

**Additional Information to the Proposed Methodology:**  
**Anaerobic digestion of organic waste for biogas utilization within wholesale markets**  
**Additional Information**

**1. Waste type for calculating reference emissions**

**1.1 Waste types**

Municipal solid waste is categorised into the following different waste types in CDM methodological tool “Emissions from solid waste disposal sites”<sup>1</sup> for calculating methane emissions from a solid waste disposal site.

Waste type *j*

1. Wood and wood products
2. Pulp, paper and cardboard (other than sludge)
3. Food, food waste, beverages and tobacco (other than sludge)
4. Textiles
5. Garden, yard and park waste
6. Glass, plastic, metal, other inert waste

**1.2 Sampling survey**

A series of sampling survey was conducted to analyse and identify the characteristic of organic waste generated at a wholesale market in Vietnam from October through December 2013. The results of the surveys are shown in the Table 1 below.

Table 1: Sampling survey results

Waste type	Category	Date		17/10/2013		21/11/2013		19/12/2013		Average	
		tonne	%	tonne	%	tonne	%	tonne	%		
Vegetable	Food, food waste	28.78	71.3%	28.68	72.0%	28.4	72.7%	28.6	72.0%		
Fruit	Food, food waste	7.19	17.8%	7.5	18.8%	7.1	18.2%	7.3	18.3%		
Seafood	Food, food waste	3.49	8.6%	2.99	7.5%	3.08	7.9%	3.2	8.0%		
Meat	Food, food waste	0.89	2.2%	0.68	1.7%	0.47	1.2%	0.7	1.7%		
Flower	Garden, yard and park waste	0.31	0.8%	0.33	0.8%	0.64	1.6%	0.4	1.1%		
	<b>Total</b>	40.35	100%	39.85	100%	39.05	100%	39.8	100.0%		

The above survey results show that Vegetable, Fruit, Seafood and Meat waste that can be categorised as Food and food waste account almost 99% and flower waste that can be categorised as Garden, yard and park waste accounts for 1%. Therefore, “Food, food

<sup>1</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v6.0.1.pdf>

waste” is determined to be the waste type to calculate reference emissions in this methodology. This is conservative as the degradable organic carbon (DOC) is assumed to be lower by setting “Food, food waste” as the waste type compared to that of “Garden, yard and park waste”.

## **2 Fraction of degradable organic carbon (DOC)**

Anaerobic digestion is the process by which organic matter is broken down to produce biogas (Primarily a mixture of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>)). The amount of degradable organic carbon (DOC) in the organic matter increases so as the production amount of biogas.

A default DOC value of Food, food waste is set at 15% (wet waste) in the CDM Methodological Tool “Emissions from solid waste disposal sites” (Version 06.0.1). Although this value is derived on the assumption of 40% dry matter content (wet weight), the dry matter content (wet weight) of Food, food waste in wholesale markets can be lower than 40% considering more than 90% of its waste composition is made by vegetable and fruit.

IPCC 2006 Guidelines for National Greenhouse Gas Inventories (Volume 5, Tables 2.4) show that DOC content of food waste (wet waste) ranges from 8% to 20% considering its dry matter content.

Therefore, 8% DOC value has been selected as a default value in this methodology in a conservative manner.