



# DEVELOPMENT OF INTEGRATED SOLID WASTE MANAGEMENT SYSTEM (ISWMS) FOR BASHNET SMALL TOWN

**June 2012**

*Implemented at Bashnet Small  
Town, Babati DC as pilot project*

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**FINAL REPORT**

## ACKNOWLEDGEMENT

This project is alive to and appreciates the facilitative role played by Tanzania Association of Environmental Engineers (TAEEs) with support from WaterAid Tanzania without whose support, the project would have not been possible. It further recognizes the contributions made by the Babati district council in regard to their relentless efforts in ensuring that the project goes on well without failing for any reason whatsoever.

Last but not list, TAEEs recognizes the support and contribution made by Bashnet communities especially the project villages for their support and collaboration they gave the working team from the beginning of the project implementation to the realization of physical setup of this project.

Finally, more appreciations have been bestowed to WA (Ms. Joyce Ndesamburo and Nicas Petro and the entire management), DWE-Babati DC, ADRA staff, Mr. Eng. Konkomo, Mr. Mkwizu, Mgishagwe and Ms. Regina for supporting the implementation of this ongoing project. Bashnet leaders and community as a whole are not left behind but more appreciation is bestowed to them for their continuing support until this project is made a success.

Finally and in the most humble way we wish to thank everybody who has been involved in this project by default or design for their inputs, criticism and corrections amongst many other contributions for work well done that is the production of this report and the work done on ground. Let everyone know that, this project is still going and we more need supporting initiatives to realized the desired future of Bashnet community which is "*improved people's livelihood*".

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## CHAPTER ONE

### 1.0 Introduction

In broad perspective, the decisions to undertake solid waste management initiatives in any town or city are not only very capital intensive, but also difficult from the environmental and social points of view. Taking that into account, there is a need to develop, comprehensive and implement a simple, but reliable tool that will help local communities as well as decision makers in the analysis process. Integrated solid waste management (ISWM) model is a tool which seems to meet all the requirements. (White, 1997) (Bjorklund, 1998), (Eriksson, 2002) (McDougall, 2001)

In all analyzed cases, the environmental burden of the ISWM system particularly in small and developing towns is significantly smaller than the economic one. The collection stage is the most expensive and the most environmentally demanding stage of the whole process of waste disposal if not well planned and cared. The model which is proposed to be used in Bashnet small town with population 6,630 (*village government data, 2012*) clearly shows the environmental benefits of recycling, compositing, reuse, sorting and waste volume reduction at generation point.

In broad terms, Integrated Solid Waste Management, or ISWM, is a tool to determine the most energy-efficient with least-polluting ways to deal with the various components and items of a community's solid waste stream. The ISWM hierarchy is based upon the material and energy that is embodied in solid waste and that is associated with its recycling, reuse and disposal. The twin goals of ISWM are to:

- retain as much as possible of that energy and those materials in a useful state,
- Avoid releasing that energy or matter into the environment as a pollutant.

If there shall be commitment to the formulated working body in Bashnet towards waste management initiatives and get support from respective organs that complements part of the management model, the model can be a very useful tool for the decision makers and waste management in Bashnet town from which manure, employment, health improvement and cash will be experienced significantly.

### 1.1 Project Objective

The main project objective is to establish Integrated Solid Waste Management System (ISWM) with commercial concept in Bashnet small town, which upon project successfulness, shall be scaled up to other small towns of Dareda and Gallapo and other small towns in the country.

### 1.2 Objective of the Model

The main objective of the model formulation is to develop, implement and maintain effective, efficient, affordable and sustainable Integrated Solid Waste Management (ISWM) system in order to ensure people's good health, improve social economic status

of the community while maintaining the ecological balance of the Bashnet town and its surroundings through proactive, participatory, and socially responsible manners.

### **1.3 Specific Objectives**

1. To raise public awareness on ISWM based on 3R through information exchange, awareness raising campaigns/programs and demonstration activities through learn by doing;
2. To reduce the quantity of solid waste to be disposed at the controlled dumpsite by effectively and efficiently implementing 3R principles through training;
3. To Increase resource recovery rate by promoting suitable waste Recovery, Reuse and Recycling techniques and simple, affordable and acceptable technology by the community through training and public meetings
4. To strengthen the environmental pollution control measures by developing and enforcing appropriate bylaws, regulations, directives, guidelines and monitoring tools that are supervised by the designed hierarchy from Bashnet community itself as well as Babati DC who is in-charge of supervising and supporting developmental activities in the whole district
5. To establish a cost effective integrated solid waste management system of commercial concept that utilizes generated waste through composting, recycling and selling recyclable materials such as bottles, glass, papers, crappers, etc
6. To develop and strengthen public private partnership including community based waste management process

### **1.4 Scope**

To develop Integrated Solid Waste Management System (ISWMS) commercial model that will be accepted and operated by Bashnet community through involving working institutions including vulnerable groups, poor, women and men, children, disabled and elder people equitably and sustainably.

### **1.5 Principles governing the model**

The basic principles considered in model development include but not limited to:

- Environment and Public Health Safety
- Environmental Justice (equity)
- Cost Effectiveness
- Quality
- Public Private Partnership
- Innovation and appropriate technologies
- Learning by doing
- Resource Optimization
- Equitability
- Inclusiveness
- Sustainability

## CHAPTER TWO

### 2.0 BACKGROUND DESCRIPTION OF BABATI DISTRICT COUNCIL

Babati District is among the six districts of Manyara Region. The District was established as a result of dividing the Hanang' District into two districts of Babati and Hanang'. Babati District was officially documented in the Government Official Gazette No. 403 of the 1st October, 1985. It became autonomous in July 1986 as a District Council. In September 2004 the Babati District Council was again divided into two Councils and form Babati District Council and Babati Town Council. Babati District Council is formed by 4 Divisions, 21 Wards, 96 Villages and 376 Sub-villages (Vitongoji) covering a total area of about 5,609 square kilometers.

### 2.1 LOCATION

Babati District Council lies between the latitude 30 and 50 south of the Equator and longitude 350 and 370 east of Greenwich. Neighbouring districts are Monduli in the North, Karatu in the North-West, Mbulu in the West, Hanang' in the South-West, Kondoa in the South and Simanjiro in the East.

Fig 1: Map of Babati District

## 2.3 POPULATION

According to the Population and Housing Census of August 2002, the District Council had a population of 237,601 with an annual growth rate of 2.7 percent. At present that's year 2010 its population is estimated to be 332,819 of which 170,095 are males and 162,723 are females. The Council has a population density of 59.3 people per square kilometres.

## 2.4 HEALTH SERVICES

Good mix of private and public Partnership (PPP) health service is observed in Babati District Council as shown in the table below.

Table 1: health services in Babati

	<b>Ownership</b>	<b>Hospital</b>	<b>RHC</b>	<b>Dispensaries</b>	<b>Drug stores</b>	<b>Total</b>
1	Government	0	7	25	0	32
2	Private	0	0	5	20	25
3	NGO	0	0	1	0	1
4	FBO	2	1	2	0	5
	<b>Total</b>	<b>2</b>	<b>8</b>	<b>33</b>	<b>20</b>	<b>63</b>

(Babati District profile, 2010)

Out of existing 96 villages, the health facility coverage is 44% in terms of infrastructure (Dispensaries/Health canters). Other villages are covered by mobile (25) and outreach (35) services special for Mother and Child care / services.

The Council has five Care and Treatment Centres (CTC) for HIV/ AIDS and has an extended programme for Prevention of Mother to child transmission of HIV (PMCTC) at facilities level, and Community Home Based care (CHBC) services.

The leading outpatient/inpatients diseases are Malaria, Acute Respiratory Diseases (ARI), Pneumonia, Diarrhoea, Intestinal worms, Pulmonary Tuberculosis (PTB), eye diseases, skin diseases, Sexual Transmitted Infections (STI) and Urinary Tract Infections (UTI).

HIV/AIDS new infection is ranging between 2 to 1.7% and immunization coverage among under five for all ant genes is 85%.

The quality of health service delivery in the Council is undermined by inadequate health infrastructures, Human Resources for Health as only 60% of existing facilities have adequate staff mix.

- Other factors that undermine the quality of services are; unavailability of durable medical equipments at msd level.
- Non realistic financial allocation from central level and Council own resources.
- Inadequate communication and transportation.

## **2.5 COUNCIL GROSS DOMESTIC PRODUCT (GDP)**

There is no official figure developed for Council GDP, however more than 95 % of Babati District Council inhabitants depend primarily on agriculture output for their livelihood. Agriculture activities are both livestock keeping and crops production of both food crops (mainly; maize, sorghum, beans, pigeon-peas and wheat) and cash crops (mainly; groundnuts, sunflowers, cotton, sugar-cane and coffee). The district enjoys self-sufficiency in food production with surplus available to supply to other districts.

Livestock kept are mainly indigenous cattle, goats, sheep, pigs and chicken. What is being produced by farmers and livestock keepers in terms of crops and animal production is account for average income per capita of Babati District Council inhabitants

## **2.6 LAND, NATURAL RESOURCES AND ENVIRONMENT**

The Council natural resources include land, forests, water, wildlife and minerals. These resources form the basis of the economy of the people of Babati District Council.

There are 4 National forest Reserves with a total area of 25,871 hectares namely Nowu (13,520 ha.), Bereko (6,114 ha), Ufiome (5,632 ha) and Haraa (605 ha). There are also 14,000 hectares of natural forests reserves which are under Village Management Committees and 42,000 hectares of land, wood lots and trees at homestead.

Fuel wood is used by majority of people in Babati District Council making the demand for fuel to be very high. This is well explained by the excessive harvesting of forests and woodlands products.

The Council is endowed with 2 National parks of Manyara and Tarangire which has enabled the formation of Wildlife Management Area of Burunge. There are water bodies formed by 4 lakes of Burunge, Babati, Gidewari (a salt lake) and Manyara.

## **2.7 INFRASTRUCTURE**

### **2.7.1 ROADS**

The most commonly used means of communication is through roads, however the roads are not in good condition especially during the rain seasons. There are 882.8 kilometres of roads of which 135.4 kilometres are trunk roads, 87.8 kilometres are regional roads, 388.4 kilometres are district roads and 302 kilometres are feeder roads 26.4km and village roads 275.6 km. There is only 12 kilometres of roads which are tarmac at Minjingu and Dabili- Bashnet.

Total length for District roads is 388.4 kilometres, among this 148 kilometres are gravel and 240.4 are earth.

Geographical features of Babati District Council that of highlands and lowlands warrant availability of several rivers, streams and gullies which in most cases has posed some communication barriers hence bridges, culverts and drifts are necessity.

### **2.7.2 WATER SUPPLY**

In habitants of Babati District Council do get water for domestic use, irrigation and livestock use from the following sources:- gravity and underground water, lakes, charco dam, rivers, streams, ponds and springs.

There is inadequate clean and safe water for domestic use in Babati District Council. There are 190 shallow wells, 2 surface pumps, 60 gravity piped schemes and 23 dams which serves a total population of 191,682, which is equivalent to 56 % of total Council population.

### **2.7.3 ELECTRICITY AND COMMUNICATION SERVICES**

The District is supplied with Hydroelectricity from Tanzania Electric Supply Company (TANESCO) through the national grid. Telecommunication services are available through Landline telephone service from TTCL and mobile phone services from Vodacom, Tigo, Zantel and Zain subscribers in a large transverse of the district depending on where boosters and transmitters are installed.

### **2.7.4 ADMINISTRATION AND PERSONNEL**

The Council administrative structure starts at hamlet (sub village) level. At the Village level, there is a Village government, Village assembly which meets once after every three months and 3 standing committees namely the Village Council, Education, Health and Water Committee and Economic Services, Works and Environment Committee which meet every month. The Village assembly is the supreme final decision making body at Village level of which the elected Village Chairperson is a political leader and The Village Executive Officer is a Secretary to the Village Council.

At the Ward level, there is Ward Development Committee (WDC) led by the Ward Councillor and the Ward Executive Officer is the Secretary. WDC meets at least once every three months.

At the District level, there is the Full Council which is the supreme decision making body of the Council. There are 3 standing Committees which are Finance, Administration and Planning Committee, Education, Health and Water Committee, Economic Services and Works and Environmental committee. Also there exists Council Multi-sectoral AIDS Committee (CMAC). Both Full Council and Committees receive technical advice from The Council Management Team which is under the chairmanship of the District Executive Director. Currently Babati District Council has 8 Departments and 3 Units each with a Head of Department/ Unit who reports directly to District Executive Director.

## CHAPTER THREE

### 3.0 DESCRIPTION OF THE PROJECT AREA – BASHNET SMALL TOWN

Bashnet is among the fast growing trading centers into small towns found in Babati District. Others are Magugu, Dareda and Gallapo. Bashnet small town is made up of 2 major villages of **“Bashnet”**(sometimes called **Bashanet**) and **“Long”** which are separated by the existing earth road. There are five sub villages in Long village namely; Qunya, Long, Endaw, Ayatango and Hilot. In Bashnet, there are also 5 sub-villages namely; Bashnet kati, Masakta, Tsaayo, Ayayae and Mandagew. Other trading centers /towns near Bashnet include: Dareda (9.0 miles / 14.4 km E), Dongobesh (11.4 miles / 18.3 km N/NW), Endasaki (14.8 miles / 23.8 km S/SE), Nangwa (16.7 miles / 26.9 km S), Katesh (20.2 miles / 32.5 km S), Bassotu (25.3 miles / 40.8 km W/SW), Mbulu (27.3 miles / 43.9 km N/NE), Haidom (28.1 miles / 45.2 km W/NW), Magugu (28.1 miles / 45.3 km E/NE)

### 3.1 POPULATION DISTRIBUTION

According to the information obtained from the District council by the survey done at the village level, the population was reported to be 3,821 at Bashnet and 2,809 habitats at Long with the average population growth rate of 2.7 per annum. Table 2 below shows the population estimates in comparison to the National 2002 census data.

Table 2: Population estimates

Area	Population estimates (year)	
	2002	2011
Bashnet	3,510	3,821
Long	2,305	2,809
	5,815	6,630

### 3.2 GEOGRAPHIC AND PHYSICAL FEATURES

Bashnet ST is located at 4°13'48" S and 35° 25' 12" E (Latitude: -4.23000, Longitude: 35.42000) about 57km from Babati town centre and is easily reached through earth road joined with a small piece of tarmac of about 7km (see location map). The town is located at an elevation of above 2000m a.m.s.l with mountains and valleys.

Bashnet small town occupies about 64km<sup>2</sup> and has approximately 19,087 citizens (2004 estimates). Most of its residents are permanent while few are temporary residents who come there for business, farming and markets purposes. There is slight high population in the town centre and less populated while getting to the outer skirts.

There are vegetation covers and plantations with food and cash crops. Few places especially those located distant from Bashnet small town are flat and can be suitable for dump site or sanitary landfill.

Fig 2: Map of Bashnet small town

### 3.3 CLIMATIC CONDITION

Two rainy seasons prevail in the Babati district: the short rains lasting from October to December and the long rains from February to May, accounting for an average annual rainfall of 750 mm. The wettest areas may receive up to 1200 mm, while the driest may get below 500 mm rainfall each year. The temperature averages 23.5°C, with the highlands being much cooler.

There are few and small streams of which most of them are seasonal and they dry up within a short time when rains stop. However, taking into account the flow directions of most rivers and where the proposed dump site is, the rivers may not have significant impact to the SLF when constructed and in full operation.

### 3.4 SOIL CHARACTERISTICS

The soil in Bashnet is mixed of clay and loose loam-clay that supports both cash and food crops to grow sparkingly. The same soil might also be suitable to support the proposed sanitary landfill though in some places, borrowing of soil might be needed to ensure compatibility of the area is secured for high performances of the SLF especially when compacted.

### 3.5 SOCIAL ECONOMIC SITUATION

The social dependency of Bashnet small town is mainly cash and food crop cultivation, animal husbandry (taking place at the outskirts of Qunya and Bashnet kati) and small trading.

The social structure and the standard of living result in an average of five people per household (*TAEES questionnaire survey, 2012*). Since then, there had been local solid waste collection and in few individuals, there had been composting to produce manure for farming purposes which indicates existence of waste management knowledge to few people and hence the facilitation role becomes to consolidate what has been missing. However, the total amount of solid waste generated in Bashnet had never been established and it is difficult to estimate such values because the statistics are not available.

Practical experience in Bashnet shows that there had been local sorting though not official since some residents have been sorting bottles, scrapers, plastics and glasses and reselling to local vendors from nearby towns of Arusha and Moshi or sometimes from Magugu small town located about 45.5km from Babati town.

Table 4: Social services at Bashnet

TYPE OF SERVICE	NUMBER
Primary school	1
Secondary School	1
Hospital	1

TYPE OF SERVICE	NUMBER
Mosque	2
Church	6
Dispensary	1
Market	1
Primary court	1
Butcher	1

(TAEs, 2012)

### 3.6 AVERAGE MONTHLY INCOME

Like most of the rural areas in Tanzania and as pre-described, Bashnet people depend much on agriculture making their income fluctuation depending on the season of the year. During the harvesting period the income of the people rises as residents sell crops and all other businesses done around the area gain customers. This period lasts for about three to four months then it drops as the expenditure to most of residents exceeds their income at this juncture. In average about 50% of the people gain the average monthly income between

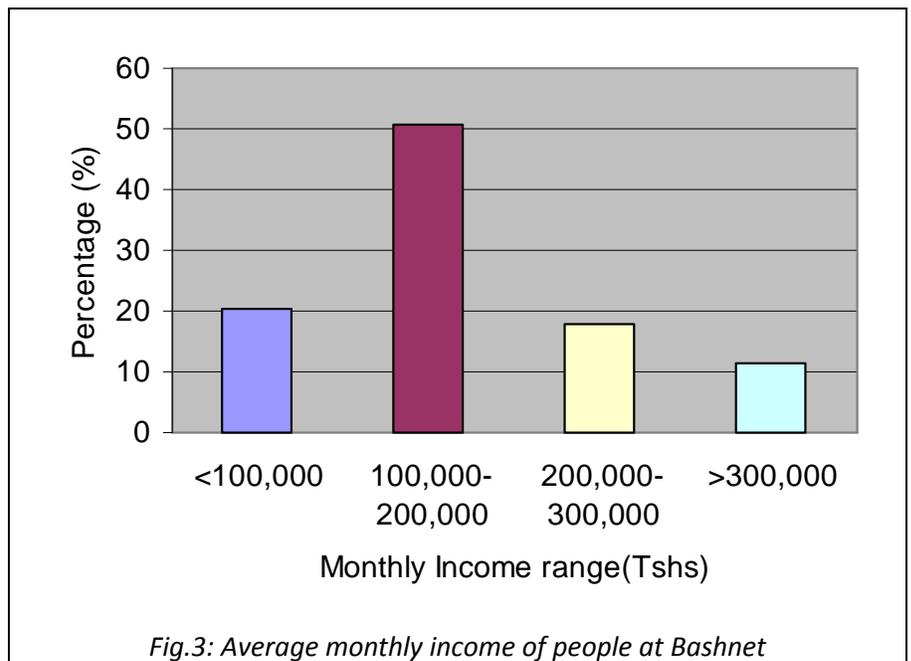


Fig.3: Average monthly income of people at Bashnet

Tshs.100, 000 to Tshs.200, 000 throughout the year (TAEs questionnaire survey, 2012).

# CHAPTER FOUR

## 4.0 DEVELOPING ISWM SYSTEM

### 4.1 INTRODUCTION

Integrated solid waste management (ISWM) can be referred to as the selection and application of the suitable techniques, technologies and management programs to achieve specific waste management objectives and goals

The basic strategy of the ISWM is to reduce the amount of wastes that is to be disposed of, where set to recycle energy (fuel) and fertilizer (nutrients) value of SW, increased rates of recovery and reuse of waste materials and limit the consumption of raw (virgin) materials

### 4.2 INTRODUCING ISWM CONCEPTS IN SMALL TOWN COMMUNITIES

In due course of developing this ISWM in small towns, the facilitation team used the following set of integrated waste management concepts with hope to open up some new opportunities in guiding the community planning process in Bashnet.

#### **Concept1 -- explore for waste value**

Solid waste only becomes "waste" when people lose sight of its value. Virtually, everything in the "waste stream" has residual value for someone or some business in any community. The key message to the ISWM planning team/peers and the community is, **find the value and redirect it back into the community**. Part of this process is to **find or create local markets** for reused, recycled, reprocessed or composted materials. Waste materials with residual value such as plastic bottles, broken glasses, scrapes, biodegradable wastes from domestic premises were identified to exist at Bashnet which justifies the potential of this ISWM concept.

#### **Concept2 -- Upstream approach**

If we think of solid waste as a flow of materials entering the community at different places, traveling through the community as they are used one or more times, and ending up in other places, we can use the analogy of a river or stream as training guide to expand community knowledge. Intercepting would-be a waste item as far "upstream" as possible after its initial use has several advantages:

- It often has more value left in it;
- It is usually cleaner & easier to re-use or recycle;
- Less energy has been wasted transporting it; and
- The original purchaser of the item has the first opportunity to re-use it.

In this way of looking at solid waste management, we try to **intercept each item as far upstream as possible**, redirecting it before it becomes defined as "waste." First owners of the item get the first chance to re-use it. Waste management becomes the

responsibility of each member of the community. The Bashnet community has same reusable and recyclable materials (plastic and glass bottles) that enter in the waste stream without treatment and loose value. However, the project intends to emphasize the reduction of waste from at point of generation.

### **Concept3 -- Use the ISWM hierarchy to retain value**

The Integrated Waste Management hierarchy gives us a systematic way to search for the value in that would-be waste item. For example, it suggests that re-using an item usually captures more value and saves more money than, say, burning it. In combination with concept2, we can systematically look at each component of the waste stream.

### **Concept4 -- Start where the community is**

Each community -- and each person, business, institution and local government in the community --has its own unique culture and way of looking at solid waste and its economy. Initially and before this project introduction, waste stream had no value to majority of Bashnet community. This project has become an eye opener to waste management concept after being introduced. The solid waste management process works best if it reflects both the values of the community and the local approach to waste management practices. Prior to project introduction, to a limited capacity, few individuals in Bashnet were involved in collection of scraps for recycling and using compost which has naturally decomposed at waste heaps.

Some communities may have specific waste issues on the table, such as toxic wastes, cost of disposal, tipping fees, flow control, meeting regulatory mandates, or controversial waste management technologies. The specific issue to Bashnet is flow control of waste, and lack of waste management technologies which are simple and affordable by local community.

Planners and community facilitators need to be sensitive to **what motivates each waste generator**, and **encourage innovative, localized solutions** during implementation of SW management project. What is thought here is to encourage sorting separation, recycling and reusing of waste materials with residual value before being disposed off together with proper composting methods at household and community level.

### **Concept5 -- Keep materials separated**

Mixing unlike solid wastes together often contaminates otherwise useful materials and reduces their value. It also causes additional processing to be done to re-separate the materials or items farther "downstream." Materials and items are often transported great distances and handled several times, wasting public funds which could better be used elsewhere. The project emphasize the separation of waste at source and encouraging community members to have at least two waste containers at each household so separate the degradable and non degradable wastes

### **Concept6 -- Minimize handling, transportation and processing**

This is related to concept2, 3 and 5. The earlier in the "waste stream" an article or material can be intercepted and returned or diverted to its next use, the more money

the community saves in hauling and handling costs -- including vehicle fuel and its polluting effects, labor, and equipment costs.

### **Concept7 -- Start with the low-tech, low-cost, flexible solutions**

People find it easier to participate in low-technology solid waste solutions. It is easier to visualize doing your part in a backyard or small-town composting operation than to send your garbage to a high-tech, regional incinerator in the Next County or city. Low-tech solutions usually cost less to put in place and less to abandon, dismantle, or alter if they are no longer viable. Citizens who have participated first hand in such solutions will learn their pros and cons, and may be better able to understand the need for higher tech and/or regional solutions at a later date.

The project seeks to emphasize the use of simple and affordable local technology such as digging waste pits for compositing degradable waste at household level as well as at dumpsite. Also, the project propagates the use of compost from waste for garden and farms as a way to utilize this concept.

### **Concept8 -- Measure results in a meaningful way**

Three guidelines of the "total quality" philosophy in business are "Measure, Measure, and Measure." In order to monitor the success of a rural community's solid waste management strategies, solid waste managers must first **measure results against the objectives the community intended to achieve**. Secondly, it must **measure the total costs and benefits in some agreed-upon way**. In a community whose primary motivation is to defer the siting of a new landfill, measuring reductions in compacted-in-place, buried waste may be the most appropriate and important measure of success. In a community which chooses to use solid waste management to create new jobs, the number of jobs created and the dollar value of materials and items recovered may be the most important measure. At the same time, the costs to the community of achieving their solid waste goals should not be ignored. This should be planned by community itself or be created by the working body on behalf of the community and be presented by SW working groups via community assemblies

In relation to Bashnet ISWM project, the logic framework has been prepared and Monitoring and evaluation before, during, and after project implementation will have to take place to identify the progress, performance, success, challenges and way forward during each project phase.

## **4.3 WHAT DO WE MEAN BY "BUSINESS DEVELOPMENT OR BUSINESS MODEL?"**

For the purposes of this guide, we use the term **business development** to refer to the process by which we are building the benefits of ISWM and waste reduction into urban economies. It includes:

- Creating new jobs related to waste reduction;
- Improving the profitability of businesses by means of reducing waste; and
- Using waste reduction as a tool for recruiting businesses and industries into the region.

These concepts are very important to ISWM and waste reduction because:

1. Business Development provides a financial incentive to reduce waste (i.e., a profit);
2. Business Development provides for highly-motivated application of the ISWM concepts--especially ISWM concept 1, "Search for Value," and concept 3, "Use the ISWM Hierarchy to Retain Value;"
3. Business Development builds waste reduction into the very economic "fabric" of the community;
4. Business Development helps to create jobs and to keep industries profitable; it helps industries to stay in the community and sometimes to expand;
5. It allows the local community which generates the waste to keep the value of the waste at home on the local economy rather than "leak" it out to the benefit of another state or county.
6. It translates what otherwise seems like a highly theoretical and perhaps idealistic concept (the ISWM hierarchy) into a very tangible form (jobs, profits, investments, tax revenues). Without Business Development, ISWM could be seen by some as just a "pie in the sky environmental goal;"

#### **4.4 ISWM AND COMMUNITY ECONOMY**

There are several ways to describe integrated waste management and its benefits. Perhaps the best way for our purposes to this project is to look at the effect of solid waste on the economy and environment of Bashnet community. The job creation and economic potential of ISWM stem from the following:

1. The economic value of recovered materials as re-usable products (either "as is," or through refurbishment) or as raw materials.
2. The opportunity for simpler, more decentralized sometimes more labor-intensive solid waste management solutions which can create jobs in rural communities. Such decentralized solutions often work better in more sparsely-populated, rural communities because they do not depend upon high population densities to achieve economies of scale (e.g., centralized solutions may be expensive in rural areas because of the long transport distances required to serve relatively few people. Community or backyard composting of yard, food, and other organic waste is often better suited to rural areas because it saves transportation costs of these heavy waste stream components over relatively longer distances than in urban areas).
3. Opportunities to intentionally create and recruit businesses and industries which use the waste streams of existing business as feedstock. Such arrangements can help to plug economic "leaks" from emerging urban communities. Such methods can be integrated into the strategies of local business development specialists, industrial recruiters, and existing industry managers.

4. The short-term and long-term economic value to emerging urban communities of avoided land filling. Benefits of this include:
  - o deferring expensive landfill construction processes,
  - o reducing annual operation and maintenance costs for existing landfills,
  - o reducing transportation costs to the community, and
  - o Reducing the rate at which successive cells of expensive new landfills must be developed and lined.

Generally, integrated solid waste management provides a new approach to solid waste. It seeks to keep products, the materials and energy embodied in their manufacture, and the by-products of their manufacture, in the productive part of the economy -- and out of the "waste" stream -- as long as possible, and to wring as much economic value out of them as possible before giving up on them as "waste." When this is done, the following happens:

1. Local and regional economies benefit by the continued exchange value of the reclaimed materials and products and the jobs created in reprocessing and reselling them;
2. Private businesses often find these materials a cheaper source of raw materials than virgin sources, especially when virgin materials are becoming scarce, more difficult to access, under more stringent regulatory controls, or must be shipped from far away.
3. It often takes less energy to reprocess or re-manufacture these reclaimed materials than raw materials, because of the energy already embodied in their original manufacture. This increases the value of these materials to industry, since energy savings in manufacturing can be added to the acquisition savings for a more competitive "bottom line."
4. National as well as global resource natural depletion is reduced, contributing to a more sustainable long term economy.
5. Local governments benefit through reduced cost of ultimate "disposal" of the materials because many would-be "waste" materials and products are diverted from their landfills for an extended period of time.
6. Pollution from landfills is reduced because many toxic or otherwise polluting materials are diverted from the landfills, and because the overall volume of land filled material is reduced.

#### **4.5 EXISTING SOLID WASTE MANAGEMENT SITUATION IN BASHNET**

There are no clear data to show the quantity of wastes produced at Bashnet in categorized manner for commercial planning. However, the waste management system in Bashnet is done in a traditional way and it has been used for a long time. It is

traditional in the sense that every individual collects the generated solid wastes at his/her own premises and either takes to the farms, burn/burrry the wastes in a small pit around the compound, thrown into the toilet pits or throws them anywhere just to get rid of the solid wastes near his/her compound.

#### 4.5.1 Generation

The waste generators and the types of wastes in Bashnet were identified during the physical observation, discussion with communities and field survey. At Bashnet town solid wastes are generated from domestic premises, commercial premises (Retail shops, timber, welding and motor workshops, Butcherries, Guest houses, Hotels, Market and small businesses) and Institutions (Schools, Offices, Dispensary, Hospital and Churches).

The SW from these generation points includes:

Decomposable wastes

- Organic wastes such as vegetable and fruit peels, leftover foodstuff etc
- Paper
- worn-out cloths
- Wood/timber pierces and sawdust
- Manure from animal zoos

Non-easily decomposable wastes

- Glass materials
- Plastic and nylon materials
- Scrapers
- Nails and wires
- Animal bones
- Tin cans
- Used electronic devices
- Worn shoes and clothes
- Tires
- Hairs
- Leather pieces

Hazardous wastes

- Old batteries
- Paint tins
- Clinical waste such as Old medicines, medicine bottles, used needles and cloth soiled with blood and other body fluids, outdated medicines
-

#### **4.5.2 Collection, treatment and Disposal**

During the study, the team discovered that each Solid waste generator uses different way to collect and treat SW.As observed in Bashnet, some SW generators collect their wastes and burn them near their premises or dump them crudely at various locations around the town. Generally, crude dumping was observed to be a common practice in the town causing nuisance as uncollected and dumped wastes are scattering in the surroundings and make the town look dirty..

There are no appropriate and well managed appointed waste collection points therefore, wastes were found to be thrown indiscriminately in most parts of Bashnet and Long streets which indicated that introduction of IWSM education has appropriately come to rescue the situation if well observed and adhered to.

*Plate 1: waste dumped near residential premises*

*Plate 2: An abandoned cage used as a dumping place near market area*

*Plate 3: Burning of the SW was identified as a major way used to get rid of wastes at Bashnet*

*Plate 4: Improper management of clinical wastes as they are collected and burnt in a pit near the dispensary*

So far, during this study, it was noted that there is no official land use plan that is in-place that has identified various areas for various uses such as sanitary landfill, public market, waste collection points or waste transfer stations, etc. But the government has identified the area at Endau (a nearby site located at about 6.6 kilometers from Bashnet) to be used for dumping all solid wastes generated from Bashnet. The area has been confirmed and approved by the Bashnet and Long government leaders and Waste management enterprise members who visited the area and made approval of the location, which was then confirmed by long community members in the general assembly held on 18<sup>th</sup> June 2012.

On the other hand, during administration the questionnaires, the Ward Health Officer (WHO) *Mr. Marcus Boa* reported that for the time being, he had been collaborating with the health and sanitation committees, the ward leadership and The primary court to enforce The public health act, 2009 environmental management act, 2004 and village bylaws (currently applicable) as a way in ensuring generated wastes are managed in Bashnet town.

#### **4.6 ACTIVITIES PERFORMED IN DEVELOPING ISWM MODEL FOR BASHNET**

In order to fulfill the project objectives for developing the ISWM model for Bashnet Small town, the following activities were planned and conducted:

1. Developing and promoting public awareness campaign on Integrated Solid Waste Management based on 3R principles through probe meetings with village leaders,

public meetings and trainings to formed WM groups. Meetings were set to meet village, potential community members who has influence and good image to the public and have convincing power so assist awareness and acceptance of the project by target community. 6 meetings were held, 2 at the beginning and 4 during course of project implementation. 3 public meetings were held 1 at the beginning to introduce the project concepts and its requirement including role of each stakeholders required by the project, the 2 public meetings were meant to sensitize project requirements, community involvements and selection of community members who were required to form the enterprise (initially was known as SWM-CBO). Thereafter followed by trainings as part of capacity building.

2. Gathering the social economic and waste management related data through questionnaire survey. Three samples of questionnaires were set, 1) to district council personnel to give the overview and their expectations and challenges therein. These also were split into several parts with respect to department and type of data required. Another questionnaire were set to gather information from local leaders and the last set of questionnaire was set to gather information from community members.
3. Identifying locations for the proposed transfer stations and other waste management facilities such as dumpsite to be included in the planning map. Various sites were visited for verification and confirmation if it meets required criteria to be suitable for being a transfer station or dumpsite. The Baraqusoo area at "**Guse**" village and area at Endau "sub village" of Long were visited to check suitability and qualification of being used as dumpsite (for the time being) and the team confirmed the Endau site to be qualifying for setting a dumpsite with regard to the nature of other areas visited. The responsibility of confirming by all community members were left in the hands of local leaders of Bashnet and Long.
4. Establishing waste management working groups with representation from all ten sub villages. 24 members were selected during public assembly which had equal representation from each "sub village". The representation was also balanced women and men on membership as well as leadership of the enterprise. The balance became 20 men (equivalent to 66.7%) and 10 women (equivalent to 33.3%).
5. Planning for improving the existing SWM system for the town and community level through developing WM regulations, Management and Claims models, identifying dumpsite area and strengthen public participation in the solid waste management efforts through trainings and meetings.
6. Locating an appropriate area for material recovery, waste treatment activities and disposal of the remaining wastes. Endau site was confirmed by various stakeholders including Long government leaders, SWM enterprise members and community members whose final meeting was held on 18<sup>th</sup> June 2012 to confirm officially the Endau site to be an official dumpsite.
7. Identification of markets for recovered or recycled materials through involving the formed waste management groups (WMGs), small scale vendors and community members.

In order to accommodate the purpose of ISWM, the following types of players are viewed to be part of the planned model to give its livelihood in Bashnet;-

- Waste Reduction Activists (WRA) - this comprises community members, scavengers and SWM-enterprise members who will be reducing waste volumes to be disposed off
- Recycling Coordinators (RC)
- Small Town Legislators (STL)- this includes Bashnet councilor, division secretary, Ward executive officer
- Local Politicians (LP) - councilor
- Nonprofits (e.g. CBOs) and their Staffs (CBOs)
- District Planners (DP)
- Informed and Active Citizens (I&AC)
- Private Recycling & Waste Disposal Companies (PR&WDC) - these can come from Babati, Arusha and Moshi centers to collect recyclable materials

The ISWM model however can interlink all players in simple or complex form depending how the activities coordinated and who is being invoiced and how is demonstrated in the chart below.

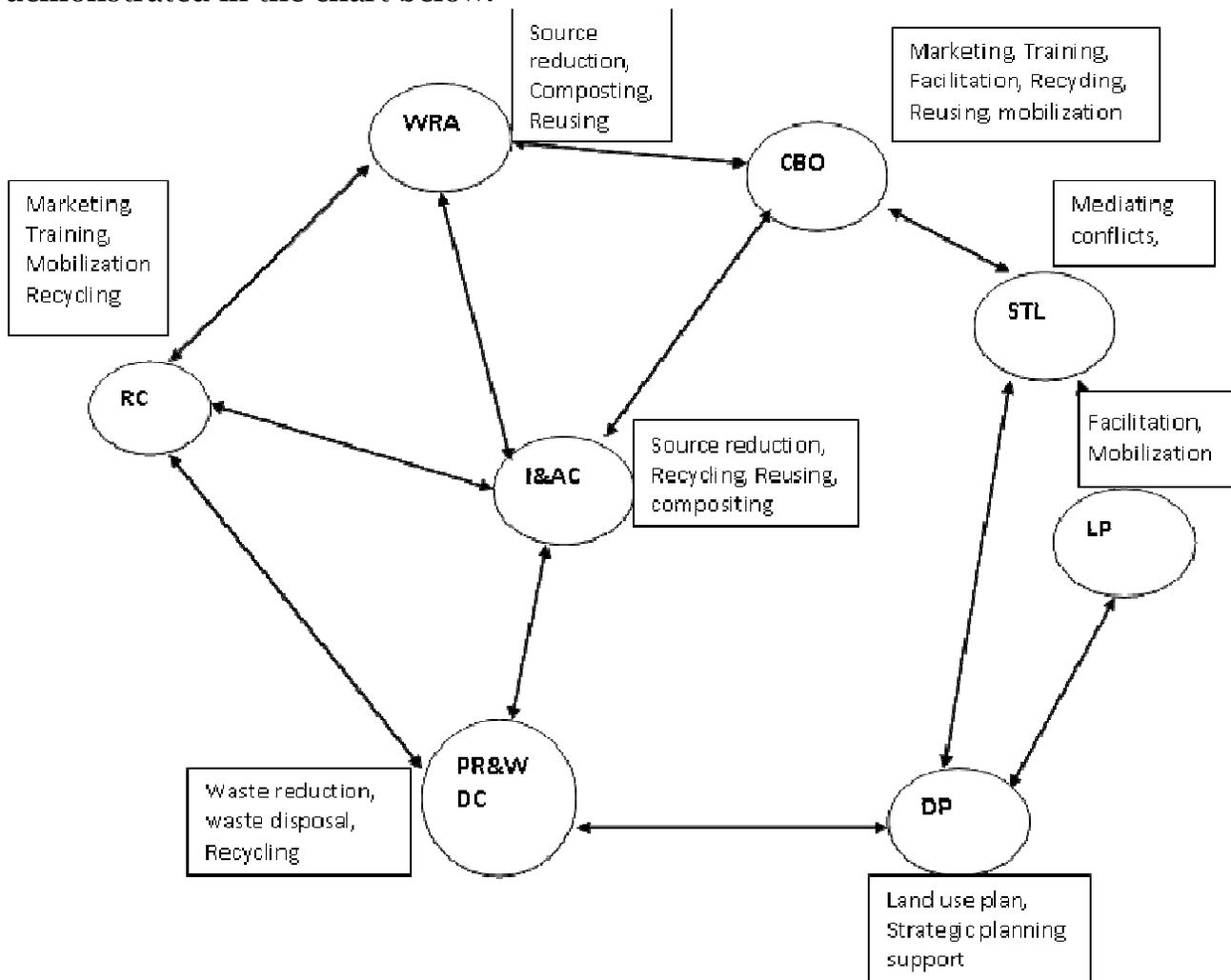


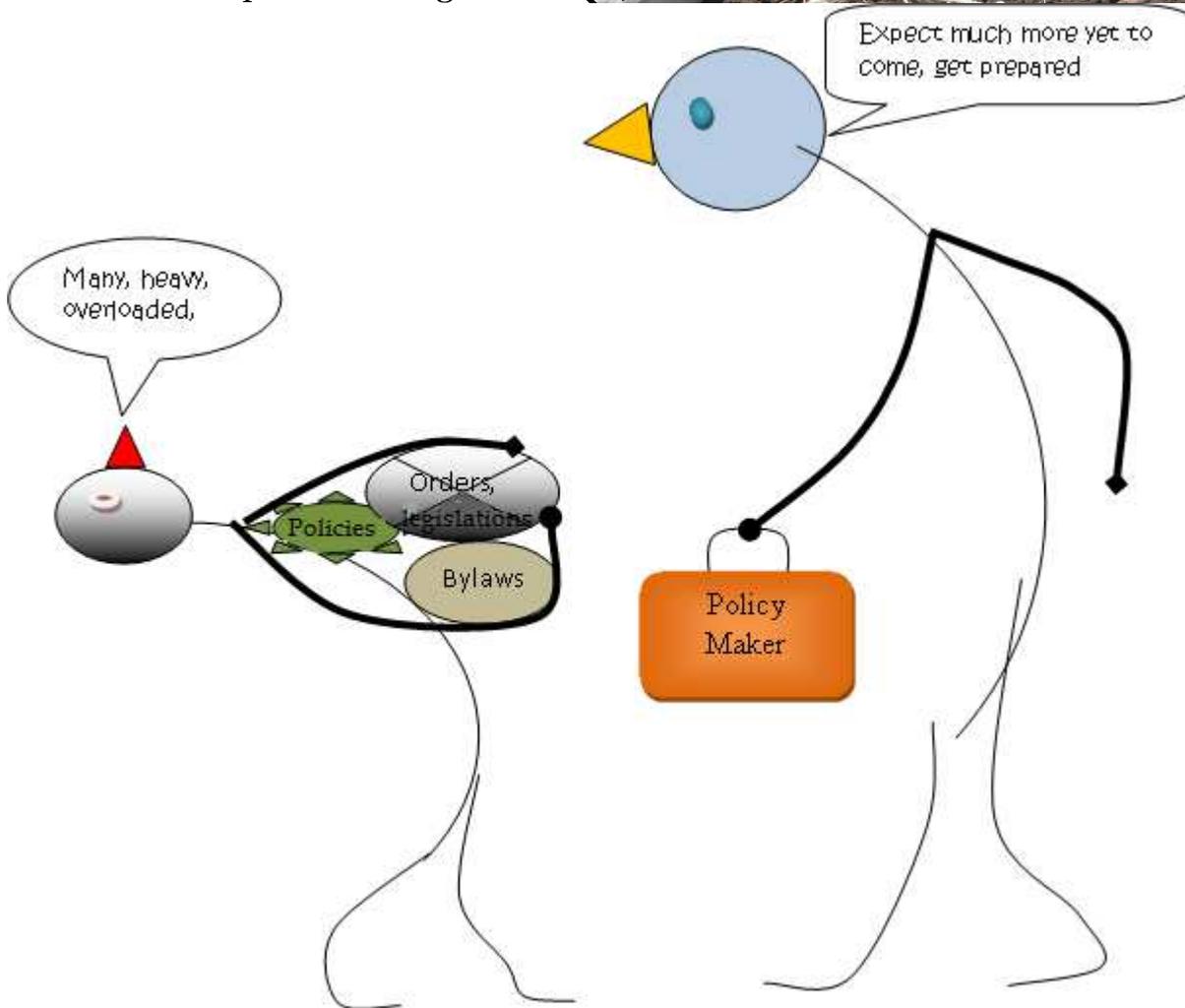
Fig.4: Relationship of ISWM stakeholders

Good involvement of these key players are vital to ensure that the model last longer from short term (1-2 years), medium term (3-5 years) to longer terms (6-10 years). Each player will have looped responsibilities that interlink with others as shown in the model above and the roles flow in each direction. This is an interrelationship of key players who will be involved in fostering integrated waste management. The development of this waste management model discourages the following old approaches and skills.

- "End-of-pipe" disposal or waste reduction methods which overlook the value inherent in solid waste;



- Top-down, secretive public decision making in an era of increasing public suspicion and right-to-know;



- Long-term, linear planning (including using the past to predict the future) in an era of rapid, unpredictable changes;
- Viewing solid waste management as a problem rather than as an opportunity; and
- Failing to link waste reduction to the local economy

Looking Bashnet in broad spectrum of waste management initiatives and the introduction of SWM initiatives with commercial basics, Bashnet as other rural community often face the turbulent solid waste arena with the added burdens of poverty, geographic isolation, limited local government staff resources, financial limitations, and other constraints. These to the other hand create limitations to have integrated waste management which is commercially based that doesn't look solid waste as rubbish but rather as a key milestone of employment and cash generation.

Taking all the above into considerations, a range of skills are required in order to meet the demands of the rapidly-evolving solid waste arena in the project area:

- A better understanding of **Integrated Waste Management** , with a particular emphasis on the top levels of the ISWM hierarchy;
- **Strategic thinking and planning**;
- **Public involvement** strategies;
- Improved **group problem-solving** at all levels;
- A **business development** mindset; and
- Openness to **district-regional approaches**.

## 4.7 ISWM MODEL COMPONENT

### 4.7.1 GENERATION

Various types of wastes are generated at Bashnet and they are all mixed and there is no sorting is done. Sources of generation include domestic, kiosks, market, shops, butchers, institutions (dispensary, schools, church and mosques). All these sources generate different types of wastes from hazardous wastes to quickly decomposable wastes

### 4.7.2 ONSITE PROCESSING

Some of the waste materials such as boxes, plastic bags, plastic water bottles and glass (beer & soda) bottles are reused on site and this reduces the amount of waste disposed-off in streets (for the time being). This habit to some extent has minimized the amount of waste that enters directly into the waste stream and hence minimized the amount of wastes to be collected at Bashnet town.

Decomposable wastes may be processed at point of generation to get manure. This can only be done by those who have enough area around their premises to dig waste disposal pits. Other wastes such as plastic and glass bottles are reused onsite until they lose their usability that is when they enter into waste stream.

### 4.7.3 COLLECTION AND STORAGE

Solid wastes shall be collected in a separate manner at the generation point and taken to the transfer stations around the project area. There are 15 and 16 transfer station locations identified in Qunya sub village (Long) and Bashnet kati sub village (Bashnet) respectively. The coordinates for the identified locations are as presented in table below. The waste management group members and village leaders proposed the following as a way of ISWM model implementation:

- The community members under household level will sort and collect their wastes at particular transfer stations near their neighborhood.
- Collected wastes shall be stored at the transfer stations for a shortest time as possible so as to reduce the risk of creating nuisance to the surrounding environment.
- The collected waste will be transferred to the processing sites three days a week which will be set by the working enterprise for both Long and Bashnet sides
- Decomposable and non-decomposable and hazardous wastes except for clinical wastes shall be collected in separate containers at transfer stations.
- Clinical wastes shall be collected and stored in safety boxes and transferred to Bashnet hospital incinerator.
- With time improvement, waste will be collected in three days a week specifically days well known to a waiting pull-cart or TOYO which will transfer the waste directly to the dumpsite for decomposition and correct disposal.

The proposed locations for collection/transfer stations with coordinates as were proposed Bashnet people (WM-CBO) during training and site visiting are listed in appendix I

### 4.7.4 TRANSFER AND TRANSPORTATION

The waste management group (WMG) members identified different facilities, equipment and resources required for transfer and transportation of the wastes from transfer stations to the processing /disposal area. These include:

- **Human resources:** a group of people who will be responsible for collecting waste from the collection points to the transfer point and later to the disposal site. However to start with, the group members will be responsible (voluntarily) to collect wastes from the collection/transfer stations so as to be able to identify the quantity of waste that needs to be dealt with. Also to know the number of people that shall be responsible for transfer of the wastes from the collection/transfer stations.

- **Community contribution to the SW services:** After a month of working team (CBO), they will be in a position to propose contributions for each waste generator in the area. The proposals will be presented and discussed at the village meeting together with the village leaders and community members for acceptance and endorsement.
- **Facilities and equipment:** in order to keep the ISWM programme moving forward, the responsible organ identified the following list of equipment to be of priorities for them to start working on waste management initiatives:- dustbins, gloves, wheelbarrows, rakes, carts, blooms, dust masks, boots, reflectors, overall/overcoats, store, power tiller/lorry and first aid kit.
- **ISWM awareness** to the CBO members and the community is vital for the change to proper management of waste and the successful model implementation.

#### 4.7.5 PROCESSING AND RECOVERY

Wastes from the transfer stations shall be transported to the processing/material recovery area before they are taken to the dumping area. At this point, all recyclable, reusable and processed materials shall be sorted and made available ready for the purpose. Most of the materials (such as glasses, bottles, plastic bags and scraps) are not easily processed in small scale like at household level; therefore, at this point is where the commercial idea of the model is expected to be seen at large.

Various technologies were suggested by the WMG members that can be applied in producing various products like the use plastic bags in making **paving blocks** and **cooking stove“jiko la ajabu”**, decomposing of biodegradable waste for **making compost**The table below shows types of wastes and identified processing/material recovery option.

The WMG shall sort the wastes and apply simple and appropriate processing or material recovery technologies and get products that can be used within or outside the project area. Some wastes (such as glasses, bottles, plastic bags and scraps) shall need to be transported and sold to the recycling/processing units in Arusha, Moshi, Dar es Salaam, Nairobi or elsewhere to the processing factories.

Table 6: Waste generated in Bashnet and technological treatment options proposed

Waste type	Processing technology/disposal	Product
Decomposable waste like organic wastes and papers	Collected in composting pits and composted for 4-6 months	Manure

Waste type	Processing technology/disposal	Product
Non Decomposable waste like glasses, scrapers, nails, wire, plastic bottles, cane, batteries and used electronic devices	collected and sorted ready to be sold for other uses/processing	Raw material for other processing factories
Bones, hones, hooves	collected and sorted ready to be sold for other uses/processing	Buttons, ornaments, glues,
Plastic materials	Collected to be processed at site (collected plastic bags will be heated and mixed and stirred with of sand in equal weight proportions i.e. 1:1, to make moulds that is used as paving blocks	paving blocks
Medical and hazardous wastes	To be collected and transported to Bashnet hospital for incineration	-
Worn shoes and clothes and tires, , hair, leather pieces	To be collected and transported to dumpsite area waiting for appropriate disposal option	-
Bodies of dead animals	To be buried at the dumpsite area	Manure
Waste from abattoirs (eg. Bones, horns and hooves)	To be crushed and be used as animal feed To be used to make buttons, decorations, etc	Animal feed, Cloth buttons

#### 4.7.6 SAFE DISPOSAL

The wastes from the processing activities and wastes that shall not be able to follow this stream shall be taken to the controlled sanitary landfill or dumpsite or incinerator for their disposal. In this case, if all teams work well, there shall be small quantity of wastes (actual measurement shall take place in phase II) to be disposed-off as the 3R principle will be applicable and the WMG shall generate income from the waste management activities.

## 4.8 IMPLEMENTATION METHODOLOGY

### 4.8.1 Developing ISWM MODEL

The model was developed by the representatives chosen from all sub villages constituted in the two villages of Bashnet and Long together (names attached) with their village leaders and the facilitators from TAEs. The model considered the management of the waste from the generation point, through the SWM hierarchy to the disposal point. The model considered deeply the value of reusing, recycling, composting and volume reduction such as incineration to some hazardous wastes that would otherwise go directly to landfill prior to pretreatment. With an exception of hazardous wastes, the rest of the wastes were tested “learn by doing and seeing” as part of pilot training.

### 4.8.2 Knowing Integrated Solid Waste Management Hierarchy

During training, it was noted to trainees that people should take note that the very highest option in the hierarchy is, “*don't create the solid waste in the first place*”, and is termed “**source reduction**.” Source reduction can be done in several ways:

- Manufacturing processes can be devised which create fewer or less toxic waste by-products;
- Consumers can choose not to purchase products with excessive packaging; or
- Consumers can choose not to purchase products which are unnecessary “luxuries,” which require unjustifiably large amounts of energy or natural resources to manufacture, or which cause toxic waste problems in manufacture, use, or disposal.

Out of all the above, Bashnet people are trained to choose not to purchase products with excessive packaging to reduce the volume of waste generated in the area.

The other higher level ISWM options are (in order):

**Reuse** -- The use of a product more than once in its same form for the same or similar purpose. Bashnet people were found reusing water bottles, plastic bags and boxes

**Recycling** -- The process, by which materials otherwise destined for disposal are collected, processed, remanufactured into the same or different product, and purchased as new products.

**Composting** --The controlled process whereby organic materials are biologically broken-down and converted into a stabilized humus material.

Materials retain their value for longer periods of time if they are handled within these “top four” levels of the ISWM hierarchy. One resident in Bashnet was found practicing composting wastes and takes the products to his farm to grow farm crops from time to time.

The following ISWM hierarchy was taught during developing the SWM commercial model in Bashnet

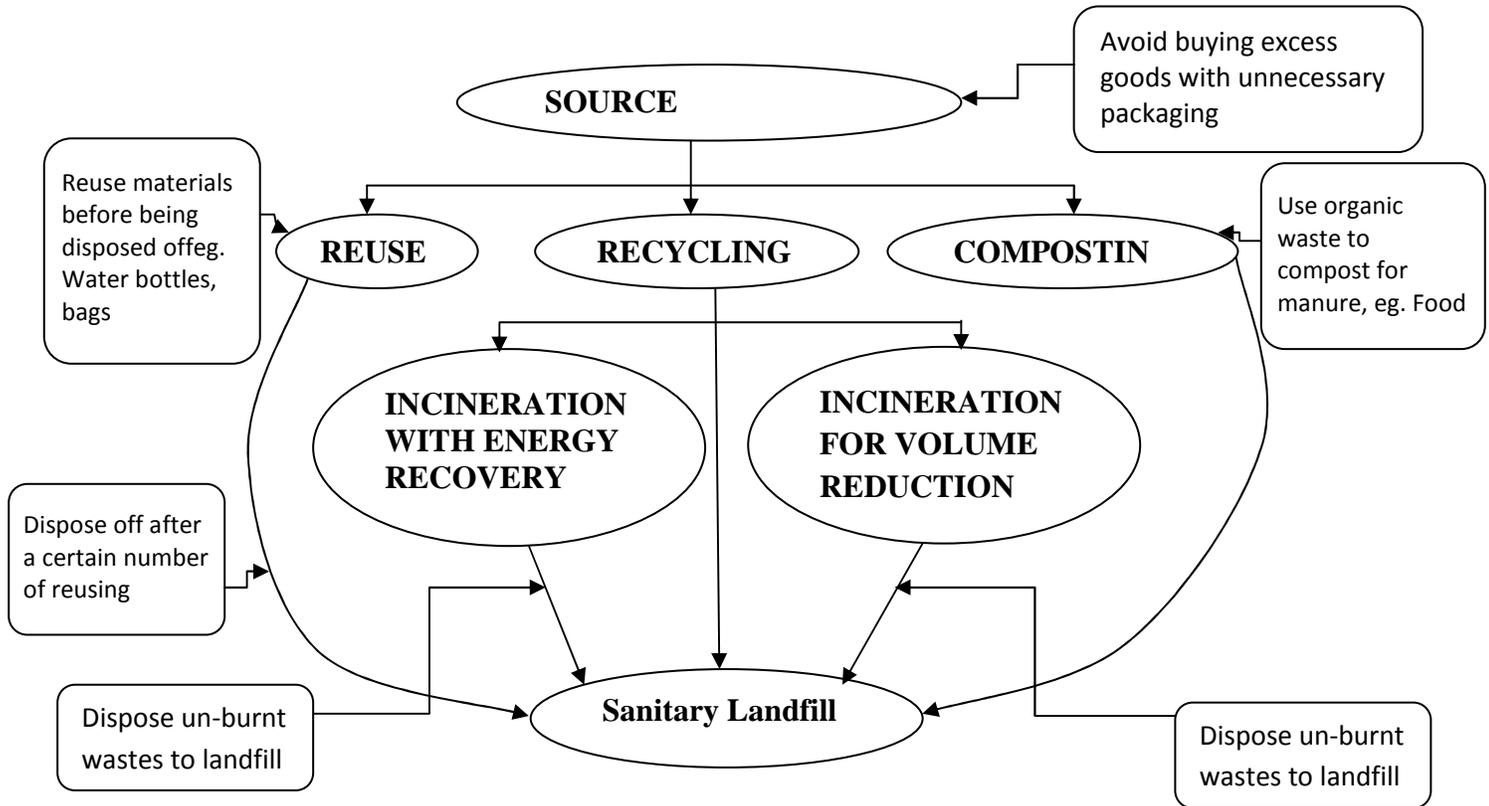


Fig.5: Waste flow

#### 4.8.3 PICTORIAL REPRESENTATION OF THE BASHNETI ISWM MODEL

The following model has been shared with Bashnet CBO and is to be share with community members in village assembly after having shared with other stakeholders and shared the challenges and impact of each category proposed

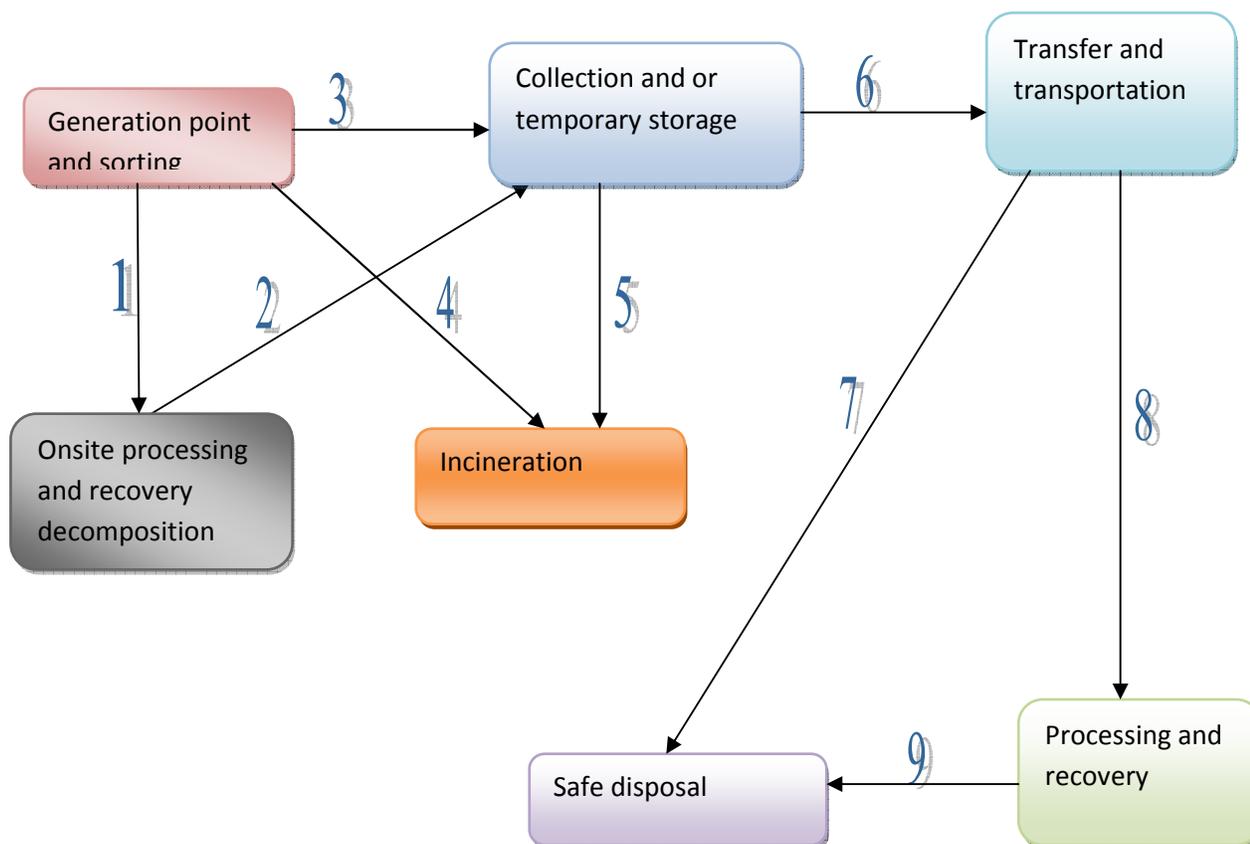


Fig.6: Pictorial presentation of the model

### **Legend**

1. Wastes that can be processed/recovered at the generation point (small scale processing/recovery at household level)
2. Residential wastes from processing and recovery activities at the generation point
3. Wastes that cannot be processed at generation point
4. Wastes from hospital or dispensary that cannot be stored are taken to an incinerator
5. Hazardous wastes that are not rapidly decomposable (injection, drug bottles) are collected and taken to incinerator
6. Wastes collected and separated according to their nature
7. Collected wastes that can be processed in large scale at project site
8. Collected wastes that cannot be processed at project site
9. Residual wastes from processing/recovery activities

### **4.9 MANAGEMENT SETUP FOR THE KEY PLAYERS IN THE ISWM MODEL**

Management hierarchy for the model implementation starts from the community at household level to the LGA through involvement of all other stakeholders at Bashnet small town and Babati District as a whole. The detail of this model has been separately presented in more details. See annex A

#### **4.10 Bylaws and Guidelines for ISWM for Bashnet Town**

The model shall operate under the simplified guidelines rules which have been zoomed from the existing village bylaw made under the local government act No.7 of 1982 cap 163. The village bylaw shall remain as a mother law to guide all undertakings while these guidelines will be updated according to demand, time and needful requirement to suite the existing environment.

A separate working regulations document (annex B) has been presented to Bashnet community including village leaders, SWM enterprise and district council for review and approval and finally will start working and supervision of the implantation.

## CHAPTER FIVE

### 5.0 PROJECT FINDINGS

#### 5.1 Waste as a business

During scoping study, it was noted that there is an opportunities that can be utilized by the Bashnet people to turn SW into business. Such business opportunities are hereby detailed:-

1. Availability of roaming trucks collecting scrapers of which 1kg is sold Tsh.200. after collection, they are taken to be sold in Arusha and Moshi where there are recycling industries. On the other hand, there is also a collection godown in Magugu where scrapes are collected and transported to Arusha and Moshi towns.
2. There are also vehicles moving around collecting used bottle water in Babati as well as other towns including Bashnet which creates opportunities to turn the bottle water into recycling business.
3. In Babati town there are business people who do collect broken bottles and glasses which are thereafter sold. This in the other hand turns into business opportunities to people in Bashnet.
4. At Bashnet, there are people already decomposing the generated wastes from their homestead and thereafter take the manure to their farms.

#### 5.2 Prevailing gaps

- i. Among the gaps, it has been noted during scoping that planning has been done only for a small part of town and the rest is not planned. However, todate, title deed haven't been given out and still people are complaining about this and there is a feeling that they have been conned by the district council. A serious gap here has been note that people haven't been given a feedback over where the process has reached and what is holding them behind.
- ii. There are limited access roads to the whole town of which few have been surveyed
- iii. It was noted that there are no transfer stations, only a crude dump exist of which wastes are never removed
- iv. It was noted that there is low economy to majority of community members of which majority depend on seasonal economy and animal husbandly
- v. There is no proper bus station which has forced them to pack along the roadside
- vi. Solid waste is not a very serious problem as houses are scattered and many have available land where they can do composting of waste at homestead.

### 5.3 Project Opportunities

The following have been identified to be opportunities towards the initiatives to integrated solid waste management in Bashnet small town

- There is awareness among the community members over solid waste management
- Citizens of Bashnet are aware over the waste mismanagement problem and are willing to cooperate to overcome the problem since they have already local base which is operating in collection of waste
- There is leadership which is willing to support the project as could have compared to Gallapo small town
- Leaders are cooperate and willing to cooperate with project working team in the establishment of the system which will perform the activity
- Availability of land (*though not free land*)
- SW is a real problem in the area since there are no collection points which are well planned and established in place.
- There is an available composting initiatives
- Some people are already using composted wastes manure in their farms
- Still the town is small and not well developed an hence has opportunity to be planned at early stages
- Bashnet is still a developing town therefore its good and well to establish solid management initiatives where young generation with grow with it.
- There is an availability of welders who can use scraps (reuse)

### 5.4 Identified Challenges

- The small town hasn't been officially inaugurated and hence current leadership setup still uses village setup instead of streets/urban setup and this still has a lot of arguments in it
- There is no free available land that can be commissioned for sanitary land fill unless someone volunteers to give his/her area for the purpose
- There is no specific demarcation of boundaries for streets have been made so far todate which might also create hardship to roll the project from centre to the outer-skirts. This might stimulate another component of preparing land use plan of the area whereas the sanitary landfill will be identified and demarcated.

### 5.6 Future planning for model implementation

#### 5. 6.1 Short, Medium and Long term plans

The short, medium and long term plans will be accomplished during stakeholders' presentation that will have to be done in Bashnet and WA

Short team plans (1-2 years)	Medium term plans (3-5 years)	Long terms plans (6-10 years)
Preparation of land use plan	Consolidation of LUP into	Construction of sanitary land

(LUP)	activities	fill
Separation of waste at householder level	Establishment and consolidated collection points and transfer stations	Purchase of working tools/equipment to collect waste to sanitary landfill
Recycling of waste through selling recyclable materials to recycling companies	Developing gardens at dumpsite and uses of compost for raising vegetables	
Purchase of working gears e.g gloves, gunboats, overcoats, etc		
Starting paying for waste collection services after 3months of project implementation		
Composting waste at household level and preparation of vegetable garden		

*Note: see detailed implementation/operation plan in annex C*

## CHAPTER SEVEN

### 7.0 CONCLUSION AND RECOMMENDATION

#### 7.1 Conclusion

The integrated solid waste management project is of paramount importance not only to the Bashnet people but rather to all growing small towns. This will create the initial settings to young and inborn children so that they inherit and grow with the waste management concept in their mind and hence support to improve people's livelihood and reduce any diseases that erupts due to accumulated waste and unclean environment.

The integrated waste management is hereby spelt to encompass business concept whereby instead of people seeing wastes as garbage they should see wastes as a source of employment, and income earning.

Performance management of ISWM is bestowed to waste management CBO which was formed in February 2012 with 24 people which will thereafter divide into six zones each bearing 4 people to enhance effectiveness and efficiency of the waste management initiatives. The implementation of action plan will mark success initiatives the business model which will enable people to utilize solid waste as a resource and not as '*wastes*'.

Te nature of solid wastes produced in this area entails the need for the project existence and promises success if well adhered by project beneficiaries. Commitment and willingness to support the project through collecting, sorting, paying for the services, etc will spearhead to long term existence and success of this project.

Continuous follow-up, capacity building and enhancement of project activities through training will continue building stronger the working team (WM-CBO) in Bashnet and this will facilitate getting promising positive results towards desired future of Bashnet small town.

#### 7.2 Recommendation

Integrated solid waste management adaption is time based process that needs a close follow-up and continuous training for capacity building. Viability of the project lies within a sustainability framework having full support from community and formed CBOs that fully engage in supporting the project implementation by both in-kind and in-cash contribution to sustain the project.

Local government support from district, village government as well as from other stakeholders is of vital value for project sustainability.

## REFERENCES

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Assessment of current waste management system and gaps therein: UNEP, 2009
- Integrated solid waste management for rural areas; a planning toolkit for solid  
waste managers: by Jim S & Elizabeth T, 1995
- Integrated solid waste management training guide; Eco Governance, Oct. 2004

## Annex A: Proposed locations for collection/transfer stations

<b>Qunya - Long village</b>				
<b>Point No.</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Elevation</b>	<b>Name</b>
1	-4.226900	35.427676	2119	Zuberimrefu/Plukti
2	-4.226464	35.428422	2129	Mahakamani
3	-4.222093	35.427787	2110	Safari Qwarsan
4	-4.225709	35.427231	2118	Tanu
5	-4.224700	35.426633	2111	Lusiani Tomas
6	-4.223839	35.427009	2107	MihindiMandoo
7	-4.223208	35.426539	2103	Hando Wema
8	-4.223373	35.425819	2103	Seja
9	-4.223705	35.426423	2105	January Daati
10	-4.222818	35.427078	2105	Dangati Peter
11	-4.220573	35.425378	2096	Maiko Kwaslema
12	-4.222045	35.425635	2095	MwalimuPanga
13	-4.222388	35.428805	2115	Paulo Kirway
14	-4.225155	35.427958	2119	Bashnet P/S
15	-4.222206	35.426356	2102	Andrea Masinda
<b>Bashnet Kati- Bashnet village</b>				
<b>Point No.</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Elevation</b>	<b>Name</b>
1	-4.225155	35.425200	2103	BohayBaata
2	-4.226355	35.425729	2105	John Awe
3	-4.225692	35.426583	2113	Fanueli
4	-4.225034	35.426265	2110	John Lori ( Nyumbayakijiji)
5	-4.227380	35.427155	2112	LuliaLapia
6	-4.222458	35.423547	2093	Paulo Longini
7	-4.222411	35.424300	2094	Martin Laurent
8	-4.220007	35.424467	2090	Myunga/Mnadani
9	-4.224128	35.424084	2100	SokoKuu
10	-4.226978	35.425659	2106	DeoMughesha
11	-4.226900	35.426631	2112	Lohay
12	-4.228825	35.427313	2120	Ofisi/Kanisa TAG
13	-4.235259	35.427243	2123	Masabeda Sec
14	-4.223023	35.425080	2100	John Dawaas
15	-4.223125	35.424081	2099	Abraham Mlundi
16	-4.226215	35.427034	2116	Silivini

## Annex B: LIST OF SWM-ENTERPRISE MEMBERS

<b>CBO MEMBERS FROM BASHNET</b>				
<b>S/N</b>	<b>NAME</b>	<b>SEX</b>	<b>DESIGNATION</b>	<b>SUB-VILLAGE</b>
1	ANNASTAZIA NICOLAUS	F	TREASURER	BASHNET KATI
2	FLORENTINA PAULO	F	SECRETARY	-----//-----
3	MASONG NADA	M	MEMBER	-----//-----
4	MARTINA NG'ADI	F	MEMBER	-----//-----
5	RAPAE ER	M	MEMBER	MASAKTA
6	MARTINA PAULO	F	MEMBER	-----//-----
7	ALEX QAMBESH	M	MEMBER	TSAAYO
8	ANTONI SHAURI	M	MEMBER	-----//-----
9	JAMES BERNARD	M	MEMBER	AYAYAE
10	LONGINI BURAN	M	MEMBER	-----//-----
11	MARTINA JACOB	F	MEMBER	MANDAGEW
12	DAMIANO SAQWELI	M	MEMBER	-----//-----

<b>CBO MEMBERS FROM LONG</b>				
<b>S/N</b>	<b>NAME</b>	<b>SEX</b>	<b>DESIGNATION</b>	<b>SUB-VILLAGE</b>
1	MARCELI SLAA	M	CHAIRPERSON	LONG
2	JOHN UMHE	M	MEMBER	-----//-----
3	FIDELIS BAYO	M	MEMBER	QUNYA
4	SAIDI NADA	M	MEMBER	-----//-----
5	SOFIA LOHAY	F	MEMBER	-----//-----
6	SIRILA JUST	F	MEMBER	-----//-----
7	JOHN DAMIANO	M	MEMBER	HILOT
8	SELINA DARABI	F	MEMBER	-----//-----

9	CAPTOLINA AMHE	F	MEMBER	AYATANGO
10	PAULO JONH	M	MEMBER	-----//-----
11	AGNES MESHACK	F	MEMBER	ENDAW
12	DANIEL QOLI	M	MEMBER	-----//-----

**Annex C: Project Implementation Plan (PIP/AP), 2012 by SWM enterprise**

No.	Activity	Time frame	Responsible	Requirements	Expected Outcome	Indicators
1.	Continue raising awareness to community on ISWM and Model operation	Continuous for April to June and repeated quarterly for 2 consecutive years up to 2014	TAEs team supported by LGA, WM-CBO and village/ward leaders	Training materials and demonstration tools/models, study tours (field visits)	<ul style="list-style-type: none"> <li>Increased awareness on waste management in the area</li> <li>Proper usage of working tools installed in project area</li> </ul>	<ul style="list-style-type: none"> <li>Waste are dumped in waste bins</li> <li>Availability and proper usability of the dustbins</li> </ul>
2.	Acquiring land for SW processing and disposal	25/03 - 20/04/2012	VEO with support from Village and ward leaders	Village meeting	Acquired land for continuous processing of wastes	Acquired land
3.	Preparing transfer stations for processing activities e.g. to dig composting pits,	23 - 28/04/2012	WM-CBO with support from Village/ward council and community members	Working tools e.g gumboots, rain coats, rakes, wheel barrows, slashers, pangas, hoes, transportation mean and wages for manpower	The areas shall be ready to be used as transfer stations and processing purposes. Processing and material recovery activities to commence	<ul style="list-style-type: none"> <li>waste processing underway,</li> <li>transfer station settled,</li> <li>Dug pits</li> </ul>
4.	General cleanliness of the town to create “zero ground” for the project implementation	15 - 19/05/2012	WM-CBO with support from Village/ward leaders, LGA, community members, TAEs, WA	Working tools and manpower	All scattering wastes are removed from the town premises and taken to the processing or controlled dumping area.	Available dustbins, continuous proper usage of dustbins,
	Initial Waste collection activities starts	Three times per week from 24/05-22/06/2012	WM-CBO with support from community	Working tools and manpower	Wastes are collected from the collection	<ul style="list-style-type: none"> <li>Waste processing in progress</li> <li>Processing centre</li> </ul>

No.	Activity	Time frame	Responsible	Requirements	Expected Outcome	Indicators
			members		points and sent to the processing area.	<ul style="list-style-type: none"> <li>established</li> <li>Transfer station established</li> <li>Dumpsite established</li> </ul>
	Waste collection activities continues	Three times per week from 26/06/2012 onwards	WM-CBO with support from community members grouped into working zones of 4 people per zone	Working tools and manpower	Wastes are collected from the collection points and sent to the processing area.	<ul style="list-style-type: none"> <li>Waste processing in progress</li> <li>Processing centre established</li> <li>Transfer station established</li> <li>Dumpsite established</li> </ul>
6.	Waste processing activities	Continuous From 15/05/2012	WM-CBO	Manpower and working tools	Composting at large scale, separation of the wastes for material recovery activities commences	<ul style="list-style-type: none"> <li>Availability of composite manure generated from solid waste,</li> <li>continuous composting activities,</li> <li>sorting of waste products,</li> <li>available collection points for bottles, cans, broken glasses</li> </ul>
7.	Collection of the monthly contributions for SWM services from the community members	Continuous from 01/06/2012	Community members, Village/ward leaders and WM-CBO	Receipts for payments, collectors,	The community members are willing to contribute for the SWM activities	Available paid receipts