
Zero Waste – A New Culture for A New Century

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Abstract

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. The Solid Waste Hazard is persistent all over the country from Himalayas to Terai, from villages to cities sparing nobody. Many think, the solid waste hazard will go away if thrown away but it comes back through the air we breathe, water we drink and food we eat through the chain of food, water and air. The status of SWM is the reflection of National Image and Economy.
 3. In Nepalese context, Solid Waste Issues were taken into consideration since 1978 with the initiation of the Solid Waste Management Project with the cooperation of the Federal Republic of Germany.
 4. The current practice of Solid Waste Management is shortly known as “Throw Away” practice with municipalities collecting, transferring and partly disposed into landfill sites and mostly into open Nature as riverbanks, forests, ponds, and open places. Today, solid waste produced in the country exceeds 7,500 Tons per day with 1,489 Tons/day produced in 58 municipalities alone.
 5. The Solid Waste Management sector 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 solid waste dumped on its banks (and aggravated with wastewater discharge) and that destroyed all aquatic life, contaminated the ground water and emitting huge volume of methane gas trapped in the dumping yards. This will continue for next over 20 years and more. Apparently, there is no easy way to bring back the rivers into their original natural conditions.
 6. The community based Solid Waste Management in Pokhara, Biratnagar, Bharatpur, Butwal, recycling of paper, plastics and metal, and “Waste Free Communities” campaign of Zero Waste Nepal are few examples of good practices.
 7. 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 in Kathmandu, and consequent down fall of tourism industry are some of the cases of past failures in SWM.
 8. Nepal has made very important policy changes at domestic level and is a signatory to a number of international conventions including Kyoto Protocol. Nepal also has had prepared several plans and programs related to Solid Waste Management. The implementation of the plans, programs and policies is the weakest part in SWM in Nepal and is aggravated by the lack of will power and commitment. There is a visible gap in Policy, Legislation and commitments. SWM National Policies were grossly not been followed up and as a result huge hazard to human health and environment is evident. Solid Waste Management is not considered as a part of corporate or institutional responsibility.
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9. All stakeholders including individuals, communities, Business Houses, Industries, and Institutions produce waste. But the management responsibility is vested on the Municipality or central government alone beyond its capacity. This is one of the reasons for mismanagement and environmental hazards created.
10. The responsibility of SWM 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 for SWM.
11. HMG has taken efforts to create high authority institutions as National Councils and Commissions. National Council for SWM, Environmental Protection Council, Tourism Development Council, High Powered Commission for Bagmati Area Sewerage Improvement, High Level Commission for ICT are some examples. 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 chair in many institutions and have little time for these councils. Their priority and responsibility are spread beyond the limits of SWM and not affordable. It should be noted that since they are final authorities, it is not possible for any body to raise question on them for their performance.
12. The lessons learnt suggest the need of radical change in the planning process and reforms in Solid Waste Management and particularly of shifting from the Government or agency managed approach to community / producer managed approach and promoting a new approach of Zero Waste – an approach based on Recycling of all waste back into their sources of generation, imposing disposal ban on Public Places and Open Nature, encouraging Community and Producer based SWM. For practical purpose, the SWM should be the issue of moving from the current practice based on **“Throw Away”** to a new culture of **“Don’t Throw Away, Don’t Burn, Don’t Bury and Send Back/Take Back”** and inviting partnership between the stakeholders- the Government, Business and Communities.
13. The Tripartiate Partnership has ample scope for providing Waste Management Services and mobilisation of resources that the Government has no access for. But the partnership require custody through motivation, incentives, trust, belief, understanding and confidence that required to be developed with continuous and persistent promotion through partnership development at National Level and Grass root level through establishment of a National Council for SWM.
14. The main objective of the NCSWM will be to develop partnership among the stakeholders for practicing Zero Waste Approach- a new culture for a new century. It is a long term vision that requires to be implemented right now. If you are not for Zero Waste, how many waste you are for?

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
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
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
NORAD	Nordic Organisation for Regional Development
NPC	National Planning Commission
NPR/NRs	Nepalese Rupees
NS	National Standard
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 Dub-Metropolitan Corporation
PWD	Public Works Directives
RD	Research and Development
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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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 Devtayoh, Jalam Varun Devetayoh” 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 for reusing as Bed Cover, Pillow Cover, Sitting Mat, 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 Solid Waste Management

In 1970 for the first time in Nepal, the problems and issues of solid waste management in 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 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 “Saagaah²” 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 conditions brought the new scenario of urban and rural areas where dumping of solid waste in the open Nature and river systems has been the regular phenomenon. Despite of significant efforts in the last decades, the majority of the municipalities including Kathmandu and Lalitpur could not manage the growing volume of the waste. As a result of the steps established by Kathmandu and Lalitpur Municipalities, the whole nation imitated the SWM dumping approach creating huge environmental and health hazards. The problems are aggravating from day to day due

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² Saagah is a Newari system of Organic waste composting in the backyard of households.

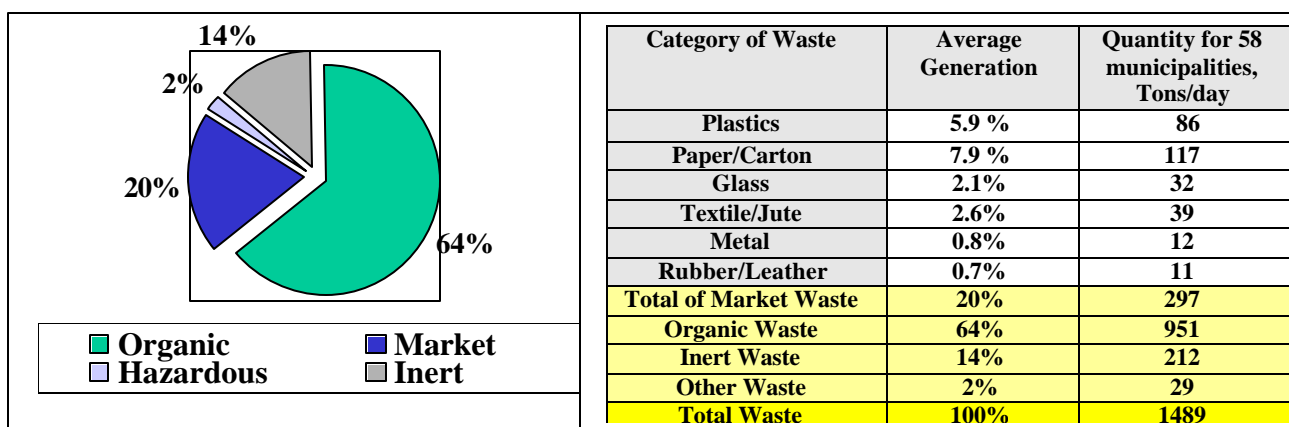
to the increasing volume of urban waste dumped over land, water masses and air (by incineration) and diverting the waste from urban areas to rural areas without much value added benefits.

5. Solid Waste Composition

The average quantity of solid waste generated in various cities as reported by various projects is accounted for 0.34 Kg/Capita/day. The major sources of generation are Households, Streets, Business/Institutions, Healthcare, Industries and Construction Industries.

Total Solid Waste generated all over the country is believed to be around 426,500 ton/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.

The Solid Waste generated comprises of 64% of Biodegradable, 20% Recyclable and Market Waste as plastics, glass, paper, wood, cans, and metal, and the balance of 16% is the inert materials as construction debris, earth, sand and dust. The composition of Recyclable waste mostly comprise of plastics and paper and indicated in following box.

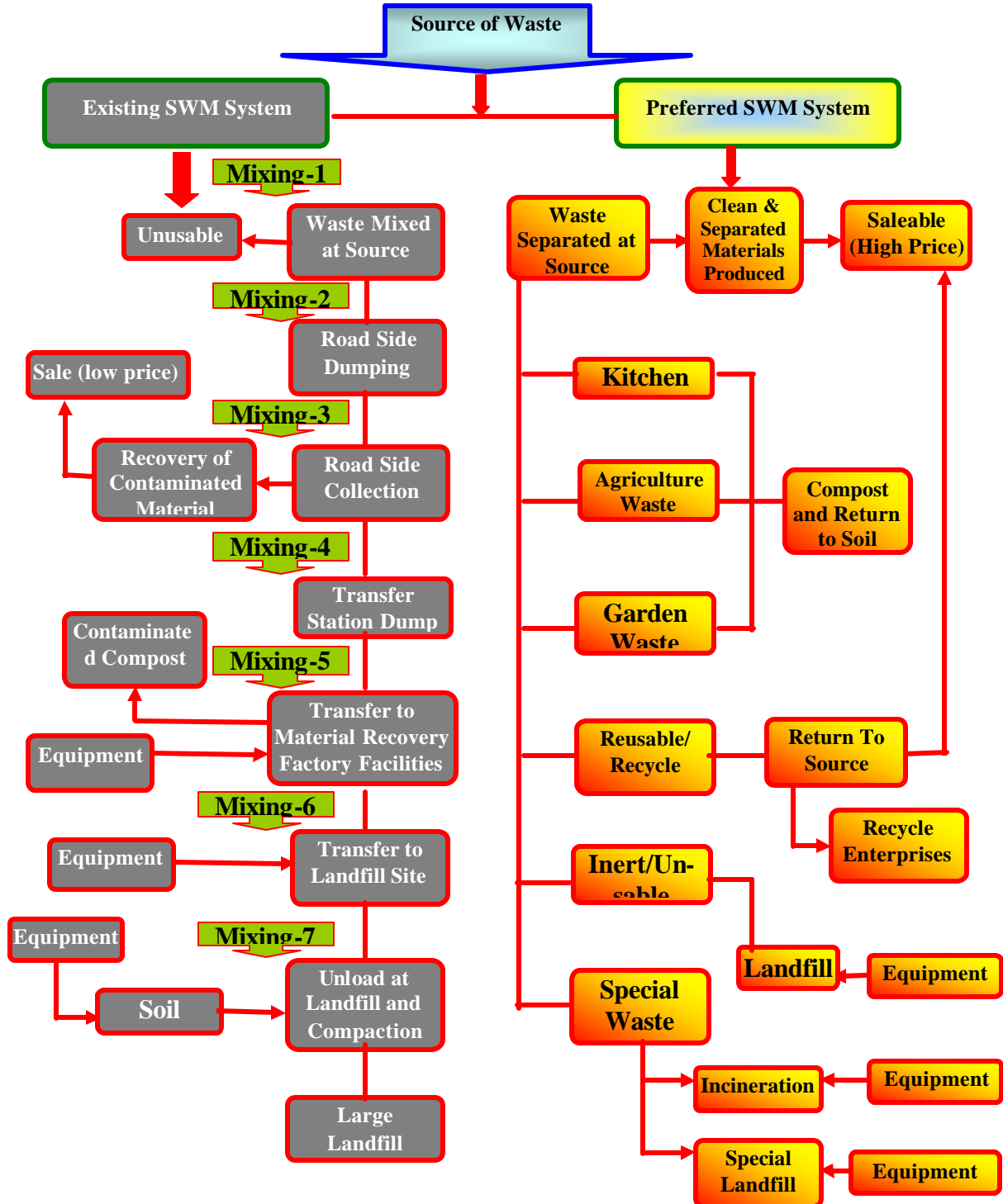


6. Current Practice of SWM and proposed system of WMS

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. There are at least six 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 that emphasises on 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 without WMS and pay for it, it should be allowed.

Figure 1: Comparative Chart of Current and proposed SWM Systems



7. Waste Treatment Methods

The Treatment methods used for the various category of Urban Waste are indicated in Table 1.

Table 1: Solid Waste Treatment method and Degree of Hazards

Methods of Treatment	Degree of Hazard to Environment and Health							Cost Implication
	Ground Water	Source Water	Earth Surface	Vegetation	Air	Environment	Human Health	
Dumping	H	H	H	H	H	H	H	H
Landfill	M	M	M	M	M	M		H
Incineration of Compounds without Cl, Fl, Br content	L	L	M	M	H	H	M	H
Incineration of Compounds with Cl, Fl., Br content	M	M	H	H	H	H	H	H
Source Management			L			L		L

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

8. 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 as the air we breathe, water we drink, and food chains we get from farm land and water bodies. 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, Dietherria, Dysentery, Skin cancer, Eye and throat Sore is attributed to the environmental hazards created by solid waste.

9. 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.

10. Effectiveness of Waste Management Approach

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. Based on the actual demand observed in the waste management of 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, and several NGO in Kathmandu Valley alone.

II. Review of Policies, Legislation and Development Plans

11. The Governmental and Sector Policy

With realization of the facts, the Government of Nepal formulated and enacted sector policies and several legislative measures listed herewith:

- The Constitution of Nepal, 1991 The Article 26(4) and Article 88 (2)
- National Policy on Solid Waste Management, 1996
- Strategies of National Policy on SWM
- Solid Waste Management and Resource Mobilization Act, 1987
- Environmental Protection Act 1997
- Local Self-Governance Act and Regulation, 1999
- Kyoto Protocol
- Millennium Development Goals Agenda 21
- Industrial Policy Act, 1992
- Town Development Act, 1988
- Water Resources Act, 1992
- Child Labour Laws

12. 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.

13. Ninth and Tenth Plans

The objectives of the Ninth and Tenth Plans included effective mobilization of non-governmental and private sector for joint venture investments, recycling business, waste management services, waste treatment at source, development of cleanliness concept, resource recovery, Provision of subsidy to Local Authorities through Environment Protection Fund, and pollution free disposal. But in practice, the objectives were hardly considered.

III. Review of Good Practices

14. Current Good Practices in Solid Waste Management

The review of the current best practices in SWM in Nepal is carried out and presented in Table 2. 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 /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.

As a bench mark of evaluation, it may be noted that Dumping In Street is assumed as lowest value whereas the Waste Management at source with highest value. The community based SWM in Pokhara and Biratnagar have relatively highest values but have a lot of scope for further improvement.

Table 2: Best Practices in SWM in Nepal

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	70%	Waste collection by Everest Expedition Teams
Local Communities	Community Based SWM (40 HH)	ZWN		Domestic Composting
	Composting at Source		77%	
	Incineration		40%	
	Waste Management at Source		83%	

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

IV. Review of Past Failures

15. Policy Failures

Several Policy Decisions, Plans and Program were not followed up and not implemented as envisaged by the plans. The political will and commitment required for implementation of the plans also found very weak. Landfill site faced severe problems. Some of the examples of past failures as follows:

- SWM was never recognised in par with Water Supply, Electricity, Telecommunication, Roads and Bridges, and Industries, and is given least priority by the Government.
- Kathmandu Municipality managed CKV studies suffered from neglect of Environmental Guidelines 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.
- SWM responsibility is scattered in many agencies and no exclusive and dedicated organization exists to coordinate and consensus building. No independent institutions exists that is responsible for monitoring of Environmental Performance, Environmental Surveillance, and Audit.
- No Civil Societies exist that are capable and properly empowered to advocate for the preservation of the nature, environment and human health compared to Human Rights Commission.
- Lack of Long Term Vision and Goals has had its toll on Solid Waste Management Sector. The hazards created today in Nepal are the direct result of such a deficiency. Lack of understanding 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.
- The closure of solid waste sorting and composting plant at Teku was due to neighborhood resistance for the hazards created by the plant that aggravated the problem of final disposal and deteriorated the quality of waste dumped in Gokarna.

- The Closure of Gokarna Landfill site due to the failure to maintain the environmental conditions and particularly because of dumping of none segregated mixed waste and failure to maintain trust fo the local communities
- Today, practically no landfill sites are available because of the experience from Gokarna Site. The people from other potential Landfill sites as Okharpauwa, Ramkot, Taukhel, Champi, and Seuchatar refused to accept establishment of new ladfill sites and transfer of solid waste to their areas.
- Creation of Havoc because of the Bird Hazards to the Trivuban International Airport due to the dumping of Solid Waste along Bagmati River at Guheswori area
- Loss of tree plantation along Satdobato-Gwarko Ring Road due to dumping of solid waste
- Abuse of Bagmati, Bishnumati and Manohara River corridors from Gokarna to Chobhar with dumping garbage and wastewater discharged from the cities of Kathmandu Valley. The areas along the rivers are filthy with bad smell, infested with birds of pray and rodents, permanently contaminated ground water, methane gas generation within the waste dump mass, extinction of all aquatic life in these rivers. The rivers are permanent sources of spread of water borne diseases in Kathmandu Valley.
- The downfall of the tourism industry in Nepal since1992 is attributed to the mismanagement of Solid Waste with waste disposed in streets and tourist areas attracting international attention. Many countries declared Nepal as environmentally unsafe country.
- The tax colected by DDC for export of solid waste from districts are diverted for administrative and staff costs and not used for developing capacity for SWM.
- The effort of MLD to outsource the solid waste management services to a private sector could not be materialized and implemented so far.
- No recognition and regard is given to the role of the formal and informal private sector, the communities, waste generators and waste pickers and are suffering from starvation of 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 with the efforts of formal and informal private sector.
- The Municipalities are the prime beneficiaries from the efforts made by the private sector that bring direct benefits in terms of reduced burden and save resources. The saved resources are not shared with other partners.

16. Constrains

A bunch of reasons of past failures is attributed to the various constrains as:

- Intersectoral constrains developed for securing the jobs of the sectoral stakeholders that prevent them to recognise others and act as partners
 - Legislation and Regulations constrains preventing formation of pratnership
 - Procurement and Franchise constrains preventing outsourcing of services
 - Technological Constrains preventing effective selection of waste processing and disposal alternatives
 - Financial Constrains preventing proper dirbursement of resources based on actual performance and subsidy for reduced burden to the government and saving of resources from reforms
 - Access to Financial Resources as Bank loans
 - Constrains on Critical Thinking, Will and Behavior preventing innovative solutions
 - Constrain on Performance Monitoring preventing evaluation of complience with obligations
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- Constrains on Donor Cooperation prescribing Donors’ Technological and Manpower inputs irrespective to the sustainability of the recipient countries
- Marketing Constrians preventing the access to national and international markets for waste products

V. Proposed SWM Approach

17. The World Trend

The SWM practices in countries as India, China and Nepal remained at primitive level based on mixing, collection and dumping in Nature creating considerable Environmental and Human Health hazard whereas the developed countries as Japan, USA and Switzerland are practicing Prevention, Minimization and Resource Recovery methods, and initiated Community Based and Producer Responsibility SWM methods. Several companies as Hewlett Packard, Nike, Toshiba, and many more has had benefited millions of dollars from reforms in waste free lifestyle approaches.

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 and 3. The current practice based on Agency management is characterized by need for huge landfill sites, low value recovery of resources and imposition of penalties for defaulters whereas the community based or producer responsibility Approach required limited landfill site for safe disposal of non-recycled waste, high value recovery of resources and introduction of economic tools for motivation and providing incentives for waste mangement services provided.

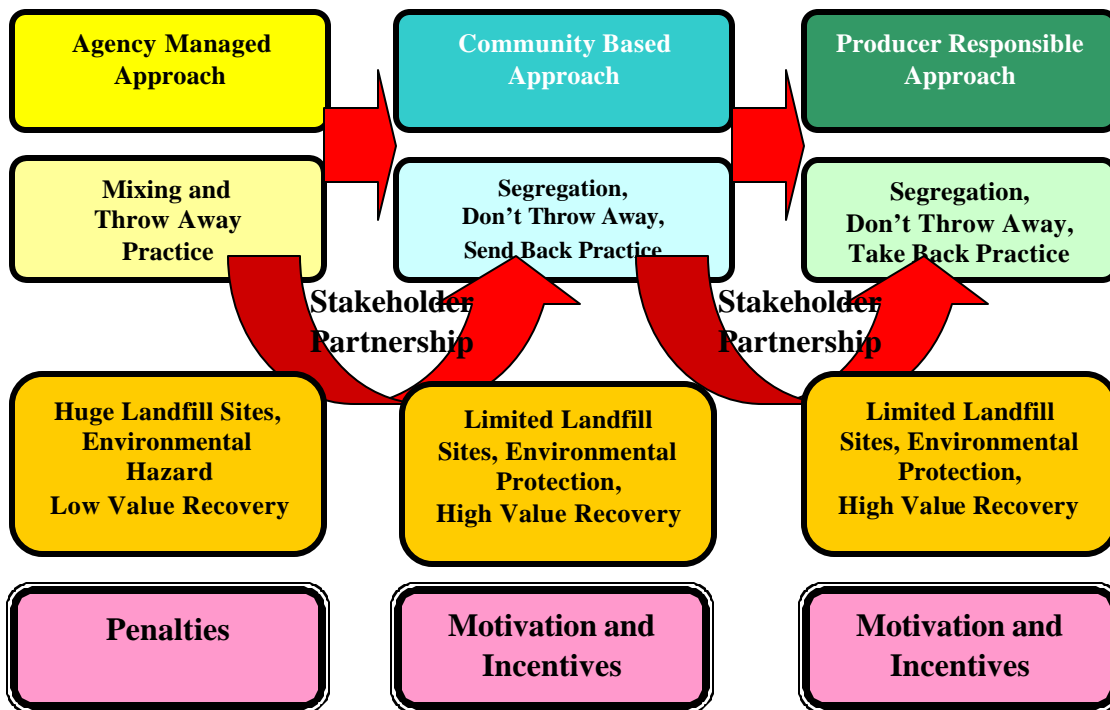


Figure 2: World Trend of Waste Management

18. Stakeholders Participation

The Stakeholders participation in the process of SWM is the key factor behind the change in policy and reforms that is instrumental for transformation from “Throw Away Practice” to “Don’t Throw Away Practice” and high value recovery of resources.

As defined by UNPPPUE, stakeholder participation refers to Tripartite form of contractual agreement between the public sector (Government and Municipality), the private sector (Formal and Informal Enterprises) and the Civil Societies (Communities, NGO, Research Groups and individuals) 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 as beneficiary target groups. There are three recognised categories of partnerships – G2B, G2C, B2C and illustrated in following chart.



Figure 4: Public Private Partnership Structure

The linkages and relationship of the partnership modalities will depend on the characteristics of the cooperating entities. The G2B partnership known as Public Private Partnership is of particular interest since this mode of partnership has access to resources, technology and entrepreneurship for providing waste management services. 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 for the participation or by invitation as and 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.

19. Partnership Development Approach

The Figure 5 indicates the approaches of Partnership Development. They are:

- **Top Down Approach** – where the Government takes initiatives and call for Partnership. Such initiatives are mostly 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 carried out by the Communities and Private Sector as their Corporate and Idealistic Responsibility. The strength of Lateral Partnership has strong effect on Government Policy.

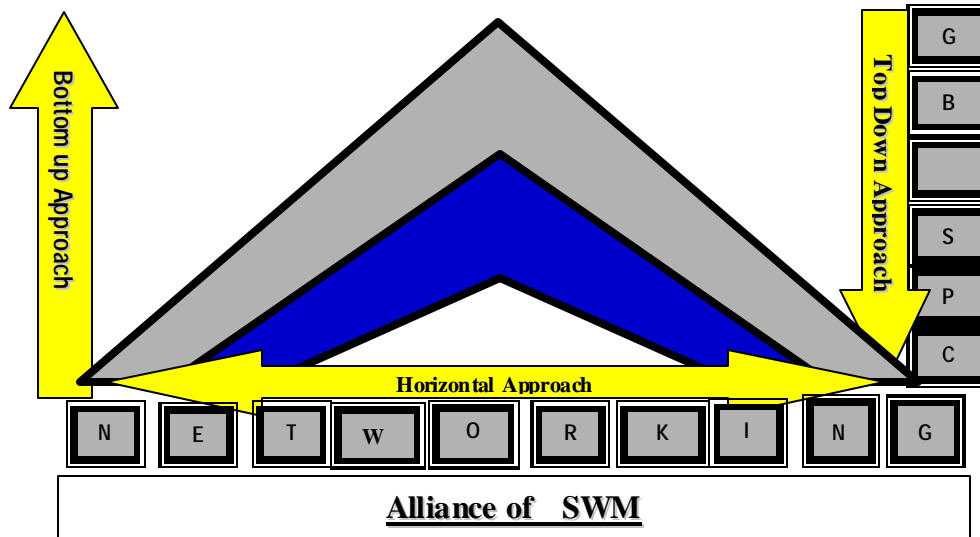


Figure 5: Partnership Development Approach

20. Impact of Waste Management at Source

The impact of Waste Management at Source that follows the world trend is best known as Community Based approach, Producer Responsibility Approach or Zero Waste Approach is illustrated in Figure 6. For the current time, all waste recovered through “Throw Away Approach” is diverted to land fill sites. With application of Waste Management at Source or Zero Waste Practice, the burden on landfill site will be limited to the diversion of non-recyclable waste. There are certain prerequisites for the community-based approach to be successful i.e. building trust, belief, understanding and confidence among the stakeholders and develop consensus on common program. This in turn requires a partnership-based organization at national and local level where the stakeholders could come into dialogue and interaction, resolve the problems and issues, and promote critical thinking.

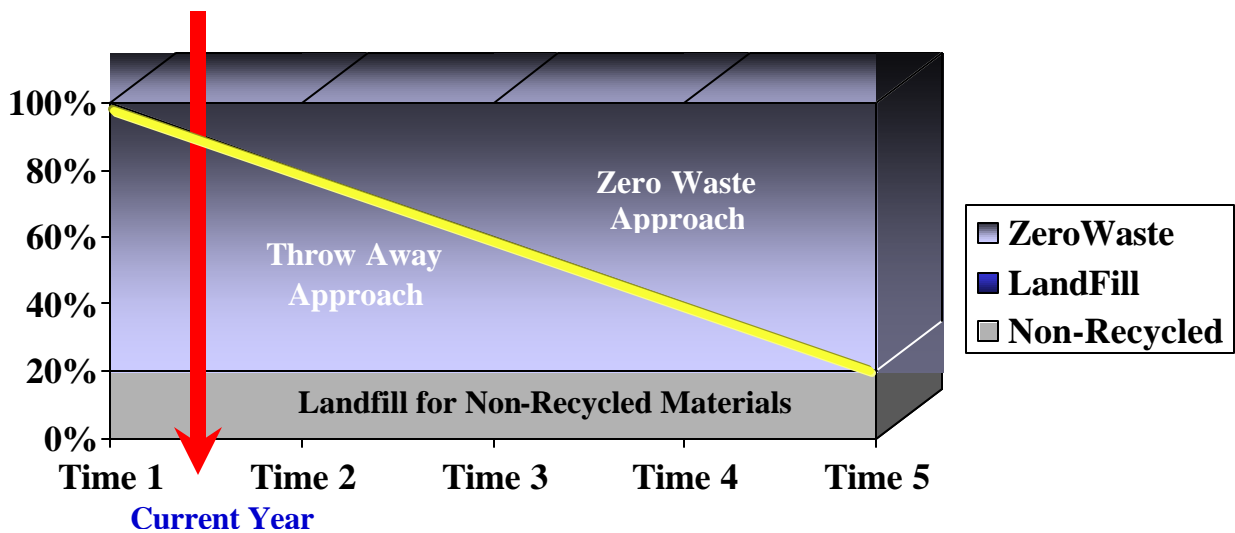


Figure 6: Impact of Waste Management at Source

VI. Proposed Institutional Arrangement and Legislation

21. No defined institutional structure

Currently, there is no defined institutional structure at the national level responsible for overall coordination among the various stakeholders related to SWM. The Ministry of Local Development is responsible for Solid Waste Management and heads the National Solid Waste Management Council. The Council is headed by the Minister of Local Development and comprises of government officials. Virtually, there is no representation of the Private Sector and Communities and waste generators. The efficiency of this Council is very visible with the performance of the sector and large scale hazard it has created. The Council is overshadowed by other issues in the Ministry and the waste management remains at low priority.

22. Structure of the Proposed Organization

The proposed organization structure of the National Council would be an apex body of **Partnership among the institutional representatives of Stakeholders** from Private Sector, Government Sector, Association of Municipalities, DDC, and VDC, Academia, and supported by theme committees, and a secretariat. 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 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. From the data on the formation of various high-level organizations, a shift towards encouragement for greater role by Private Sector is visible with reduced dependency on higher authorities. 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. The Currently existing NCSWM may be remodelled following the above suggestions.

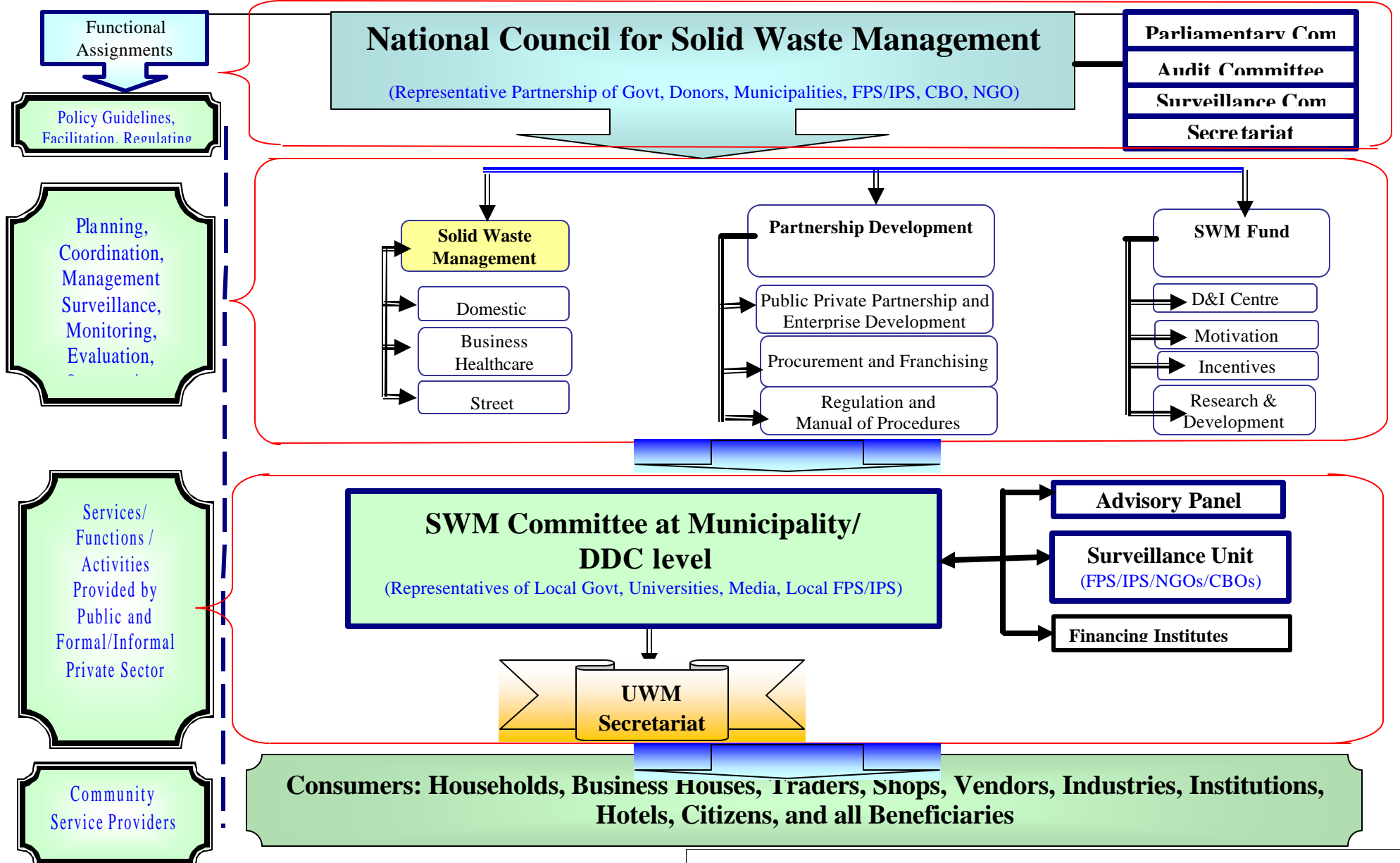


Figure 7: Proposed Institutional Model for SWM

VII. Resource Management

23. Human Resources

As Solid Waste Management 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.

24. Capital Resources

The capital resource required for management of Urban Waste Management 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.

25. Creating Solid Waste Management Fund

A separate fund for SWM 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

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

Contribution from various funds

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

International Trading of Waste

- Export of Waste

Revenue from Waste Generators and Beneficiaries

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

VIII. Motivation, Incentives and Awards

26. International Experience

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

27. 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 SWM. Some of the cases of motivation factors are application of Waste Management at Source with application of a fee based on “Pay As You Throw Away (PAYTA) Approach”, a price based generation of clean and separated waste, recognition of employee enthusiasm, funding for developing sustainable partnership, Tax Waiver or Incentives for cleaner Products or Take Back systems of used products

28. Some categories of awards

Awards are one of the ways to encourage the stakeholders to participate and develop partnership 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.

IX. Recommendation

29. Need for Exclusive, Dedicated and Autonomous Organization

The SWM is currently dealt by several organizations in a piece mill basis. It is generated by all but managed by the municipalities by collecting of mixed waste and thrown away in the rural areas or Nature. The Environmental commitments are grossly neglected because of very weak and inconsistent implementation approach. This situation invites to work out for development of a comprehensive and integrated policy dealt by an exclusive and dedicated organization.

Thus, the establishment of National Council for SWM 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, Association 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, plans and programs, and monitoring of progress. The Council will be a catalytic Support Organization to the existing executing agencies and will be a custodian of the proposed Urban Waste Management Fund.

A parliamentary committee, environmental audit committee, Dispute Resolution board and specialized Judiciary and a civil society that will advocate for qualitative and timely performance will support the National council.

30. Proposed Activities for SWM

Some limited activities are proposed herewith in Table 3 that should be possible to carry out and achieve some success. These activities are already practiced in certain communities.

Table 3: Proposed Activities for Solid Waste management

SN	Proposed Activities
1	Support Domestic Composting by Developing market force with Waste Reduction target of 20% per annum
2	Support Marketing of Clean Waste Materials with recycling target of 30% of Waste Generation (Plastic, Paper, Metal, Textile, Glass, Bone, Leather, Feather, Batteries)
3	Support Landfill Operation by Private Sector
4	Support Entrepreneurship for 5 recycling industries(Paper, Plastic, Metal, Glass, Bone, Feather) and Business for SWM services (Segregation, Collection, Transfer, Marketing, Monitoring)
5	Support Reform of Acts, Regulations, Investigation, research, documentation, and analysis
6	Support Awareness Building, Information Dissemination, Education, Capacity building, and Empowerment
7	Introduction of Motivation, Incentives and Awards Schemes (Take Back Schemes, No Disposal Schemes, Waste Reduction, Reuse Schemes, WMS Schemes)
8	Establishment of SWM Fund with contribution <u>from various funds, and Revenue from Waste Generators</u>

31. Implementation Strategy

At National Level

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

- Including all Associations of Organizations relevant to SWM as members of NC (with unlimited membership number)
- Facilitating Reform of Acts and Regulations
- Introduce 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.

At Community Level

- Establishing Alliance of SWM NGO and PSO
- Creating Community and Neighborhood Groups for practicing ZW Approach
- Conducting Awareness Campaigns
- Initiating SWM at sources including Composting at home and separation of waste
- Initiating Recycling Enterprises
- Pressurising Government and Municipalities for Application of Zero Waste Approach and Reduction of SWM cost to the citizens.

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