

Programme Solid Waste NAMA - Peru  
“Programme for Supporting Up-scaled Mitigation Action  
in Peru’s Solid Waste Sector”

**Report:**  
**Diagnosis of Solid Waste in Peru**



**EXECUTIVE SUMMARY**

Lima, 18.12.2013

**Programme Solid Waste NAMA - Peru**  
**“Programme for Supporting Up-scaled Mitigation Action**  
**in Peru’s Solid Waste Sector”**

**Note:** *This document has been approved in terms of its technical aspects, but do not necessarily represent the official point of view of the Directorate General of Environmental Quality of MINAM.*

## EXECUTIVE SUMMARY AND CONCLUSIONS

Supported by the Nordic Environment Finance Corporation (NEFCO) and the Nordic working group for global climate negotiations (NOAK), the Peruvian Ministry of Environment (MINAM) is implementing the Programme “Solid Waste NAMA- Peru” which is being executed during the period from 2013 to 2015 by the consortium composed of NIRAS (Denmark), Perspectives Climate Change (Germany), ECO Consultorias e Ingenieria (Peru), Miranda & Amado Abogados (Peru) and the Pontificia Universidad Catolica del Peru (PUCP) (Peru).

The present report hereby named "Diagnosis of Solid Waste in Peru" comprises aspects from generation, composition and management of **Municipal Solid Waste (MSW)** at national level, in order to establish an analysis of current situation of MSW in Peru and generate inputs for the estimation of Green House Gas (GHG) of the sector.

It should be pointed out that current diagnosis does not include GHG emissions data yet.

### Methodology

The diagnosis **is focused on MSW generated in urban sectors** because in rural sectors, which represent 24% of country's population, there is almost no waste collection service and only prevail disperse final disposal which is little relevant in terms of GHG emission. The study **does not include** Non Municipal Solid Waste (NMSW) such as waste from industries, agribusiness, mining, liquids, construction or hazardous waste (hospital or industrial waste).

In order to elaborate the diagnosis, 156 interviews were conducted to municipalities outside Metropolitan Lima, there were visits to 08 regions of the country, execution of 03 characterization studies for solid waste (ECSR, in Spanish) in three different climatic areas, visit to disposal sites and other facilities, interviews with representatives of authorities and private sectors, among others.

Besides, 98 characterization studies for solid waste were analyzed, along with 45 Municipal Solid Waste Management Plans, 34 Integrated Plans for Solid Waste Environmental Management (PIGARS, in Spanish), 148 Public Investment Projects (PIP), as well as technical studies of solid waste management projects and the consolidated data base of the Solid Waste Management Monitoring System (SIGERSOL), in addition to the “National Reports on Municipal and Non Municipal Solid Waste” elaborated by the Ministry of Environment, among other available studies or documents. Those analyzed sources of information represent coverage **of 81% of the urban population at national level**.

The data of waste generation and composition extracted from those studies were placed along with the population data in a matrix with the 1838 districts of the country, where the values were interpolated and weighted upon obtaining reliable figures for each of the districts by year 2012.

## Generation and composition of municipal solid waste

By 2012, Peru counted with approximately 30 million of inhabitants, from where 23 million lived in cities (urban population), representing 76% of total population. The quantity of waste generated in the urban areas is summarized in the following table.

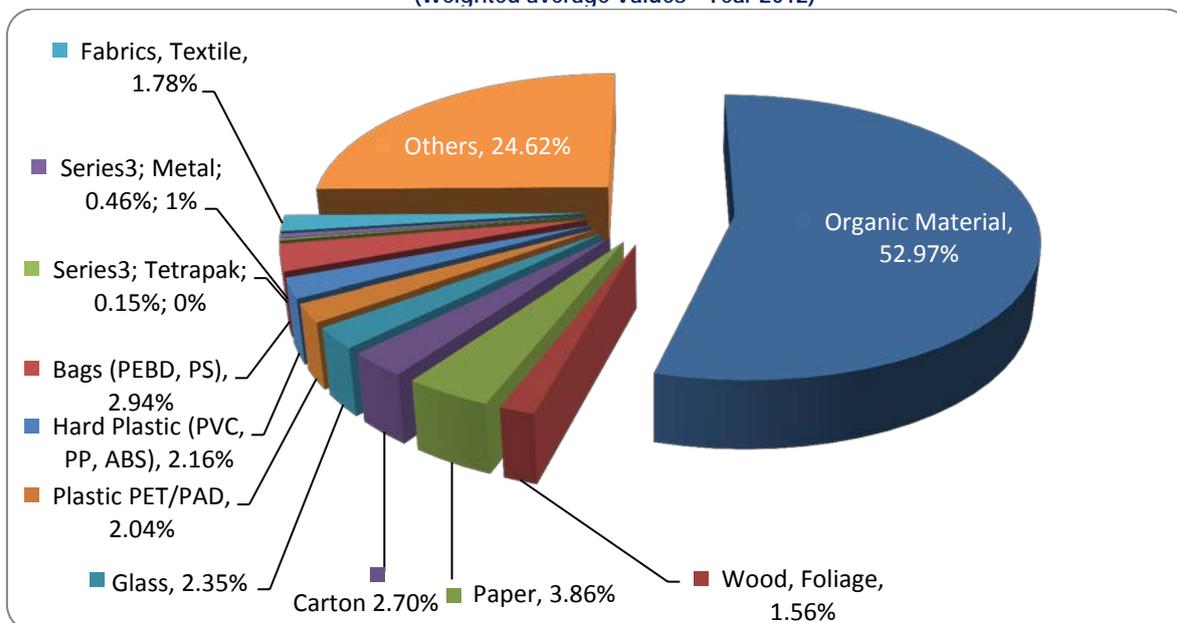
Table 1: Quantities of municipal solid waste generated in urban areas of Peru (Average weighted Values - Year 2012)

Municipal Solid Waste (MSW)	Household Solid Waste (RSD, in Spanish)	Non-Household Solid Waste (RSND, in Spanish)
0.83 kg/inhabitant/day	0.56 kg/inhabitant/day	0.27 kg/inhabitant/day
7,030,000 ton/year	4,740,000 ton/year	2,290,000 ton/year
100%	67%	33%

Lima Metropolitan Area generates approximately 41% of total municipal solid waste generated by the urban population of the country.

The **composition** of municipal solid waste (weighted average of the country) is shown in the following illustration.

Illustration 1:  
Composition of the municipal solid waste generated in urban areas of Peru (Weighted average Values - Year 2012)



Summarizing, MSW contains 53.0% of organic material, 6.6% of paper and carton, 7.1 % of plastics, 2.4% of glass, and 0.5% of metals.

## Sanitary Landfills and Dumpsites

Nowadays, there are **8 sanitary landfills** in the country, which receive around 38% of the MSW generated in the urban areas of the country. Four of them are located in Lima-Callao, one in the region Junin, two in region Ancash and other one in Cajamarca. **Two operative landfills and one closed landfill count with registered CDM projects, the others have passive capture chimneys and gas burning.**

On the other hand, the presence of **30 dumpsites** was counted in 43 cities with high population density outside Lima-Callao. From them, the quantity of dumpsites that count with some kind of management, such as compaction and daily waste coverage are not well known.

According to the survey applied to 156 districts outside Metropolitan Lima, 21 dumpsites have **gas capture chimneys**, from where 8 of them burn the gas. On the other side, it was determined that the majority of the **small dumpsites** related to cities with less than 10,000 inhabitants have a waste layer height of less than 5 meters, thus they are not considered less relevant for methane gas or GHG generation.

## Collection

Regarding waste **collection**, a **coverage** of 85% of the generated municipal solid waste in urban areas was determined for 2012.

## Recycling (dry materials)

At country level, it is supposed that approximately 14% of recyclable waste is recovered by waste pickers (informal and formals), which is equivalent to a recycling rate of 2.5% of total MSW.

Regarding the Programme for Separation at the Source (formal recycling), and according to official data, by 2012 205 municipalities participated and recovered an average of 9,020 tons of recyclable waste per month. This recovered quantity equals almost 9% of recyclable waste or a recycling rate of 1.5% of total SWM.

On the other hand, according to the survey applied to 156 districts outside Metropolitan Lima, 93 of them participate in recycling programmes, which as average achieve recycling rates only of 0.7% of total MSW.

As consequence, the recovery of recyclable municipal solid waste in the country is mainly due to the informal sector; however, the recycling rate in global terms is relatively low.

## Biological and energetic process

Although 53% of MSW is organic, only around 1% of total MSW is composting in those districts that count with composting plants, which were only 25 from 156 surveyed. The existent plants are generally related to the garden centres of the municipalities. Regarding the projected plants, the majority of them correspond to **relatively small flows**, such as the case of the "National Solid Waste Program", that only foresees to compost waste coming from markets.

On the other hand, there are **nor mechanical-biological (MBT) neither biodigestion** treatment plants related to municipal solid waste; however there are two MBT plants projected in Pucallpa and Arequipa.

It should be pointed out that no **incineration plant and/or waste to energy** plant, existent or projected, related to municipal solid waste was detected.

### Projects and conclusions

Currently, there are many **programs and initiatives, especially for the construction of sanitary landfills**, many of them even with **recycling plants** and small **composting plants**, which are already approved and count with financing (JICA, IDB, KfW, Swiss cooperation, private companies), thus its implementation in short to medium term is expected. **These projects will determine solid waste management for an important part of the country during the coming 20 years.**

The "National Solid Waste Program" is relevant in this context, which is guided by MINAM and funded by IDB and JICA; it foresees the construction of 31 small and medium sanitary landfills with recycling plants and small composting plants that will attend approximately 3 million of inhabitants.

Some of the programs consider preventive GHG mitigation strategies (i.e. composting, separated collection), although they are usually only for small solid waste flows. On the other hand, the great majority of projects does not include an effective landfill gas capture at the sanitary landfill. It means, the new projects are focused in reducing the sanitary and environmental impacts, **but they will have very reduced effects in the mitigation of climate change.**

It can even result contrary: the construction of new sanitary landfills might lead to an even **higher GHG emissions compared to current situation** (which partly consist of disperse final disposal), if appropriate mitigation measures in the design of the projects are not considered. This risk will be analyzed more deeply in detail during the development of current NAMA program.

Under this context, the option of an **active methane gas capture** at the final disposal sites will be analyzed, which is an example for GHG mitigation technology that will imply an additional cost, without incomes for the system; except that energy generation can be obtained in the short term, which covers the additional necessary investments. However, it is suggested to consider a system called "**Pay-for-Performance**" as financing element, which means a direct economic compensation for GHG mitigation achieved through this technology.

In any case, the installation of this projected infrastructure has a much better standard than current one, which unavoidably will **increase the costs of municipal solid waste management service**, at least in many parts of the country. Under this context, it should be outlined that currently **low fee levels** and a **low fee collection rate** force many municipalities to subsidize the solid waste management service.

Due to the high percentage of organic waste within the municipal waste, there is a **great potential to mitigate GHG generation through different biological treatment technologies** (composting, biodigestion, mechanical-biological treatment). The market wastes that are mainly organic and that are already separated at the source especially represent a good mitigation potential.

But GHG **mitigation measures for sanitary landfills** are also visualized, and for that purpose, different technologies are available.

Consequently, it can be concluded that **Peru is in a critical moment** with the opportunity to intervene through GHG mitigation projects in the solid waste area, such as current **NAMA Programme**. The conceptual and strategic as well as the technological aspects of GHG mitigation should be considered in the currently ongoing projects, as well as in the initiatives, programmes or financing mechanisms in the solid waste sector.

Another relevant aspect for GHG mitigation is that most part of the municipal solid waste of the country is generated in the metropolitan area Lima-Callao (41%) and only a small part in the small cities with less than 10.000 inhabitants (17%), so the great potential for mitigation is in the larger cities of the country. From the above, it may be deduced that **the main target for the NAMA options is focused in the urban conglomerates**, of Lima-Callao as well as those located in the regions from the country, which complies with the expectation of finding more efficient or economy-of-scale projects regarding the mitigation efforts. These urban conglomerates will be defined and analyzed in more details during the following development stages of NAMA Programme