: AEPC, BSP, MOPE, ENPHO

38. Worldwide Trend

The Current trend worldwide has indicated that there is no limit for waste generation and it continues to grow as the societies become modernized. The current practice in general is to transfer the waste from urban areas to rural areas, and from developed countries to underdeveloped countries. As the awareness on Environmental Hazards get strength, the availability of disposal sites are jeopardized. No one wants waste to be disposed off in their localities and invite huge environmental problems for themselves. More and more rural communities resist the disposal policies. There is no safe solution to the burgeoning waste problem unless we look from a different perspective and adopt innovative approaches towards managing the waste.

The current world trend in UWM is to move towards Community and Producer managed waste management systems from the Agency-managed systems as demonstrated in Figure 2.

Figure 2: World Trend of Waste Management



IV. Review of Past Failures

39. Policy Failures

Several Policy Decisions, Plans and Program were not followed up and not implemented as envisaged by the plans. Though the policies have had ample provisions requiring proper UWM, the implementation of the plans and programs remained very weak. The political will and commitment required for implementation of the plans also found very weak. Major wastewater treatment plants and sewerage systems remained defunct. Landfill site faced severe problems. Vehicle emission control measures were not applied for majority of polluting vehicles as buses and Trucks. Emission control in majority of industries was not practiced even when emission control devices were available. The Supreme Court reviewed the issue of closure (Dust and emission, and politics?) of Himal Cement Factory and ordered for reinstatement but the order was not implemented and the factory remained abandoned. The lack of commitments and will power for implementation of the policies, plans and programs is very prominent.

40. Legislation and Institutional Failures

The UWM with its vivid characteristics was remained in the domain of various institutions from various Ministries to Municipalities. The sub-sectors as Solid Waste, Waste Water, Industrial waste and air pollution were dealt by various institutions and without much of intersectoral linkages.

41. Failure to recognize UWM as an Infrastructure

The UWM never recognised in par with Water Supply, Electricity, Telecommunication, Roads and Bridges, and Industries, and is given least priority by the Government. Though the plans and programs made ample provisions, the issues associated with UWM are dealt at sporadic level and shadowed by the other general environmental issues and development plans.

42. Neglect to Environmental Guidelines

The Agency-managed SWM systems suffered with lack of adequate environmental and social consideration explicitly expressed in the policy documents. The JICA funded CKV studies suffered from this aspect and resulted in the transfer of municipal mixed waste to Landfill site at Sisdol, and inappropriate selection of landfill site and construction of unloading platform at Teku Station. The lack of attention towards the health concern of Waste Pickers is another aspect to be reviewed following the JICA Guidelines for Social and Environmental Consideration, March 2004.

43. No exclusive and dedicated organization

Actually, no exclusive and dedicated organisation at National and local level exists to deal with the issues of UWM in a comprehensive and integrated manner. There are no independent institutions responsible for monitoring of Environmental Performance, Environmental Surveillance, and Audit. Practically, there are no Civil Societies capable and properly empowered to advocate for the preservation of the nature, environment and human health compared to Human Rights Commission.

Similarly, the Government and the municipalities failed to fulfil their international commitments including Environmental Protection commitments and continued to dump waste in the nature without proper treatment.

44. Lack of Long Term Vision and Goals

Lack of long term vision and goals has had its toll on UWM sector. The hazards created today in Nepal are the direct result of such a deficiency. Lack of ability to understand that long-term vision shall start from today is a strong failure in itself. It is highly recognized that the Government and Municipalities had always given attention on short-term solutions only.

45. Closure of Sorting and Compost Plant at Teku

The closure of solid waste sorting and composting plant at Teku was due to neighborhood resistance for the hazard created by the plant. This has aggravated the problem of final disposal and deteriorated the quality of waste dumped in Gokarna.

46. Gokarna Landfill Site not in operation

The Gokarna Landfill site designed for 50 years of operation, particularly after the take over of the Solid Waste Management by Kathmandu and Lalitpur Municipalities, suffered and became defunct due to the failure to maintain the environmental conditions of a sanitary landfill site and particularly because of dumping of none segregated mixed waste. The deteriorating environment of the land fill site combined with the political motivations ignited the situation for the people to start agitation for a number of reasons such as: a) The air quality in the surrounding area deteriorated due to the foul smell of decomposing waste; b) Leachate from the Landfill was not properly managed and the natural drainage is effected; c) The area is infested with swarm of flies, insects and rodents; d) Decomposing waste from the municipality trucks transporting garbage to the site spilled over on roadsides; e) Rumours that Residents from other villages refused to enter into marriage with the village residents due to the stigma attached to staying near the plant; f) The birds and animals spilled the waste picked up from the landfill site in their households and surrounding areas; g) The quality of waste delivered to the site deteriorated continuously and virtually no separation of organic and recyclable waste was done; h) Inadequate equipment, negligence of SW workers over their duties, disrespect to the voices of the local residents, uncollected waste at the street and transfer station were other issues. The strong Public Private Partnership developed from the beginning was completely destroyed.

47. Havoc to the Trivuban International Airport

The dumping of Solid Waste along Bagmati River at Guheswori area created huge havoc to the Trivuban International Airport Authorities because of the Bird Hazards created and several International Flights were diverted.

48. Loss of tree plantation along Satdobato-Gwarko Ring Road

A glaring example of the hazards of solid waste mismanagement is the loss of trees along Satdobato-Gwarko Ring Road.

49. Agitation Against Potential Landfill Sites

Another example of bad practice is the agitation of the people of Gokarna area who suffered to the limits and they were compelled to agitate for closure of Gokarna Landfill Site. Based on the Gokarna experience, the people of Suichatar refused to allow using their neighbourhood for developing landfill site. Similarly, locating new landfill sites at Okharpauwa, Champi, Ramkot and Taukhel struggled and opposed for construction of landfill sites in their neighbourhood and transfer of urban waste to their areas.

50. Abuse of River corridors

The Bagmati, Bishnumati and Manohara River corridors from Gokarna to Chobhar are today turned to dumping yards with garbage disposed and wastewater discharged from the cities of Kathmandu Valley. The river system in Kathmandu Valley is now permanently polluted with wastewater and solid waste dumping. The areas along the rivers are filthy with bad smell, infested with birds of prey and rodents. The ground water remains permanently contaminated forever. The organic matters in the dumping strips generate methane gas, which will be released continuously for long period over 20 years. There is constant threat that the methane gas accumulated within the dumped mass may explode some time. All aquatic life in these rivers ceased to exist and the wild life of the Kathmandu Valley, for instance the monkeys in Pashupati area that depend on the river water for livelihood, is infected with various diseases and waiting for total extinction. Many river systems near the urban areas have similar fate. The rivers will remain contaminated forever. This is one of the sources of spread of water borne diseases in Kathmandu Valley.

51. Prime cause of downfall of the tourism industry in Nepal

Back in 1992, following the take over of waste management responsibility by Kathmandu and Lalitpur Municipalities, and following the closure of Teku Sorting plant and Gokarna Landfill site, the capacity of Solid Waste Management became so low that waste remained dumped in the main streets for several days creating a hazardous condition that attracted international attention. Many countries declared Nepal as environmentally unsafe country that became instrumental for considerable downfall of the tourism industry in Nepal. The industry has not been able to recover to its original state.

52. Recycling of PET Bottles

Certain NGOs and private sector enterprises started recycling of PET Bottles for solar disinfection of water for drinking purposes. WHO has suggested that the method of disinfection of drinking water with exposure to sunlight for at least 6 min at 60°C will eliminate bacteria and pathogens causing dysentery, diarrheria, typhoid, hepatitis and many other common diseases. However, the recycling of PET bottles itself is not acceptable since the manufacturers of these PET bottles have not recommended for recycling of these bottles and exposure of PET bottles to ultraviolet rays of sunlight could be very harmful for the human health since they contain certain volatile chemicals. This is evident by blurred appearance of PET bottles after exposure to sunlight. Recycling of PET bottles for solar disinfection of water should be avoided.

53. Diversion of resources

The DDC that are responsible for raising tax for export of waste from districts are diverting the taxes collected to the administrative and staff costs of DDC and do not utilize the tax payers' money for developing capacity for UWM. It is estimated that the annual scrap tax collection by various DDC exceeds NPR 4.85/capita/annum (BLN, 2005) or NPR 16 million annually.

54. MLD's efforts for involving PS in SWM in Kathmandu

Back in 1999, MLD made efforts to procure the services of the private sector through a contract agreement to outsource the solid waste management services to a capable private sector. After a long homework and much delayed decision, the contract was awarded to a private party in 2003. However, the contract did not materialized and the contract was not implemented so far.

55. Waste Water disposal in Nature

It is assumed that 95% of the wastewater generated in Nepal is disposed of into the Nature in the rivers, ponds or underground through septic tanks. This is a prime source of spread of water borne diseases, environmental damage and contamination of the drinking water sources, particularly the dug wells and swallow tube wells (Dhobi Khola wells)

56. Defunct Wastewater Plants

The wastewater plants at Dhobighat (15 Mld capacity), Sallaghari (2.4 MLd) and Hanumanghat (0.2 Mld) are defunct since 1995 with wastewater being disposed of into the rivers without treatment. These treatment plants awaiting for major rehabilitation remained defunct since they are bundled with the Melamchi Water Supply Project making it much more complicated issue. These plants are getting more dilapidated with the lapse of time and facing strong pressure from various sectors and in danger of being used for some other purpose. Huge investments made in these plants remain idle for such a long time.

57. Mismanagement of Wastewater System

The collector piped sewerage systems in Kathmandu, Lalitpur and Bhaktapur are mostly leaking due to poor construction and mixed up with the surface water drainage contributing to contamination of water supply system. The surface water drainage systems are gradually converting to combined sewerage system that further contaminate the river system. There is no designated responsible organization to look after the surface water drainage and river system and nobody resumes responsibility for mismanagement of wastewater sector. No case of PPP in wastewater sector is identified so far.

58. Misuse of Wetland Treatment of Wastewater

With the pretext of institutional failure of Biological Lagoon Wastewater Treatment Plants in Kathmandu, the Reed Bed Waste Water Treatment Plants (RBWWTP) are promoted. These wetland plants are considered very inefficient for several reasons:

- Mostly can absorb nutrients as NPK and leave out Sulfur and other heavy metals in the effluent
- Due to the lack of appropriate desilting and settling primary ponds, the filter media and the pipe systems in RBWWTP are choked and require replacement in very short time
- During the monsoon period, the filter media and the reed beds are full with rainwater and the wastewater overflows to nature without treatment.

This situation requires reconsideration of Reed Bed Plants Technology and should be thoroughly discussed and their economic sustainability should be proved before further application of the Technology. The proposed NCUWM could be a platform where project clearance issues could be discussed.

59. Closure of Himal Cement Factory

The closure of Himal cement factory back in 2002 was apparently attributed to the dust and chimney emission and noise issues, and partly for the rising real state values in the neighborhood. The factory has procured major devices for dust and chimney emission control. However for unknown reasons, they were not installed and factory was closed down in the prelude for relocating to another place. The factory is currently evaluated no more than a scrap. It was a huge economic and employment loss to the Nation.

60. Closure of Electrical Trolley Bus in Kathmandu

The electrical trolley bus system in Kathmandu was considered one of finest system that provided convenient mass transit system, prevented air and noise pollution. The closure of the system was a big set back for efforts towards UWM. That was an illustrative case of lack of political understanding, competitive environment and PPP Approach. The system is partially restored in 2004 and brought into operation.

61. Indoor Air Pollution

The sources of air pollution is categorised into Indoor and Outdoor Air pollution. Indoor Air Pollution is considered as much hazardous as outdoor Air Pollution. Indoor Air pollution has not been given much attention. The Indoor Air Pollution is attributed to following factors:

- Bad housing condition as dusty floors, clay floors,
- Lack of ventilation (Specially, use of glass windows without ventilation system)
- Use of firewood and fossil fuel for lighting, heating and cooking

Indoor air pollution is associated with the increase in diseases as Asthma, ENT and Eye sore. As estimated by Clean Air Revival Inc., 78 % of air pollution is believed to cause by combustion of firewood using unapproved wood stoves contributing to Total Carbon emission of 0.2 ton/capita/annum (HDR 2005).

62. Outdoor Air pollution

Outdoor Air Pollution attributed to the emission from transport vehicles (motor bikes, three wheelers, car, bus and trucks) and various industries that produce huge emission are so far not dealt with. No particular efforts made towards reduction of emission from these sources.

63. PPP Failures

Waste Management is considered as the business of the Central Government and Municipalities only and particular regard was not given to the role of the citizens, businesses and industries. No regard is made to the role of the formal, informal private sector, the communities, waste generators and waste pickers. Grossly, the private sector was not able to derive the recognition for their efforts in the UWM and did not access to resources required for their functioning and growth. No incentives and rewards are available for the supplemental contribution made for reducing burden of municipalities and the central government.

The Municipalities were the institutions responsible for UWM at least for Solid Waste Management. They are the prime beneficiaries. The efforts made by the private sector believed to bring direct benefits in terms of reduced burden and received additional benefits in terms of saving of resources. The saved resources are not shared with the partners for enhancing their capability and motivation.

V. Prospects of Public Private Partnership

64. Stakeholders of Public Private Partnership

The Partnership generics evolve from the possible linkages among the stakeholders involved in the UWM System. In general, there are three major groups of stakeholders and three categories of partnerships linkages. The PPP is particularly known as partnership between the Government and the Private Sector. This category of partnership is the part of concern and will be discussed more in depth.

The other two forms of partnership between the Government and the Communities, and partnership between the Private Sector and the communities or Civil Society are not

discussed. The partnership between the Government and the Civil Societies is based on the policy of the Government on particular sector to include and empower the Civil Societies when required.

The partnership between Business and Civil Societies is based on the Social and Corporate Responsibility policy adopted by the Business houses and becomes their internal matter. However, the latest two forms of partnership are more conveniently understood based on the modalities discussed for Public Private Partnership.

The linkages and relationship of the partnership modalities will depend on the characteristics of the cooperating entities as G2B, G2C, B2C and illustrated in following chart.



Figure 3: Public Private Partnership Structure

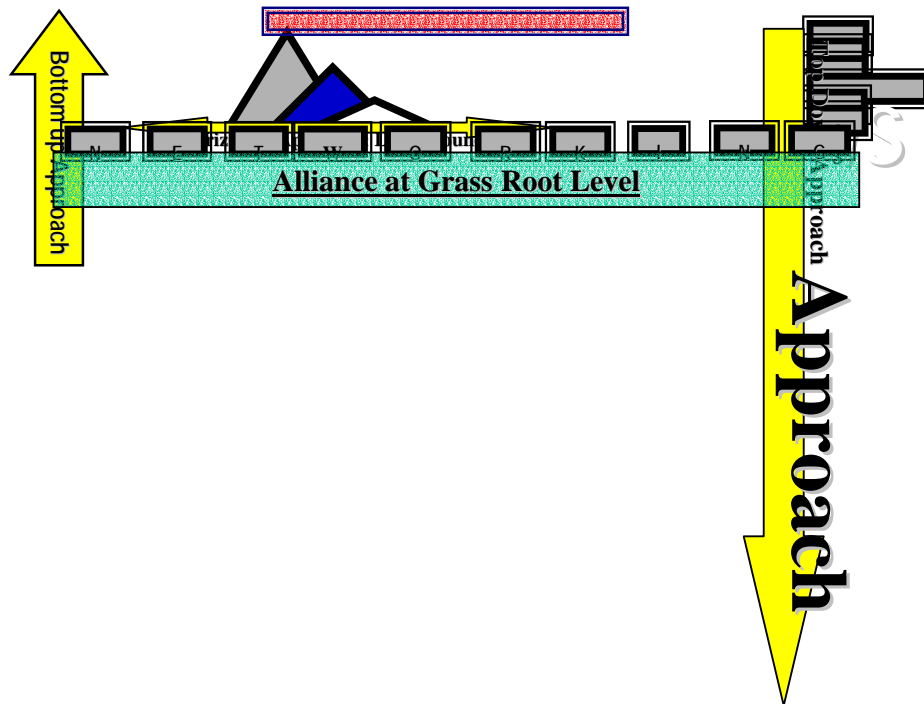
The stakeholder under the Government category included the Central and Local Government Bodies as Ministries, Departments, Municipalities, DDC and VDC. The Donor Agencies and other Government Owned Agencies also fall under this category. The second category of stakeholder is the Formal and Informal Private Sector comprising of profit making and non-profit making organizations as business houses, industries, companies, enterprises, service providers, NGO, CBO, and individuals. The third category of stakeholders is the consumers comprising of service users from Government to citizens who are responsible for generation of waste.

65. Partnership Development Approach

The Figure 4 indicates the approaches of Partnership Development. They are:

- **Top Down Approach** – where the Government takes initiatives and call for Partnership. Such initiatives are almost rare unless it is mediated and pressurised by the Civil Societies.
- **Bottom Up Approach** – This requires influence on Policy, Plans and Programs of the Government and very difficult to achieve.
- **Lateral Approach** – This approach is not dependent on Government Policy. Mostly it is carried out by the Communities and Private Sector at grass root level following their Corporate and Idealistic Responsibility. The Lateral Partnership has very strong effect on Government Policy depending upon the strength and extend of spatial coverage of membership of the partnership. The recent political changes in Nepal could attributed to this form of partnership where the communities and individual informal partners united for achieving a particular goal of political change.

Figure 4: PPP Development Approach



66. Definition of PPP

As defined by UNPPPUE, PPP refers to Tripartite form of contractual agreement between the public sector (government and municipality) and the private sector (formal and informal enterprises) for provision of Basic Services based on combination of commercial viability, sustainability, environmental awareness, social responsibility, public accountability (fairness, Competitiveness and Transparency) with effective involvement of the civil societies (communities, ngo, research groups) as beneficiary target groups.

67. Long Term Vision of Partnership

Strengthening of the inter-sectoral partnerships in support of a long-term vision of the goals of waste management would be the key subject for UWM.

68. Goal and Objectives of Partnership

The goal is to achieve sustainable UWM systems which are stable over time, and which are beneficial to the society, the economy and the environment, and to enhance the access of the citizens in an affordable manner.

The major objectives of the inter-sectoral partnership in UWM would be to:

- Identify and recognize the stakeholders and partners currently involved in UWM,
- Explore the potential new partners and define forms of partnership models to create synergy,
- Explore capability and strength of the stakeholders involved in UWM and to utilize their strength in an optimum manner,
- Define and consolidate the roles of each stakeholder partners in UWM,
- Explore the ways of economic and commercial sustainability of methodologies of waste management that protects human health and nature,
- Explore the methods of waste management that prevent waste disposal in public place and nature

- Motivate and mobilize the waste generators, polluters and communities in general to work for waste management at source with view to reduce waste management burden of local government, and
- Reduce the cost of UWM to the consumers.

69. Purpose of Partnership

The prime purpose of the Partnership would be to identify the pragmatic ways of UWM and to implement the proposed activities that will lead to the achievement of the Objectives and finally the Goals. It would explore the aspects of participation and integration of the different sectors in detail, in order to arrive at a framework for action. One of the difficulties of the task like this is the need to find access to the number of actors working in the field and with the huge differences of their objectives, purposes and approaches.¹

70. Scope of Partnership

The broad scope of Partnership would be related to following activities and Tasks:

- **Investigation, research, documentation, and analysis** of the existing UWM system in operation in the city, with emphasis on economy, institutional set-up, organizational capacity, roles and impact of all actors, regulatory framework, industrial and commercial infrastructure, municipal and national policy goals.
- **Capacity building, enabling, and empowerment** of all current and potential partners in order to enhance their capacity to take on new partnership roles for sustainable UWM, and particularly, to define the role of local government, formal and informal private sector, community based organisations and non-government organisations, and communities.
- The **creation of infrastructure**, preconditions, instruments, and **an institutional context** in which all partners can perform their partnership functions in relation to the development of **new models** for sustainable UWM in an optimal manner.
- **Definition of Motivation, Incentives and Awards** for recognition of Best Practices and Innovativeness in UWM.

71. Procurement Framework for Partnership

The Procurement framework in Nepal is based on the donors' policies and is governed by the Financial Administration Regulation of HMG including PWD and is subject to frequent changes. A comprehensive policy of Procurement of Services does not exist at present. A Procurement Act is currently in making and will govern the construction works, equipment and services. No exclusive procedure is available for procurement for services based on partnership offered by non-profit and community organizations. The procurement framework does not include procedures for procurement of solicited and unsolicited services. The procurement framework shall be designed to encourage and recognize innovative and creative works in UWM and enhancing transparency through making public the selection criterias and evaluation reports.

72. Proposed Options of Partnership

Various models of PPP practiced worldwide are summarized in Table 5-1. The Table also summarizes the likely areas where a particular model could be more appropriate. But, however, the stakeholders of partnership should be more knowledgeable which model will respond to their need.

¹ UN Public Private Partnership for Urban Environment (PPPUE)

Table 5-1: Public Private Partnership Modalities

Activity	Government	Services	Management	Lease	BOT	Turnkey	Concession	BOOT	Private
Legislation	Public	Public	Public	Public	Public	Public	Public	Public	Public
Tariff Decisions	Public	Public	Public	Public	Public	Public	Public	Public	Public Private
Asset Ownership	Public	Public	Public	Public	Public	Public	Public Private	Private	Private
Capital Investment	Public	Public	Public	Public Private	Public Private	Public Private	Public Private	Public Private	Private
Planning Design	Public	Public	Public	Public Private	Public Private	Public Private	Public Private	Public Private	Private
Construction	Public	Public	Public	Public Private	Public Private	Public Private	Public Private	Public Private	Private
Operation Maintenance	Public Private	Public Private	Public Private	Public Private	Public Private	Public Private	Public Private	Public Private	Private
Rehabilitation	Public	Public	Public	Private	Private	Private	Private	Private	Private
Revenue Collection	Public	Public	Public	Private	Private	Private	Private	Private	Private
Risk management	Public	Public	Public	Private	Private	Private	Private	Private	Private
Autonomy	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Binnie and Partners, 2000

VI. Constrains of Partnership

73. Key Constrains

The key constrains in terms of the development of integrated, sustainable and partnership based UWM systems are the well-identified barriers to development of inter-sectoral relationships. The constrains are discussed in various sections as Policy, Legislation and Regulations, Institutional Development, mutual Recognition, Involvement of Private Sector, Procurement and Franchise, Market and Technology, Finance, External Influence and Performance.

74. Constrains on Legislation and Regulations

The current legislative and regulatory context for UWM is developed for particular conditions. It is unfocused, fragmented, incomplete, and so does not tend to facilitate the formation of cross-sectoral partnerships. In fact, there are no such provisions for PPP. If such partnerships, nevertheless, come into being, the existing legislation normally provides few tools for coordinating or managing them and is often difficult to adapt to new circumstances.

The following are specific examples of the kinds of legislative barriers that may frustrate the formation of cross-sectoral partnerships:

- Mandates for public delivery of services may make it difficult or impossible to contract out the services to private sector actors;
- Lack of legislative and regulatory infrastructure for the management of contracting risks.

75. Procurement and Franchise Constrains

The existing Laws and Financial Administration Regulation requires any services to be contracted out based on free competition and does not recognise the advantage of partnership with Formal or Informal Private Sector, and particularly of the unsolicited offers based on felt needs, initiatives, innovative ideologies and research orientation. The existing public contract laws may explicitly or implicitly require contractors to have achieved a level of prequalification in terms of institutional or financial stability, which would exclude both smaller formal private sector firms and informal sector entrepreneurs.

A municipality or local authorities which proposes to contract or franchise certain waste operations to the formal and informal sector has to justify its decision, generally on the basis of efficiency or lower cost. If it can show that the private operator is financially sound and has a track record and good credit rating, it does not run into resistance from its sources of financing. This can be a barrier to contracting both with new entries into the formal private sector and with the informal sector, both of which may lack the track record and credit history. The barrier is based addressed through policy decisions and encouragement for gradual involvement of formal and informal sectors through incentive schemes.

The time schedules of municipal government for decision-making, contracting and payments are beyond the tolerance of most informal sector that needs specific immediate actions for daily survival.

76. Technological Constrains

There are technological issues affecting the success of partnership among various stakeholders. Technology choice for final disposal of waste generally has a severely limiting effect on the institutional arrangements since the waste materials are heterogeneous and feasible quantities may not be available. At the same time, the choice in favor of appropriately designed and scaled technical solid waste tools and systems is necessary but hardly a sufficient condition for the creation of partnerships among the stakeholders.

The technological intervention required for emission control of trucks and buses may be of special interest. The import of new bus and trucks could be of emission-controlled standard as Euro II and I whereas the emission control of the large fleet of existing trucks and buses will be difficult and may require intensive search for technological intervention.

Similarly, the choice of wastewater treatment technology is guided by the availability of resources and mostly treatment methodologies applied in recent years (wetland treatment using reed bed plants) cannot fulfill the environmental standards whereas the biological lagoon and activated sludge methods require huge capital investment and capability to operate.

77. Issues Surrounding Recognition of the Informal Sector

The issue is related to the fact that involvement of informal sector will achieve some degree of formal status and recognition, and some degree of institutionalization of function. The specific barriers to attaining recognition of informal sector activities and their institutionalization within the formal waste management system could be:

- Solid Waste and Waste Water work is regarded as dirty and low-status. The recognition of people doing this work runs into taboos surrounding filth and dirt, and prejudice against foul functions; whereas air pollution and emission control works have a different social status;

- Informal sector waste workers are frequently from disadvantaged and minority ethnic and social groups. Recognition must cope with race, class, and ethnic prejudices;
- Recognition may be resented by those higher up in the formal and informal waste management hierarchy. The more established processors and brokers might feel socially or economically threatened by formal recognition of their suppliers and those “beneath them”.
- Informal activities are often associated with precarious and unregistered waste pickers who do not belong to the locality and particularly in Nepal where identity of people is not known.
- Informal activities are associated with lack of dignity of labour though the informal sector waste pickers contribute significantly for waste reduction at no cost to the Municipality.
- Informal activities are associated with considerable health hazards reporting about unnoticed death of waste pickers and associated with unreported health problems.

78. Inter Sector Resistance between Public, Formal and Informal Private Sector and Communities

There are several barriers for mutual recognition and involvement in UWM. Following barriers are specific to the formation of cross-sectoral partnerships:

- The reactive and ad hoc character of informal sector enterprises make it difficult for them to provide a regular and reliable service to customers;
- Lack of applicable legislation and infrastructure make the procedures required to effect an arrangement with the formal sector or the municipality impossible to determine and often opens the field for political patronage and influence.
- Complying with commercial registration rules and regulation, labour laws, and insurance requirement is not within the capability of most of formal and informal sector enterprises.
- Public Sector personnel resist private sector involvement in their areas of responsibility for security of employment in the public sector and profound threat that they will be replaced some day from their jobs.
- Actual or threatened competition from private-sector operators may impose new work requirements on civil servants, putting new and stringent performance requirements on jobs;
- A shift to private sector operators may shift the structure of privilege for highly placed civil servants and elected officials. Where these people have been receiving a higher level of service for no or little cost, there is a natural resistance to a change that risk a loss of privilege.
- The waste generators and stakeholders are disorganised, illiterate and indifferent to environmental issues and health hazards unless they are directly affected. Neighbourhood environmental issues are almost not recognised and taken care of. This characteristic behaviour is often an advantage for the Government to neglect the SWM issues.
- Every new change is a threat to the current business and diversion of profits. The involvement of communities and community organisations in waste management is a big threat to the public sector, formal and informal private sector that are enjoying the waste business and is a threat to the municipal government since the most valuable waste items would be diverted by the communities and community organisations as they introduce new system of waste management with segregation of waste at the source.

79. Financial Constrains

The statistics of Solid Waste generation is one of the critically unreliable. Equally true is the fact that the actual cost incurred for UWM is not known. It makes very difficult to make a

rational and objective judgment on financial constrains. The cost of waste management and benefits are attributed to various stakeholders. In Nepalese context, the income from solid waste export tax is collected by DDC without any responsibility for waste management whereas the Central and Municipal Governments have no explicit income stream for SWM services unless they raise household and service tax. The magnitude of scrap tax collected and expenditure made by the municipalities and DDC, and potential expenditures are summarized in following Table 6-1.

Table 6-1: Scrap Tax collected and Expenditure on Waste Management

SN	Description	Unit	Min. Amount	Average Amount
1	Per Capita Annual Scrap Tax collected by selected DDC	Rs/Capita/Annum	0.19	4.85
2	Per Capita Waste collection by selected Municipalities	Kg/capita/day	0.34	0.46
3	Per Capita Cost of Waste Collection and Transfer	Rs./capita/day	0.29	0.59
4	Per Ton cost of Waste collection and Transfer	Rs./ton	1354	2309

CKV/JICA, 2004; (2) SEAM-N, 2003; (3) PEIP/PSM, 2000. Daily papers

Table 6-2: Potential Resource of Solid Waste Management

S N	Description	Unit	Min Amount	Average Amount
1	Total Population in 2005 mid year	No.'000	27,677	27,677
2	Average Annual potential Solid Waste Generation	Ton/day	9,410	12,731
3	Potential Scrap Tax collection	Million Rs/day	5.3	134
4	Potential Expenditure to Municipalities for Waste collection and transfer	Million Rs/day	8.03	16.23
5	Potential Material Recovery (Composting, Recycling)	Million Rs/day	17.5	23.6
6	Potential Saving in SWM	Million Rs/day	14.23	141.37

Table 6-3: Potential Business in Carbon Trading,

SN	Description	Unit	Min Amount	Average Amount
1	Total annual Carbon Emission	Ton '000	1,000	21,000
2	Potential Selling Rate	Euro Per Ton	10	40
3	Total Business	Euro million	10	840

Refer Table 1-6

80. Constrains on Access to Financial Resources

The sources of financing used for solid waste management come either from the central government or from fees or charges for municipal services, or out of property taxes. The formal or informal private sector providing solid waste management services are practically starved of funding since they do not get the benefit for the services they provide and for savings made to municipalities and the Central Government. Similarly, the Alternative Energy Sector has large contribution towards carbon reduction, but the benefits arising from reduction of carbon is attributable to some body else.

The small fees collected by informal and formal sector for the service provided are not sustainable and not adequate to replace the equipment and tools used for waste management and certain sector of the population and business seek illegal or informal disposal as an alternative to paying for waste removal.

Most of the municipal governments do not know what the true costs are, and so the actual fees often do not fully cover the costs (for example, capital depreciation is not included) and do not reflect the actual link between quantity generated and amount paid, and therefore no incentive to reduce the amount.

Financing involving commercial financial institutions as Banks has to demonstrate a high probability of success, with the promise of relatively high returns, and at the end the UWM does not get support from Banks since they cannot produce security and guarantee return on commercial terms. Banks and other formal credit facilities are reluctant to provide loans to private formal and informal enterprises, due to the absence of assets and securities.

81. Finances of the Formal Private Sector

The finances of the formal private sector present fewer although significant barriers to the setting up of partnerships. These barriers fall into the categories as credibility, capital formation, and market guarantees, problems with the collection of fees, cash flow.

82. Finances of the Informal Private and Community Sector

Almost by definition, the informal private sector entrepreneurs and community groups (especially low-income) have extremely limited access to financing. Entrepreneurs have no access to funds for equipment or to capitalize their businesses. This makes it very difficult and restricts the potential for improving products, broadening markets, improving working conditions, and the like. Community groups often rely on outside donors for basic equipment (carts, tri-cycles, brooms) to run a cleansing service in their area or to employ a community member to earn some income through this service.

83. Constrains on Critical Thinking, Will and Behavior

The general lack of critical thinking in relation to urban waste systems is often a barrier to innovative solutions. The intellectual framework for understanding the relationships between consumption, waste generation, disposal, recycling, industrial activity and natural resource exploitation is not considered in totality. UWM is often a “dumping of their traditional ideas” and reluctance to implement innovative ideas and bring changes. They discard any innovative ideas or skill as “Long Term solution” and forget that there is no long term solution if it does not start today. The lack of critical thinking is also associated with the lack of political will to bring change and reforms unless the civil society built up pressure.

For Example, the blame is given to plastic bags ignoring the human behavior that indiscriminately practice the Throw-Away Culture culminated by the Municipalities and the Central Government over the time.

84. Constrains on Local Systems

The waste management plans mostly characterize as one of “technology”. The plans failed to take unique features of the local system adequately into account, and imply that the solution to the problems can be achieved through the acquisition of large facilities. The SWMRMP when started with the assistance of the Government of Germany failed to recognize the local systems of domestic composting and community participation.

85. Constrain on Monitoring of Performance of Central and Municipal Governments

The monitoring of performance of the central and municipal governments in waste management is a big constrain. There is no practical way for making them responsible and accountable.

86. Constrains of Waste Management Personnel

Lack of knowledge, experience and interests are often a big constrain. The government owned organizations are often the “dumping-ground” for political workers and patronage. Such organizations are often overstaffed with workers with low qualifications, and lack adequate training.

87. Marketing Constrains

The key constrains discussed below relate to marketing of waste products as recovered materials, and new form of trading in carbon credits. They are:

- Lack of access to the established national and international markets is often a considerable constrain that require specific knowledge, skill and experience. The formal and informal sector and community organisations are lost and are not capable to take advantages of the market. They are also not capable to mobilise resources for developing market access due to risks involved.
- Low or inconsistent quality of the materials processed in the private informal sector is often a detriment to the acceptance in formal markets.
- The marketing of alternative energy products as biogas plants, solar systems, wind energy, electrical vehicles and other forms of carbon emission reduction technology have its own marketing constrain specially with the need to deliver to the communities at the most cost effective manner.
- Particularly, the new sector in carbon trading requires specific approach in developing international partnership and marketing.

88. Constrains on Donor Cooperation

Donor preferences towards particular technical approaches or insistence on supplying equipment, which supports their own export industries, is a constrain since the sustainability of such donor support is questionable. The collapse of SWMP after the withdrawal of the German Support is an example. The support of JICA for Sisdol landfill site operation and Clean Kathmandu Valley Project should be looked with critical view since the sustainability after their support could be jeopardized and also result in a situation where new arrangements disrupt existing informal sector waste handling systems. Donor interventions may also be motivated by the goals and/or bureaucratic procedures of the head office, rather than on a full understanding and appreciation of local systems.

It is easier to finance and monitor large, technology-oriented interventions than to develop a small-scale, context-sensitive approach. Generally, appropriate interventions require patience, investment in understanding the specifics of the local context, respect for the actors, and a willingness to modify the principles to produce locally appropriate results; donors often do not have either the time nor the political will to take these steps.

89. Gender Influence

The gender factor has significant influence in UWM from a number of points of view:

- The very significance of waste and discarded materials may be influenced by the gender of the person making the judgement. What looks like “junk” to women may be motorcycle parts to men; what looks like “dirt” to men may be compost or fertilizer to women; the piece of paper valued by men may be just useless to women; the examples are legion of different sexes “seeing” things differently.
- The role of men and women in managing waste within the household, their relationship to discarded materials may depend on who they are. In particular, the subordinate status of

women or their unwillingness to bring change to their status may affect their general access to and control of resources. So the women may more responsible for handling waste at household level including responsibility for disposal. These activities might concern buying and selling household garbage, re-using and recycling waste materials, collecting and disposing of human and solid wastes in a safe manner, and keeping the courtyards and streets clean. The regular servicing of vehicles and emission monitoring may be more recognised by men whereas improving the indoor air quality by monitoring the smoke, dust within the house may be the acceptable task for women.

- It is observed that there is in general certain difference in job character where women and men are involved. It is more likely that women are more involved where job requires individual and manual approach compared to men who is more involved in mechanized and organized jobs. The risk of women and children to the health hazard due to direct exposure to waste is more severe.
- Men and women may differ in their attitudes towards public health and community cleanliness, and have markedly different preferences for how to address public health and environmental problems. These differences, at the most local level, affect the type of services women and men would like to see developed in their communities, how much they are willing to pay for these services, and who is responsible for finding the money to pay from within their part of the family budget. Such differences may also carry through to preferences for policies, technologies, or approaches which affect decisions made by women and men leaders, entrepreneurs, managers, and public authorities that affect communities, regions, companies, or municipalities.

VII. Proposed Institutional Arrangement and Legislation

90. No defined institutional structure

Currently, there is no defined institutional structure at the national level responsible for overall UWM. The responsibility for various components of UWM is scattered among various agencies. The Ministry of Local Development is responsible for Solid Waste Management whereas the wastewater management is the responsibility of the Department of Water Supply and Sewerage. The Air pollution is the responsibility of Ministry of Industries and Department of Transport Management. The Ministry of Environment deals with the environmental issues related to the Environmental Impact of the projects.

In these organizations, various other priority issues overshadow the waste management and for this reason UWM is not dealt in a comprehensive manner with priority.

91. Review of Existing National Level Organizational Models

There are few existing institutional models that are created for dealing particular subject matter. The composition of these Councils and the mandates are illustrated in the Table 7-1:

Table 7-1: Organizational Composition and Mandate

Composition	Tourism Council	Environmental P Council	HPC for BASI	Solid Waste Council	HLC for IT	KMT for Nature Conservation
Patron						King
Chairman	PM	PM	Nominated	M	Nominated	Crown Prince
Vice Chairman	M/SM			SM		
Political Representatives		2	2			
Nominated Ministers	7	8				
Nominated Secretaries	9			6		2
Authorities Representatives	3	2	7	1		1
Municipality Representatives				4		
Academia/Institute/University		3			3	1
Professionals/Experts	2		4	3		
Government Organizations			1		2	
Private Sector Associations	8	1		2	5	2
NGO		1			3	
CBO						
International Personalities						3
Total	31	18	15	18	14	11
Member Secretary	MCTCA	MOPE	Project	MLD	PS	Nominated
Responsibility	Economic Development and Coordination	Policy Guidance, Coordination	Cleaning Bagmati River Corridor	Minimization of Health and Environmental Hazard, Privatization	Putting Nepal in Global Map by 2007	Promote, Conserve and Manage Nature
Private Sector Participation Ratio	0.26	0.11	0	0.11	0.57	0.18
Advantage	HA	HA	HA and Exclusive	HA	HA and Exclusive	VHA
Disadvantage	Low Accessibility	Low Accessibility		Low Accessibility		
Secretariat	Secretary/ Tourism Board	Secretary/ MOE	Manager	Joint Secretary, MLD	Private Sector	Nominated

Key: PM-Prime Minister, M-Minister, SM-State Minister, S-Secretary, HA-High level Authority, VHA-Very High Level Authority

From the above Table it is evident that the formation procedure of high-level organizations is taking shift towards providing encouragement to the private sector participation in policy and decision making process and the dependency on higher authorities are reducing. It is also evident that the recent forms of institutions are more inclined to be non-executive and playing the role of a catalyst supporting the executing agencies. The case of the Steering Committee of Arniko Highway Project that enjoyed the decision-making authority equal to the Cabinet of Ministers and the Planning Commission of Kathmandu Municipality that was practiced in 2000-2004.

Several of the existing councils are headed and patronized by the higher authorities. The accessibility to these authorities is very difficult because they are chair in many institutions and the have little time for these councils. Their priority and responsibility are spread beyond

the limits of UWM. For them, giving more time on UWM or Environment is not affordable. It is suggested that the higher authorities shall not be involved in these councils since they are final authorities and it is not possible for any body to raise question on them. Their involvement in these councils is simply not feasible. Particularly, the model may not be useful for when disputes arise and there is no higher authorities are available for reference and guidance.

92. Proposed Organization, and Roles and Responsibilities

The proposed organization structure is illustrated in Figure 3. The organization comprises of a National Council as an apex body supported by theme committees, and a secretariat. The Council will be a **platform for Public Private Partnership development**, a working committee comprising of **institutional representatives of Stakeholders** from Private Sector, Government Sector, Association of Municipalities, DDC, and VDC, and Academia. The Council will be a broader platform for taking initiatives for developing understanding and opening dialogue between the stakeholders, sharing knowledge and experience, preparing common plans and programs based on consensus. The adequate authority will be given to the Council for proactive functioning. Prominent leaders, renowned professionals and experts may be invited as distinguished guests.

A parliamentary committee, independent audit office, financing institutions and civil societies support the council.

Local councils are established at the grass root level for supporting the implementation agencies as municipalities. The local council comprises of institutional representatives of Stakeholders from the Government, Private Sector and Civil Societies.

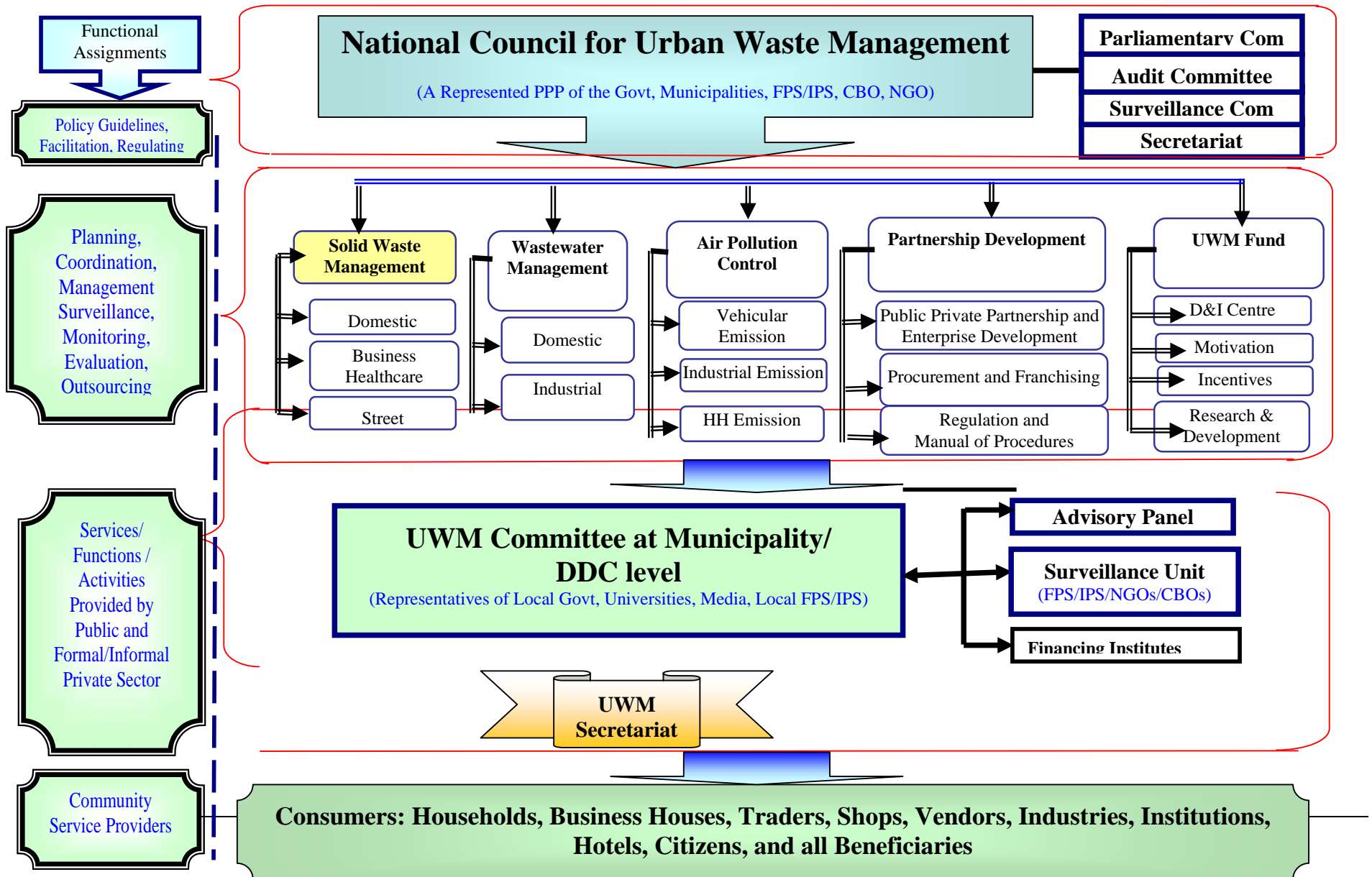
The main function of the National Council would be:

- i) Coordination with Central Government and Stakeholders,
- ii) Coordination for developing better understanding and Consensus Building
- iii) Coordination for sharing knowledge and experience
- iv) Guiding the Policy Change, Updating Legislation and Regulations,
- v) Preparation of common Plans and Programs
- vi) Support creating and operating the proposed UWM Fund
- vii) Guiding the preparation of Implementation Strategy and Manual of Procedures,
- viii) Supporting for Capacity Building and Technology Transfer
- ix) Guiding the Partnership and Enterprise development through Franchising,
- x) Support for Studies, Research, Market and Development,
- xi) Creation of Data, Information Bank and Knowledge Centre,
- xii) Facilitation for Clearance of Documents, Procedures, Plans and Programs,
- xiii) Facilitation for Motivation to Stakeholders,
- xiv) Catalytic Support to Executive Agencies,
- xv) Surveillance, Monitoring and Evaluation

The Roles and Responsibilities of the stakeholders are summarized below and elaborated in Appendix-3.

The National Council and Local Councils do not interfere into the functioning of the existing executing agencies. If required they could be instrumental for institutional reforms.

Figure 5: Proposed Institutional Model for Public Private Partnership in UWM



VIII. Resource Management

93. Human Resources

As UWM system will undergo major changes, there is a need for the public and private (Formal and Informal) sectors to understand the changes and be prepared to handle them. The project will introduce a human resource development program for waste management. The main objective of this program will be to provide essential knowledge and skills to the stakeholder organizations and motivate, and enable them to improve their performance.

94. Capital Resources

The capital resource required for management of UWM will be possible to raise from the formal and informal private sector provided attractive and pragmatic motivational and incentive schemes are developed. The problem raised due to starvation of capital resources for the formal and informal sector will be solved in many ways. The capital inflow and support of the banking sector may be possible if economically viable combination of resource mobilization approach could be derived and PPP is established.

95. Creating UWM Fund

A separate fund for UWM shall be created with the contribution of various financial sources such as:

Saving of costs induced by the proposed Reforms

- Saving of Expenditures of Municipalities and Government

Taxes and Revenue

- Sewerage Revenue,
- Government Annual Budget and International Commitments
- Scrap tax collected by DDC and other authorities (> Rs 150 million/Annual)
- Vehicle Emission and Industrial Waste
- Revenue from Beneficiaries

Contribution from various funds

- Contribution from Environment Protection Fund,
- Contribution from Tourism Development Fund,

International Trading of Waste

- Export of Waste
- Carbon Emission Trading?

Revenue from Waste Generators and Beneficiaries

- Business/Industries for Services
- Revenue from Beneficiaries
- Revenue from Polluters (Polluters Pay)

Brief information on the currently available resources is provided below.

96. Taxes collected by DDC

The taxes collected by the DDCs comprise a substantial amount ranging to Rs 150 million per annum. This amount is used for expenditures on salaries and administration without any contribution to UWM.

97. Saving of Expenditures induced from the proposed Reforms

The PPP for UWM, if applied in a proper way, would bring a lot of reforms and save lot of resources currently used by municipalities for “Throw way and Dumping” and damage done to the nature, environment and human life. The resources saved from the proposed UWM

approach, Cleaner Production, Clean Development Mechanism, should be utilized for the sector and contribute to UWM Fund.

98. Revenue from Polluters

The UW generated, particularly the market waste, industrial and business waste comprise of various components for which the community has already paid for along with the purchase of commodities. It should be the responsibility of the producers of the waste and the community itself that “Throw Away” the waste in the public area or nature should be responsible and pay for pollution they make. Several of the waste management organizations dispose the waste they collect in an unauthorized manner. Application of a fee system for the pollution created by the formal and informal sector as industries, business, waste management organizations, and communities will encourage for enhancing design of environment friendly products and decrease waste generation.

99. Revenue from Waste Generators

The waste generators that are interested to dispose off the waste using the Municipal Waste Management system shall pay appropriate fees as a municipal levy based on the quantity, category and schedule of generation.

100. Revenue from Beneficiaries

The improved urban and rural environment brings positive benefits to a number of business and industries and Municipalities, Government (enhanced image and saving on environmental recovery), tourism industry (increased business) and communities (improved health and enhanced quality of life). The situation enhances the business as a whole. Certain part of their incremental benefits shall be shared for Urban Waste Management.

101. Government Grants and Incentives

The Grants and Incentives from the Government and Donor Agencies provided to the Municipalities, DDC and VDC should be made available for strengthening the UWM Fund and providing incentives under PPP Programs.

IX. Motivation, Incentives and Awards

102. International Experience

Several countries have adopted various methods to motivate and encourage the communities, formal and informal sectors for taking initiatives in Urban Waste Management. This kind of incentives certainly reduce the burden on the government and municipalities and help to achieve the objectives and help to implement UWM System in a successful manner.

103. Double Earning

In many countries, it was observed that waste workers and enterprises working in waste management earn double of the monthly minimum wages. So, the competition in the field is fierce and many times protective. New entries or changes in the waste business may be very difficult and resistive.

104. Motivation to the enthusiasts

The creation of motivation to the enthusiasts, employees and Waste Management Partners would be the key approach for developing sustainable partnership among the stakeholders in Urban Waste Management. Some of the cases of motivation factors are presented herewith:

- The waste generation at the households, business and industry level is directly based on the fact that municipalities accept the Throw Away Waste at free of cost. The citizens and the business are encouraged to generate more waste and add more burden to the municipalities. In the contrast, a motivation factor for practicing of Waste Management at Source requires applying a fee based on “Pay As You Throw Away (PAYTA)”. In the local context, the municipality waste collection tippers shall charge a fee for every bagful of waste thrown away.
- The municipalities may motivate the stakeholders to generate clean and separated waste as paper, plastic, glass, metal and collect them at the doorsteps at a price based on quality of waste. The citizens will be highly motivated to get cash benefits and deliver high quality clean waste or the citizens may wish to continue Throwaway practice and pay fees levied for such dumping.
- Gaining employee enthusiasm and involvement is a strong way in generating waste reduction ideas. Employee involvement and enthusiasm can be encouraged in several ways such as cash awards, profit or gain sharing, public recognition and rewards, and salary raises tied to waste reduction performance matrix. Articles in company newsletters and awards given at company meetings with gifts such as appreciation certificates and gift, etc. are specific ways to increase involvement and enthusiasm.
- Funding for developing sustainable partnership among the stakeholders for WMS, cleaner production, and reducing disposal to landfill site, encouraging reuse and recycling. These funding may be applied with establishment of UWM Fund.
- Tax Waiver or return incentives to the business and industries may be a good motivation factor for enhancing waste reduction at source and for cleaner products or Take Back systems of used products.
- The incentives provided to the communities and users for alternative energy schemes shall be continued.

105. Some categories of awards

Awards are one of the ways to encourage the stakeholders to participate and develop partnership for UWM and provide opportunity for setting good examples. Awards could be in the forms of recognition and use of economic instruments through establishments of Excellence Awards for considerable achievements.

X. Conclusion

106. Policy Review and National Image

The status of UWM is the reflection of National Image and Economy caused by the execution of the policy and commitments to follow the provisions in the Constitution, Acts, Regulations, Plans and Programs and international agreements including recently ratified Kyoto Protocol. The review firmly established the commitment of HMG towards Environmental Protection and hazard free urban waste management.

107. Scattered Responsibilities

The commitments for Environmental Protection and UWM are scattered in many policies, acts, regulations and dealt by several ministries, departments, and municipalities. At the same time, none of them are comprehensively responsible. For example, MLD deals with solid waste; wastewater is dealt by MOPPW; the Department of Transport Management deals with vehicle emission, MOICS deals with industrial waste including solid waste, emission and wastewater, and the MOEST deals with environmental issues. The waste management issues are overlapped with municipalities and DDC. It seems it is the business of every body but nobody's responsibility.

108. Loss of Tourism Business

Indiscriminate disposal of solid waste in the streets, forest and riverbanks has detrimental effect on the environment, human health and economy. The business loss in tourism industry in Nepal is very much attributed to the worsening UWM with 8,500 Tons/day of solid waste dumped into the nature, wastewater amounting 370 (?) MLD discharged into river system or ground water, and factories, vehicles, and households creating air pollution with black carbon emission amounting 1-21 million Tons per annum, and dust emission from bad road conditions within the urban areas.

109. Lessons from Past Failures

The Gokarna landfill site collapsed with the interference of politics in the implementation procedures and disposal of mixed waste in the landfill site that destroyed the trust and confidence of the community.

The search for new landfill sites in Okharpauwa, Ramkot, Suichatar, is strongly resisted by the local residents. To day, the Government has no landfill sites available for use. Nobody accepts disposal of waste and location of landfill sites in their neighborhood.

The failure of the sorting and composting plant at Teku was associated with a number of reasons as failure to secure good quality waste (mixed waste from garbage containing high quantity of sand, silt, glass, metal and plastic particles), efficiency of sorting and composting plant, quality of compost that was promoted by the "You Throw Away in Streets, we take it over" Approach of Solid Waste Management promoted in 1980s.

The majority of the wastewater treatment plants remained defunct because of lack of appropriate operational capability, poor quality of sewerage system and mixing of surface waster drainage containing sand and silt. As a consequence, wastewater is discharge to the river without treatment. The rehabilitation of these WWTP (specially Dhobighat, Sallaghari and Hanumanghat) overdue since 1995 and is pending because of the institutional barrier created by donor agencies and bundling with Melamchi Water Supply Project. This is another hurdle that created pollution of the river system in Kathmandu valley and extinction of the aquatic life.

The combustion of firewood, fossil fuel, coal, solid waste and hospital waste in the households (3,545,000 Nos) and institutions, vehicles as Motorbikes, Cars, Trucks and Buses (306,000 Nos) , and factories (3,400 Nos) is continued and remain prime source of air pollution aggravated with dust pollution from earthen, gravel and unrepaired blacktop roads, waste disposal and emission from brick making industries, crushing plants, cement plants and many other industries.

The closure of Himal Cement Factory in the pretext of dust and emission pollution was a big economic loss.

110. Lessons learned from good Practices

The solid waste management practices in Pokhara, Biratnagar, Bharatpur, and certain wards of Kathmandu and Lalitpur based on certain PPP models are worth mentioning.

The domestic sanitation coverage reached 27% in Year 2002 (HRD 2005) and mostly consists of on-site sanitation using septic tanks including the urban areas. The wastewater effluent standards for domestic and industrial WW are developed.

The wastewater sector has not obtained much experience except the WWTP in Hetauda Industrial District and Guheswori WWTP. The participation of stakeholders, communities and private Sector in wastewater sector is practically not observed.

Certain commendable experience has been gained in the use of alternative energy and technology as biogas plants (152,373 Nos) that earned Ashder Award 2004, Solar House Systems (50,000 Nos), Solar Tuki that earned WB Award of US\$ 143,000, improved cooking stove (158,131 Nos), ban of diesel 3-wheelers (500 Nos) and introduction of electrical 3-wheelers (600 Nos) that were instrumental in reduction of carbon emission. Similarly, the partial restoration of electrical trolley bus system in Kathmandu is an example of good lesson.

XI. Recommendation

111. Proposed UWM Approach

Grossly, the UWM in Nepal remained at low priority level for many organizations since they have many other subjects to deal with. But, naturally the sources of generation of various categories of urban waste as solid, liquid and gas have common points such as the source of generation, stakeholders, same areas, lack of coordinated efforts, and duplication of plans and programs. The logic steps towards resolution of the problems and issues related to UWM would be to consider the all three components in a comprehensive way as an important urban infrastructure at par with other infrastructure as Water Supply, Roads, Telephone, and Electricity, with application of Community/ Producer Responsibility Approach replacing current approach of Throw Away.

112. Need for PPP

The lessons learned had very clearly indicated that waste is generated by all stakeholders and is managed by the Government agencies or municipalities and lies beyond their capacity. This situation demands for new, innovate and flexible approach and mobilizing the various stakeholders as partners for efficient delivery of services, monitoring of progress, surveillance and checking of appropriateness of decisions made. In this context, the Public Private Partnership could best address the requisite for involving the community in UWM.

113. Modalities of PPP

There are several modalities of PPP practiced worldwide. The choice of particular modality will depend on the scope of works; local situation and delivery of services required and shall be left to the potential partners. However, the PPP modalities require that the civil society is

always included as the third party in order to maintain check and balance and to make independent judgement by the consumers of the conditions of contract agreement.

114. Need for Exclusive, Dedicated and Autonomous Organization

The UWM is currently dealt by several organizations in a piece mill basis. The implementation of plans and programs is very weak and inconsistent. This situation invites to work out for development of a comprehensive and integrated policy dealt by an exclusive and dedicated organization.

Thus, establishment of National Council for UWM is recommended together with establishment of corresponding local councils. The council will truly be a representation of PPP at the apex level and will comprise of representatives of institutional stakeholders including the Government Ministries, Municipalities, Associations and Societies of formal and informal private sector organizations. The council will be a platform for brainstorming, developing consensus, developing common plans and programs and clearance of procedures, and monitoring progress. The Council will be a catalytic support organization to the existing executing agencies and will be a custodian of the proposed UWM Fund.

A parliamentary committee, environmental audit committee, dispute resolution board and specialized judiciary and civil societies that will advocate for qualitative and timely performance will support the National Council.

The major role and responsibility of the National Council will be for development of PPP for providing cost effective services in UWM, coordination among the stakeholder organizations, providing Policy Guidance and Regulation, updating Implementation Strategy, facilitating preparation of Plans and Programs, capacity building of stakeholders, technology transfer, providing support for studies, research, market and encouraging enterprise development, creation of data and information bank and knowledge centre, facilitation for clearance of documents, procedures and projects, motivation to stakeholders, providing catalytic support to executive agencies, and facilitating the consensus building.

XII. Proposed Action Plan

115. Proposed Major Activities

The proposed action plan comprises of the major activities related to the steps of implementation of the proposed UWM program. The proposed actions are divided into immediate/ short- term and long-term actions. The general characteristics are described herewith.

116. Immediate Actions

The immediate actions categorically include:

- 1) Nomination of Ad Hoc NCUWM
- 2) Review of policy documents and national commitments, and recognition of UW as important infrastructure
- 3) Define community/producer responsibility approach as future approach of UWM
- 4) Prepare business plan, personnel policies and secretariat staffing
- 5) Defining institutional structure of proposed National and Municipal Councils for UWM,

- 6) Formulating roles and responsibilities, by-laws, task assignments, job description,
- 7) Preparation of Manual of Procedures (Procurement, Franchising, Partnership Models,
- 8) Developing economic instruments for motivation, incentives and awards, and development of initial programmes
- 9) Identification of modalities of implementation of recommended immediate actions,
- 10) Identification of resources, and legal instruments,
- 11) Awareness and consensus building among the stakeholders through organisation of national seminars,
- 12) Initiation of Data and Information Centre
- 13) Preparation of TOR and identification of resources for detailed studies and implementation of Action Plan.
- 14) Nomination of independent entities for environmental auditing, monitoring and performance evaluation
- 15) Empowering civil societies for Surveillance
- 16) Development of Feedback, Review and Reform Procedures.

117. Long Term Actions

The long-term actions for UWM include the following:

- 1) **Legislative and Regulatory Framework for Urban Waste Management:** Developing legislative and regulatory framework for UWM based on PPP. The procedures for review of UWM policy, environmental guidelines, community rules and regulations; tax and incentive structure on urban waste management shall be included in the framework.
- 2) **Amendment of relevant Acts:** UWM issues shall be incorporated within the scope of acts and regulations in order to make it inherent part of the corresponding sectors as Housing, Building and Urban Development, Water Supply and Sanitation, Industries and Business houses, institutions and individual households. UWM shall be the part of social and environmental responsibility of all stakeholders and shall be incorporated by Law. A Manual of Procedures for implementing the proposed policy action, and enhancing the consistency in policy implementation across the executing agencies shall be prepared.
- 3) **Consensus Building on proposed institutional model:** The consensus building procedure will include several seminars and workshops with stakeholder organisations and individuals. Wide discussion with policy makers and legislature shall be carried out based on Long-term UWM concept and approach. Participation of the policy makers in important meetings, seminars and conferences shall be encouraged. The process would finally involve the government decision to establish such an institution.
- 4) **Establishment of supportive committees:** The establishment of supportive committees such as: a) Parliamentary Committee on UWM, b) Environmental Audit Committee and c) Empowering Civil Societies would be important steps.
- 5) **Building Implementation Capacity:** The implementation capacity of authorities at various levels shall be developed through appropriate training and sharing of knowledge. Implementation capacity is largely dependent on the policy of selection of right person in right place. This will require a radical change in the current policy of recruitment of authorities and shall be based on merit and competitive approach.

- 6) **Developing Marketing Strategy for Services and Products:** The marketing strategy for UWM services and products will be developed with application of the economic instruments to encourage the communities, formal and informal sectors to provide efficient services and for producing clean waste, cleaner production and following Clean Development Mechanism, reducing emission of GHG, and to prevent waste disposal at public places and Nature.
- 7) **Support to Innovation, Creativity, Research and Development:** Procurement and Franchising framework for supporting innovative and creative offers, research and development and studies shall be developed based on the standard procedures including unsolicited offers as a part of Public Private Partnership.
- 8) **Development of Public Private Partnership Programme:** The programme would focus on the modalities of public private partnership encompassing most of activities related to the UWM from policy development, strategy formulation, centre information dissemination, knowledge management, community development, awareness building and motivation, waste management service delivery, surveillance, environmental auditing, monitoring and evaluation, motivation, incentive, and rewards.
- 9) **Capacity building in the informal and formal private sector:** The capacity building activity shall be extended for support of the formal and informal private sector to serve as partners for municipal governments,
- 10) **Strengthening the working relationship with the communities:** The working relationship with the communities shall be improved with increased interactions and exploring the root cause of waste disposal and opportunity for bringing change in behaviour of communities towards waste disposal,
- 11) **Adapting the structure of bilateral and multilateral lending and aid institutions:** In order to ensure that donor activities support and strengthen the development of stable cross-sectoral partnerships which in turn support sustainable waste management, it would be important to adopt flexible approach to adopt the structure of multi lateral aids and support.

XIII. Sectoral Action Plan

118. Proposed Activities for SWM, WWM and APDM

Some limited activities are proposed herewith in Table 11-1, Table 11-2 and Table 11-3 that may be possible to carry out and achieve some success. These activities are already practiced in certain communities.

Table 11-1: Proposed Activities for Solid Waste management

Sector	Proposed Activities	PPP Model
Solid Waste Management	Support Domestic Composting by Developing market force with Waste Reduction target of 20% per annum	Service Contract
	Support Marketing of Clean Waste Materials with recycling target of 30% of Waste Generation (Plastic, Paper, Metal, Textile, Glass, Bone, Leather, Feather, Batteries)	Service Contract
	Support Landfill Operation by Private Sector	DBO / BOT / Various
	Support Entrepreneurship for 5 recycling industries(Paper, Plastic, Metal, Glass, Bone, Feather) and Business for SWM services (Segregation, Collection, Transfer, Marketing, Monitoring)	Service Contract
Wastewater Management	Evaluate Potential for PPP in WWM in 5 Municipalities	Service Contract
	Explore Unbundling of 3 WW Plants in KV from Melamchi Project (Dhobighat, Sallaghari and Hanumanghat WWTP)	Service Contract
	Support WWTP Development by Private Sector	DBO / BOT
	Support Entrepreneurship for Sewerage System operation and Business for sludge reuse and WWM	Private
Air Pollution and Dust Management	Support Indoor Air Pollution Control through inclusion of UWM in Building Permit Process	Service Contract
	Support Initiatives for Reduction of Firewood for Cooking with target of 8% households per annum	Service Contract
	Support Alternative Energy Development Program with target to approach 5% HH/annum	Private
	Support Entrepreneurship and Business for Carbon Emission Reduction and Emission Trading by Private Sector	Private
	Agree with DOR for reduction of Dust Pollution due to Roads by 10%	Government
Common	Support Reform of Acts, Regulations, Investigation, research, documentation, and analysis	Service Contract
	Support Awareness Building, Information Dissemination, Education, Capacity building, and Empowerment	Service Contract
	Introduction of Motivation, Incentives and Awards Schemes (Take Back Schemes, No Disposal Schemes, Waste Reduction, Reuse Schemes, WMS Schemes)	Government / Private Sector / Communities

119. UWM Fund

It is proposed to create a special fund for UWM by transfer of resources saved due to the application of UWM Policy and additional resources generated from various activities related to UWM as Taxes, Contribution from various funds, and Revenue from Waste Generators. The funds shall be utilized to facilitate, motivate and outsourcing of services, research and development and supporting the municipal activities. The National Council would be the custodian of the Fund.

120. Implementation Strategy

A number of steps shall be included as fundamental principles of implementation strategy. These steps are:

- Including all Associations of Organizations relevant to UWM as members of NC (with unlimited membership number)
- Facilitating Reform of Acts and Regulations
- Introducing Incentive Credit Schemes for individuals and organizations for Initiatives and active participation (Detailed Study required)
- Conduct meetings every two weeks (No Quorum required)
- Develop Economic Tools for Motivation, Incentives and Awards
- Attach Partnership models with economic tools as separate fees for capital investment and operation fees based on actual performance or service delivery
- Empower Civil Societies and Stakeholders for monitoring and surveillance
- Strengthen Existing Executing Agencies
- Strengthening Waste Market
- Conduct Workshops, Seminars, Conferences jointly with stakeholder Organizations.

121. Policy Action Matrix

The proposed Policy Action Matrix for implementing the recommendation for development of the PPP for UWM is provided in Appendix- 4. The Policy Action Matrix has been developed based on constrains and issues of Public Private Partnership in relation to UWM with the objective to protect the environment and human Health. The matrix indicates the list of major activities, measurable indicators, the potential responsible organization and time period for implementation.

XIV. Rationale of Partnership

122. Some points of Rationality

Some of the points that highlight the rationale of the proposed measures and recommendation could be as follows:

- Establishment of exclusive and dedicated organization
- Participation of various partners has visible advantages as greater efficiency, enhanced performance, greater flexibility, access to capital resources, reduction of operational risks, reduction of waste materials and emission, reduction of cost to consumers, extension of life time of capital investments as landfill sites, employment generation, and several other benefits.
- A permanent platform is created for continuation of dialogue, interaction and sharing of experience.
- An independent mechanism of funding is created
- Motivation, incentives and awards act as driving force
- Sustainability is enhanced with reduction of cost to the consumers

- New business and employment opportunities are opened in a transparent and competitive environment.

XV. Sustainability

123. Enhancing Trust, Believe and Confidence

The question of sustainability of the various methods of Waste Management described above is reviewed herewith. There are several constrains facing UWM and compounded by the limited vision, limited purpose and resources available to the partners in SWM. There is no simple measures to loosen or remove these constrains. One of the reasons for the difficulty of felt resistance to changes is the characteristic of the partners to protect themselves from external influence and felt risk to their secured jobs and benefits they enjoy with current settings. The suggested ways may enhance the trust, believe and confidence between the stakeholders through regular interaction, dialogue and demonstration of fulfillment of commitments through performance in practice.

124. Methods for Enhancing Sustainability

Some of the proposed measures to produce successful UWM may comprise of a set of reforms as:

- Institutional Arrangement and Legislation
- Public Private Partnership Modality
- Enhancing Social and Corporate Responsibility
- Financial Resource Management
- Motivation, Incentives, and Rewards.

Appendix-1: Terms of Reference

TOR for SCAEF

- Provide Guidance to the Consultant (TOR)
- Arrange Meetings with individual stakeholders
- Organise Internal Consultation
- Provide logistic support for meetings
- Facilitate presentation on Draft Policy Paper in Advisory Committee and Economic Policy Network (EPN)

TOR for Consultant

- Review Current and Past Policies
- Review Current Best Practices
- Analyse past failures in PPP identifying Legal, Institutional, Admin and Policy Constrains
- Identify Successful Practices
- Identify prospects of PPP and define Roles
- Suggest Improvements
- Suggest Policy Action Matrix

Appendix 2: Other Important Policies, Legislation, Acts, International Conventions

Industrial Policy Act, 1992

The Industrial Policy Act endeavors to create an environment necessary to enable the private sector to play a principal role in the industrialization classified into various industries as Energy Based, Agro and Forest-Based, Mineral, Tourism, Service Industries including consultancy, Construction [Infrastructure Development]. The Act aims to privatize the public sector industries and establish some of the industries in partnership with the private sector.

The Act has made special arrangement for Environment and Industrial Pollution Control through making provision for establishment of a separate unit in the Ministry of Industry for dealing with pollution issues due to industrial growth and to develop standards to monitor industrial pollution.

No specific reference is made in relation to UWM in Solid, Liquid and Gaseous Waste Management as the responsibility of the Industries.

Town Development Act, 1988

The Act is promulgated for preparation of town development plans for initiating Integrated Physical Development in any part of the country, Rehabilitation, Extension and development of existing towns, determining the Land Use Zone, preparing By-Laws for physical development within such Land Use Zone, and providing infrastructure as roads, transport, electricity, sewerage, drainage (?), sanitation and open space facilities based on the population density. The Act does not refer to the UWM as urban activities. The Act also does not refer to the need of PPP for Urban Development.

Water Resources Act, 1992

The Act is promulgated for making arrangements for the rational utilization, conservation, management and development of the water resources that are available in the Kingdom of Nepal in the form of surface water, underground water or in whatsoever form, and to make timely legal arrangement for determining beneficial uses of water resources, preventing environmental and other hazardous effects thereof and also for keeping water resources free from pollution.

The Act has made provision of PPP through formation of Users Committees and involvement of PPP.

Public Infrastructure (BOT) Policy, 2003 (Construction and Operation) and Private Investment in Construction and Operation of Infrastructure Ordinance, 2003

The Ordinance is promulgated making necessary provisions for involving the private sector in the process of building, operating and transferring infrastructures in accordance with the liberal economic policy and thus providing the public with services and facilities in a dependable, economic, and easily accessible manner. The Ordinance has considered various options of Private Sector involvement including BT, BOT, BOOT, BTO, LOT, LBOT, and DOT. The Ordinance has set a series of terms and conditions for operating the Policy and contract with the Private Sector that will be supervised by a committee comprising of 7 Government Officials headed by the VC of NPC.

The Ordinance does not make any specific reference to PPP partnership and WM.

Procurement Act, 2004 (Draft)

The Act provides guidelines for Competitive Procurement of Services, Goods and Works including Design and Build contracts. No explicit provisions made for PPP and involvement of NGO/CBO and informal sector.

Foreign Investment and Transfer of Technology Act,

The Act provides incentives for international investors for repatriation of benefits and capital investment.

Basal Convention 1989

The Basal Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal was adopted in 1989 in response to concerns about toxic waste from industrialized countries being dumped in developing countries and countries with economies in transition. During its first decade, the convention's principal focus was the elaboration of controls on the "trans-boundary" movement of hazardous wastes that is the movement of such wastes across international frontiers, and the development of criteria for environmentally sound management of the wastes. More recently the work of the Convention has emphasized full implementation of treaty commitments and minimization of hazardous waste generation. As of 15 July 2002, there were 151 Parties to the Basel Convention. These obligations under the Convention are to:

- Minimise generation of hazardous waste;
- Ensure adequate disposal facilities are available;
- Control and reduce international movements of hazardous waste;

Rotterdam Convention 1998

The Rotterdam Convention on Prior Informed Consent (PIC) procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted in 1998. Dramatic growth in chemicals production and trade during the past three decades had highlighted the potential risks posed by hazardous chemicals and pesticides. Countries lacking adequate infrastructure to monitor the import and use of such substances were particularly vulnerable. In the 1980s, UNEP and FAO developed voluntary codes of conduct and information exchange systems, culminating in the Prior Informed Consent (PIC) procedure introduced in 1989. The new Convention will replace this arrangement with a mandatory PIC procedure. As of 15 July 2002, the Rotterdam Convention had 73 signatories and 22 Parties. It will enter into force after the 50th ratification.

Stockholm Convention, 2001

The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted in 2001 in response to the urgent need for global action to protect human health and the environment from "POPs". These are chemicals that are highly toxic, persistent, bio-accumulate and move long distance in the environment. The Convention seeks the elimination or restriction of production and use of all intentionally produced POPs (i.e. industrial chemicals and pesticides). It also seeks the continuing minimization and, where feasible, ultimate elimination of the releases unintentionally produced POPs such as dioxins and furans. Stockpiles must be managed and disposed of in a safe, efficient and environmentally sound manner. The Convention imposes certain trade restrictions. As of 15 July 2002, the Stockholm Convention had 151 signatories and 12 Parties. It will enter into force after the 50th ratification.

Together, the Basel, Rotterdam and Stockholm Conventions cover key elements of “cradle-to-grave” management of hazardous chemicals, most comprehensively in the case of POPs, which are covered by all three treaties. The Basel Convention (Article 4) requires each party to minimize waste generation and to ensure, to the extent possible, the availability of disposal facilities within its own territory. The objective of environmentally sound management of hazardous wastes underpins the Convention. At its fifth meeting in December 1999, the Conference of the Parties adopted the Basel Declaration on Environmentally Sound Management. Three Conventions developed under UNEP auspices together provide an international framework governing the environmentally sound management of hazardous chemicals throughout their lifecycles.

Child Labour Laws

Nepal is one of the countries to ratify following Child Labour Conventions as: Minimum Age Convention 138 (C138), 1973, Adopted by the International Labour Organization (ILO) in 1973, C138 binds ratifying countries to pursue a national policy for the abolition of child labour with minimum age of 15 years. According to the convention, the minimum age for work that is unlikely to jeopardize the health, safety or morals of young persons is 18; and Worst Forms of Child Labor Convention 182 (C182), 1999 - On June 17, 1999 the ILO adopted Convention 182, which calls for immediate and effective measures to prohibit and eliminate the worst forms of child labour.

Appendix 3- Roles and Responsibilities

S.No.	Sector	Roles and Responsibility
1.	National Council	<ul style="list-style-type: none"> ○ ○ Coordination with Central Government and Stakeholders, ○ Coordination for developing better understanding and Consensus Building ○ PPP Development ○ Coordination for sharing knowledge and better experience ○ Guidance for Policy change, updating legislation and Regulation, ○ Preparation of common plans and programs ○ Support Creating Proposed UWM Fund ○ Guiding the preparation of Implementation Strategy and Manual of Procedures, ○ Supporting for Capacity Building and Technology Transfer ○ Guiding the Partnership and Enterprise development through Franchising, ○ Support for Studies, Research, Market and Development, ○ Creation of Data, Information Bank and Knowledge Centre, ○ Facilitation for Clearance of Documents, Procedures, Plans and Programs, ○ Facilitation for Motivation to Stakeholders, ○ Catalytic Support to Executive Agencies, ○ Surveillance, Monitoring and Evaluation
2.	Local Councils	<ul style="list-style-type: none"> ○ Coordination with National council and Municipality, ○ Regulation and Facilitation, Providing Guidance for Program Development, Partnership Development, Environmental Monitoring, Motivation to Local Stakeholders, Procurement of Services, Outsourcing of Jobs, Support Resource mobilisation, Support Private sector Initiatives ○ Regulation and Facilitation of Implementation of Plans and Programs, ○ Protection of Citizens' Interest,
3.	Parliamentary Committee	Pursue for continuous support for reforms and updating Policy, Legislation, Rules and Responsibility, Advocacy for effective implementation of Policies, Plans and Programs,
4.	Environmental Audit Committee	Follow up and providing guidance for fulfillment of obligations under Policies, Plans, national and international commitments
5.	Dispute Resolution Board and Judiciary	Reduction of dispute and conflicts, developing understanding and consensus, mediation, fair judgment
6.	Surveillance Committees	Follow up of performance of Authorities based on agreed Plans and Programs, Policies, Legislation, Rules and Regulations

7.	Advisory Committee	Advise from time to time as per requirement, Advocacy for appropriate decision making based on agreed Policies, world trends and innovative ideas
8.	The formal private (commercial) sector	<ul style="list-style-type: none"> o Potential Waste Management function contractors or industrial entrepreneurs, o Mobilizing Capital Resources, Technology and Knowledge o Pursuit for higher profits through application of WM principles, o Promotion of UWM as part of their Social and Corporate Responsibility, o Pursuit for higher profits through re-engineering processes, redesigning products, o Supporting Innovative Studies, R&D, Motivating employees, and o Taking other measures bringing reforms in UWM Policy of the companies.
9.	The informal private sector	Individuals, small entrepreneurs, and micro-enterprises-potential functional small contractors, R&D, Innovative Studies
10.	Community based organizations (CBOs) -	Advocacy for idealistic goals, working for their own welfare, working as watchdogs and Surveillance of Sectoral Performance, Community Motivation
11.	Non-governmental organizations (NGOs) -	Advocacy for Organizational Ideals, Employment generation, Community Motivation, Surveillance of Sectoral Performance,
12.	Households	Active Participation in UWM and Advocacy for community goals
13.		o
14.	Individuals	Pursuit for employment, Advocacy for ideal goals and support UWM activities

Appendix 4: Policy Action Matrix

Constrains	Recommendation	Activities	Measurable Indicators	Responsible Organisation	Time Frame
General Action Matrix					
Lack of Institutional Framework	Establish an Exclusive and dedicated organisation	<ul style="list-style-type: none"> - Establish and Empower Ad Hoc NCUWM, and Local Councils - Establish Environmental Audit Organisation - Empower Civil Society for performance monitoring; 	Meetings take place, Organisations established	Council of Ministers, NPC	I m m e d i a t e
Lack of Legislative and Regulatory Framework	Develop Comprehensive Policies, Framework	<ul style="list-style-type: none"> - Review existing frameworks (Acts, Rules, Regulations) for gaps and amend - Develop procedures for consensus building - Establish Supportive Committees 	Documents prepared, Committees formed	NCUWM,	L o n g T e r m
Lack of Vision, Goal and Objectives	Develop Vision, Goals, Objectives and Purpose	<ul style="list-style-type: none"> - Carry out Objective analysis - Consolidate Purpose - Recognise UW as important Infrastructure - Develop Consensus for Adoption of Community/ Producer Responsibility Approach 	Documents prepared	NCUWM, Stakeholders	I m m e d i a t e
Lack of Comprehensive Approach	Review existing Acts and Documents, Regulations	<ul style="list-style-type: none"> - Define Roles and Responsibilities - Develop Financial and Investment Framework - Develop PPP Models - Develop Manuals of Procedures and Procurement Framework - Update Implementation Strategy - Establish Data and Info Centre 	Documents prepared	NCUWM, Stakeholders	L o n g t e r m
Lack of UWM Fund	Review Rules and Regulation	<ul style="list-style-type: none"> - Carry out Feasibility Study - Identify potential sources - Carry out Studies on Tax collected - Transfer contribution from other relevant funds 	Document prepared	NCUWM	I m m e d i a t e

Constrains	Recommendation	Activities	Measurable Indicators	Responsible Organisation	Time Frame
Lack of capacity to develop PPP	Develop Annual Programs for PPP	<ul style="list-style-type: none"> - Carry out Studies on Opportunities for PPP Development - Carry out Training to Stakeholders - Outsource jobs through PPP - Support Awareness Building, Information Dissemination, Education, and Empowerment 	Performance Evaluation	NCUWM	Intermediate
Lack of Comprehensive Marketing Strategy	Develop Marketing Strategy	<ul style="list-style-type: none"> - Carry out Marketing of Waste Products - Develop Entrepreneurship - Develop Economic instruments for production of clean and high quality waste materials - Outsource Waste collection jobs 	Periodic Survey and Reporting Documents Prepared	NCUWM/ Local Councils	Long Term
Motivation, Incentives	Introduce Motivation for Good Practices	<ul style="list-style-type: none"> - Develop Economic Schemes for Motivation, Incentives and Awards - Support unsolicited, Innovative, creative Ideas and R&D 	Documents prepared		Intermediate
Sub-Sector Solid Waste Management					
Lack of Improvement in SWM	Develop Pilot Level Plans and Programs	<ul style="list-style-type: none"> - Support Domestic Composting by Developing market force with Waste Reduction target of 20% per annum 	Annual Reports and Survey	NCUWM/ Local Councils	Immediate

Constrains	Recommendation	Activities	Measurable Indicators	Responsible Organisation	T i m e F r a m e
		- Support Marketing of Clean Waste Materials with recycling target of 30% of Waste Generation	Annual Reports and Survey	NCUWM/ Local Councils	I m m e d i a t e
		- Support Landfill Operation by Private Sector	Annual Reports and Survey	NCUWM/ Local Councils	I n t e r m e d i a t e
		- Support Entrepreneurship for 5 recycling industries and Business for SWM services	Annual Reports and Survey	NCUWM/ Local Councils	I m m e d i a t e
Sub-Sector Wastewater Management					
Lack of improvement in WWM	Develop Level Plans and Programs	- Evaluate Potential for PPP in WWM in 5 Municipalities	Documents and Reports	NCUWM/ Local Councils	I m m e d i a t e
		- Explore Unbundling of 3 WW Plants in KV from Melamchi Project (Dhobighat, Sallaghari and Hanumanghat WWTP)	Documents and Reports	NCUWM/ Local Councils	I m m e d i a t e

Constrains	Recommendation	Activities	Measurable Indicators	Responsible Organisation	T i m e F r a m e
		- Support WWTP Development by Private Sector	Documents and Reports	NCUWM/ Local Councils	I n t e r m e d i a t e
		- Support Entrepreneurship for Sewerage System operation and Business for sludge reuse and WWM	Entrepreneurship functioning	NCUWM/ Local Councils and Private Sector	I n t e r m e d i a t e
Sub-Sector Air Pollution and Dust Management					
Air and Dust Pollution Management	Improve Air Pollution and Dust Management	- Support Indoor Air Pollution Control through inclusion of UWM in Building Permit Process	Acts, Bye – Laws revised	NCUWM Stakeholder Organisations	I m m e d i a t e
		- Support Initiatives for Reduction of Firewood for Cooking with target of 8% households per annum	Survey Reports	NCUWM	I m m e d i a t e

Constrains	Recommendation	Activities	Measurable Indicators	Responsible Organisation	T i m e F r a m e
		- Support Alternative Energy Development Program with target to approach 5% HH/annum	Survey Reports	NCUWM	I m m e d i a t e
		- Support Entrepreneurship and Business for Carbon Emission Reduction and Emission Trading by Private Sector	Survey Reports	NCUWM	I m m e d i a t e
		- Agree with DOR for reduction of Dust Pollution due to Roads by 10% per annum	Survey Reports	NCUWM	I m m e d i a t e
		- Make Assessment for reduction of Emission from existing fleet of Bus and Trucks	Docements Prepraed	NCUWM	I n t e r m e d i a t e
		- Street Cleaning in a better way	Survey Reports	NCUWM Local Authorities	I m m e d i a t e

Appendix-5: List of Participants of Stakeholder Participation

S. No.	Name	Organization
1.	Mr. Tanuk Lal Yadav	Joint Secretary, MoPPW
2.	Mr. Kamal Pande	Deputy Director General, DoR
3.	Mr. Dhruva Raj Regmi	Deputy Director General, DoR
4.	Mr. Radhakrishna Pradhan	Program Director, NPC Secretariat
5.	Mr. Gaurav Giri	Electronics Engineer, MoIC
6.	Mr. Iswer Raj Onta	Expert, Advisory Committee
7.	Mr. Keshav Kunwar	President, SCAEF
8.	Mr. Amar B. Shrestha	1 st Vice President, FCAN
9.	Mr. Mahendra Gurung	Secretary General, NEA
10.	Mr. Devendra Gangol	Director, MULTI Disciplinary Consultants (P) Ltd.
11.	Mr. Ram Chandra Amatya	Advisor, MULTI Disciplinary Consultants (P) Ltd.
12.	Mr. Dipendra Purush Dhakal	Team Leader, EPN
13.	Mr. Arun S. Rana	Associate Project Analyst, EPN
14.	Mr. Mohan Prajapati	Nepal Engg. College
15.	Dr. Chet Bahadur Pariyar	Karnali Sustainable. Dev. Academy
16.	Dr. Kal Bdr. Rokaya	Karnali Sustainable Dev. Academy
17.	Mr. Mahendra Gurung	NEA
18.	Mrs. Maheshwori Khadka	MULTI Disciplinary Consultants (P) Ltd.
19.	Mr. Dinesh Ghimire	MOWR
20.	Mr. Santosh K. Gupta	MULTI Disciplinary Consultants (P) Ltd.
21.	Mr. Nawa Raj Khatiwada	NDRI
22.	Mr. Bharat Sharma	NEC
23.	Mr. Kishore Shakya	Bagmati Area Sewerage Project
24.	Mr. Kishore K. Jha	NEA
25.	Mr. Dipak Chalise	Roads BLD
26.	Mr. ... R. Bhattarai	
27.	Mr. S.K. Regmi	NEPECON
28.	Mr. Kalyan B. Pradhan	ESPS/ RDE
29.	Dr. Rekha Shrestha	NEC
30.	Ms. Pragya Rajauria	NEA
31.	Mr. Tara Nidhi Bhattarai	TU
32.	Mr. Ram Kaji Kayastha	NVC
33.	Mr. K.M. Amatya	HIMEC
34.	Mr. Ram Deep Sah	DWSS
35.	Mr. Shrad Manandhar	DoLIDARs
36.	Ms. Anuradha	NEA
37.	Mr. Ambikesh Jha	NEA
38.	Mr. Rajesh K. Das	Roads Board Nep.
39.	Mr. Rajesh Kr. Deo	Microtechwise (P) Ltd.
40.	Mr. Hiranya Kumar Bhattarai	Nepal Telecom
41.	Mr. Laxmi Kanta Shrestha	Nepal Telecom
42.	Mr. Rudra Pun	KEC
43.	Mr. Om P. Sherpa	Arniko Nirman
44.	Mr. Murali Ranjit	DoLIDAR
45.	Mr. Kishor K. Bhattarai	DOI
46.	Mr. G.P. Gorkhaly	UEIP/ DUDBC
47.	Mr. Manoj Kr. Verma	NTL
48.	Mr. Anil Kr. Jha	HMG/ RADC
49.	Mr. Dinesh Manandhar	D Net
50.	Mr. Darnal Kiran	DWSS
51.	Mr. Keshav Raj Nepal	Alpha Center Pvt. Ltd.
52.	Mr. Deepak Kandel	Sunrise Home
53.	Mr. Shaligram Singh	N.E.A.

54.	Mr. Hare Ram Shrestha	SIDEF
55.	Mr. Jenius Rajbhandari	Bellnorth Engg. Alliance
56.	Mr. Anan Mall	Wonaw & Associates
57.	Mr. Badan Lal Nyachhyon	MULTI Disciplinary Consultants (P) Ltd.
58.	Mr. Pradeep Amatya	LSMC
59.	Mr. Binod Neupane	SONA
60.	Mr. Murali Ranjit	NFSWM
61.	Mr. Merina Ranjit	K.U. (Student)
62.	Mr. Sunita Yadav	K.U. (Student)
63.	Ms. Anju Shah Singh	Women Env. Group
64.	Mr. Birendra B. Rawal	Clean Env. Nepal
65.	Mr. Ashok Shahi	SWMRMC
66.	Mr. Rajesh Thap	Zero Waste Nepal

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