



A glance at the world

Edited by Francesca Girotto

This column comprises notes and info not subjected to peer-review focusing on waste management issues in different corners of the world. Its aim is to open a window onto the solid waste management situation in any given country, major city or significant geographic area that may be of interest to the scientific and technical community.

Sensibilisation campaign over plastic waste management at Sabarimala in Western Ghats, India

Sabarimala is a Hindu pilgrimage centre located in the Western Ghats, India. With no enforceable legislation governing their use, the massive amounts of plastic brought into the area by pilgrims end up as being thrown as waste in forest and riparian areas. An Anti-Plastic Awareness Campaign was conducted by the District Administration of Pathanamthitta (DAP) at Sabarimala during a 3 months pilgrimage season.

The aim of the Campaign was to spread “anti-plastic” messages among all visitors and pilgrims to reduce the huge plastic waste generation.

Based on a pilot experience, the strategic planning involved the following philosophies and outcomes (Fig. 1):

- Repetition creates memory:** messages about plastic use and environmental protection were displayed all along the roads leading to the common congregation point at Pampa, from where the holy trek starts. For on-road campaigning, large reflective billboards were employed with messages written in six of the most common languages. Pre-recorded

audio messages were also played. Cards bearing anti-plastic messages and double-sided stickers for vehicles were distributed to pilgrims by volunteers. A short-film about the hazards of plastic waste was shown on a Video Wall erected at Pampa and through online platforms. Awareness messages were also spread through online social media and mobile messaging services.

- Incentivizing change:** in order to reduce plastic use, biodegradable and eco-friendly bags were distributed. The image of Lord Ayyappa printed on the biodegradable bags was sufficient to the pilgrims to prefer their use. The image of Lord Ayyappa also ensured no littering of these materials which were instead brought home. Thus, the message of a clean and plastic-free Sabarimala reached also the communities where the pilgrims came from.
- Mopping Up – Be the change you want to see:** in order to ensure safe collection and disposal of plastic waste, a team of 800 volunteers was deployed together with eco-guardians.

The quantitative components of the campaign outcomes were reported in Table 1.



Fig. 1. Modalities through which anti-plastic awareness messages were spread.

Table 1
Quantitative components of campaign outcome.

Parameter	Quantity
Number of collected bags	256,000
Weight of collected plastic	4608 kg
Pilgrims contacted	145,000
Vehicles approached	90,000

After the campaign, the High Court of Kerala banned the use and sale of plastic bottles at Sabarimala.

The Sabarimala Anti-Plastic Awareness Campaign was in many ways a giant leap in the direction of environmental protection and sustainable pilgrimage in India.

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Collaborative action between community and government for sustainable waste management in Depok, Indonesia

Depok, one of Indonesia's dirtiest cities in 2005, is facing the problem of an overloaded open landfill. Additional landfill area expansion would be needed but the community is against this decision. The government, therefore, planned the so-called Integrated Waste Management Facilities (*Tempat Pengelolaan Sampah Terpadu/TPST*) in several areas (*Kelurahan*) in 2006, to separate organic and inorganic waste. Unfortunately, these TPST were closed after a while, due to protests from the neighbourhoods regarding unpleasant smells. This was necessary to understand that it is important to promote waste source segregation at household level.

Since the majority of generated waste is organic, the government firstly promoted home composting using Takakura Composting System.¹ However, this practice was evaluated not economically beneficial to households.

The effort to reform began to show progress after the rise of waste banks in Depok. It was a community initiative that promotes recycling by giving monetary incentive to households that separate and deposit their inorganic waste (paper, plastic, PET bottles, metals, etc.). It opens periodically (weekly, bi-weekly or monthly) and accepts inorganic waste from households within the area where it operates. Households can redeem the money periodically as well. The number of waste banks kept expanding until reaching more than 300 in 2015. In contrast to private waste collectors who apply cash-and-carry and only accept high value recyclables, waste banks promote savings and accept more varieties of recyclables.

The TPST were transformed into organic waste management units (*Unit Pengelolaan Sampah/UPS Organik*). The compost is used in parks and can be used by the households around the facility for free.

In 2016, Depok has declared to promote a priority program called 'Zero Waste City'. The system incorporates collaboration between community and government: waste banks work with inorganic waste, while the government manages the organic waste composting facilities and residual waste at the landfill. Hand in hand with the waste banks, the government of Depok is trying to find ways to increase the benefits for households that perform waste separation.

¹ https://www.jica.go.jp/english/our_work/thematic_issues/management/study_takakura.html.

Aside from the ambitious goals, the government still needs to overcome a number of challenges regarding waste bank expansion, capacity of organic waste composting facilities, and landfilling. Most of waste banks in the city have few members (only around 10% of waste banks have over than 70 households as members). Ideally, the optimal number should be between 100 and 200 households as members. This low participation causes the waste bank to obtain small or even zero margin. Waste bank revenue ranges from approx. US\$ 3.60 to US\$ 46.22 with an average of US\$ 14.13 per collecting activity.

Some waste banks face difficulties in expanding the business too. Inappropriate classification of depositing inorganic waste and competition with private collectors are the major problems. Inappropriate classification happens when depositors mix two or three different types of waste into one (e.g. PET bottles and plastic).

In addition, successful waste bank with high participation rate and profit cannot be easily replicated in all districts. Community characteristics play a crucial role in determining the success of waste banks. There is a need to find ways to expand waste banks and encourage the community to join it. This is important since the new regulation made the separation mandatory instead of voluntary, although the implementation is gradual.

Government may consider supporting waste banks financially, such as providing them with waste processor machines. Besides that, government should also hold rigorous education and information programs. Government should work well together with formal and informal leaders at neighbourhood association level to support the expansion of waste banks.

The major challenge for the government is to increase the capacity of organic waste composting facilities. The current status is only half of the 1200 ton of collected waste. Moreover, with future higher separation rates, it is expected that the cost of their running will rise.

A road map for achieving zero waste in Depok is imperative even if utopic at the same time.

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Multi-criteria evaluation for emplacement of municipal solid waste management infrastructure, using GIS tools: A case study in the Frailesca Region of Chiapas, Mexico

In Mexico, federal and state regulations, such as "NOM-083-SEMARNAT-2003" (*SEMARNAT, 2003*) and "NTEA-010-SMA-RS-2008" (*SMA, 2008*) control the establishment of solid waste management infrastructures; however, both regulations focus on environmental aspects, leaving aside the social and economic components.

This work develops a methodology that determines possible areas for setting up MSW management infrastructures, in compliance with technical, environmental and socioeconomic criteria. The tools used were the Geographic Information Systems (GIS) which are an important element of support in map generation, environmental management and territorial organization. Additionally, spatial analysis techniques were also considered. The case study was realized in the municipalities of the Frailesca region, Chiapas, Mexico, because not all localities and municipalities currently have MSW management infrastructure.

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