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Identification of Key Zero Waste Management Indicators for West Java

Eka Jatnika SUNDANA[1], Anindrya NASTITI[2], Arief Dhany SUTADIAN[1]

[1] West Java Research and Development Agency (BP2D), Indonesia

[2] Faculty of Civil and Environmental Engineering, Bandung Institute of Technology, Indonesia

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As the most populated province in Indonesia, West Java is facing serious problems in managing the increasing solid waste volume, especially those generated from urban areas. Many studies showed that, under current waste management practices (collect-transport-disposal, or CTD approach), the solid waste generation will almost exceed the capacity of landfill sites within the next decade. Thus, relying on the application of CTD will not be sustainable for the future of waste management in West Java.

Since the past decade, 'zero waste' concept has been emerging as an alternative and innovative approach to address the challenges of solid waste management (SWM). Many studies have attempted different ways to conceptualize zero waste principles to be applied in different contexts. The basic notion of zero waste is to consider and recognize waste as a resource, and encourage the redesign of its life cycle so that all materials can be reused. The ultimate goal is for no waste to be dumped into landfill and other mediums.

In Indonesia, the application of zero waste principle was first introduced in the SWM Law in 2008 and then further elaborated into a Presidential Decree in 2017, in which all provincial and local governments are mandated to reduce the waste volume by 30% in 2025. However, many local authorities are struggling to measure the performance and progress in waste reduction efforts, en route to zero waste. Therefore, it is urgent to develop appropriate performance indicators that can be measured in a simple manner, easily interpreted, while also accessible and reliable for monitoring waste reduction.

Research conducted in many places have produced different sets of indicators on SWM systems. However, they are yet to be adequately identified and consolidated as key indicators for evaluating waste management system, especially in the context of achieving zero waste goals.

This study is conducted to identify key zero waste indicators, which can then be proposed as a tool to evaluate the performance of West Java zero waste management systems. Upon an intensive literature review, we found 194 zero waste indicators. These indicators were then broadly classified into five different categories such as technical/waste management process, economic, socio-cultural, institutional, and legal/policy aspect. There were 58 of the most frequently appeared indicators from those categories were presented in the online survey. Those indicators were then rated by SWM stakeholders, through various channels, targeting SWM experts/practitioners coming from different institutions. As many as 38 respondents participated in the survey. Table 1 shows the background information of the participants.

The participants then rated the 58 indicators from 'not needed' to 'very high priority'. A number of indicators rated as 'very high priority' by at least 67% of the participants (Chang et al 2009) will be identified as the potential key indicators for the assessment of West Java zero waste management. Following the criteria aforementioned, this study found that 21 indicators from the five categories were identified as the key indicator presented in Table 2.

* Correspondence
✉ eka.sundana@jabarprov.go.id

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The result of this study will provide an invaluable input for the local decision makers to improve the performance measurement of their zero waste management and overall SWM.

Table 1. Background of survey participants.

Affiliation (Top 3)		Years of experience in SWM (Top 3)	
1. NGO/community group	34.2% (13)	1. 1–5 years	55.3% (21)
2. Government (municipality)	21.1% (8)	2. 6–10 years	21.1% (8)
3. Universities/academics	15.8% (6)	3. 11–15 years	13.2% (5)

Table 2. Key indicators for the evaluation of West Java zero waste management.

Aspects	Key Indicators
Technical	(1) reduction of waste going into landfills; (2) waste reduction at source; (3) recycling rate; (4) capacity (service life) of landfills; (5) reduction of negative environmental impacts
Economic	(6) the cost of waste treatment; (7) the cost of environmental impact due to improper SWM; (8) and % of local government budget allocated for SWM
Socio-cultural	(9) Inclusion of SWM in school curricula
Institutional	(10) a system to evaluate waste reduction performance; (11) inter-municipality cooperation in SWM; (12) stakeholders coordination forum; (13) integrated SWM information system; and (14) a system to evaluate the performance of waste handling
Legal/policy (local context)	(15) SWM regulation; (16) specific regulation on waste reduction; (17) policy commitment to achieve zero waste; (18) regulation on Extended Producers' Responsibility; (19) SWM policy and strategy; (20) SWM technical guidelines; and (21) SWM master plan.