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Domestic waste characteristic and Green House Gas emissions from the Landfill in Phnom Penh, Cambodia

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Rational

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- ❖ The **available data** related to actual DSW and GHGs emission is limited
- ❖ Cambodia still limited human capacity
- ❖ **Reliable** and comprehensive **data** sets on DSW and GHGs inventory
- ❖ Data **sharing**
- ❖ Technology, policy and finance mechanism
- ❖ Participation among stakeholders
- ❖ Commitment at institutional level and individual

Introduction

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Mismanagement
of Municipal Solid
Waste

Human activity

Contributes significantly to
greenhouse gas (GHGs) emissions
such as CH_4 , CO_2 , and N_2O are the
main substances of greenhouse gas.

CH_4

N_2O

CO_2



Figure 1. Dangkor Landfill

MSW Situation In Phnom Penh

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- Sources, composition, and physic-chemical characteristics of waste in MPP
 - Solid waste in MPP was collected from a number of sources such as household, commercial restaurant, commercial other shops, market, school, hotel, office, street sweeping, and other wastes according to JICA in 2003 (JICA, 2005).

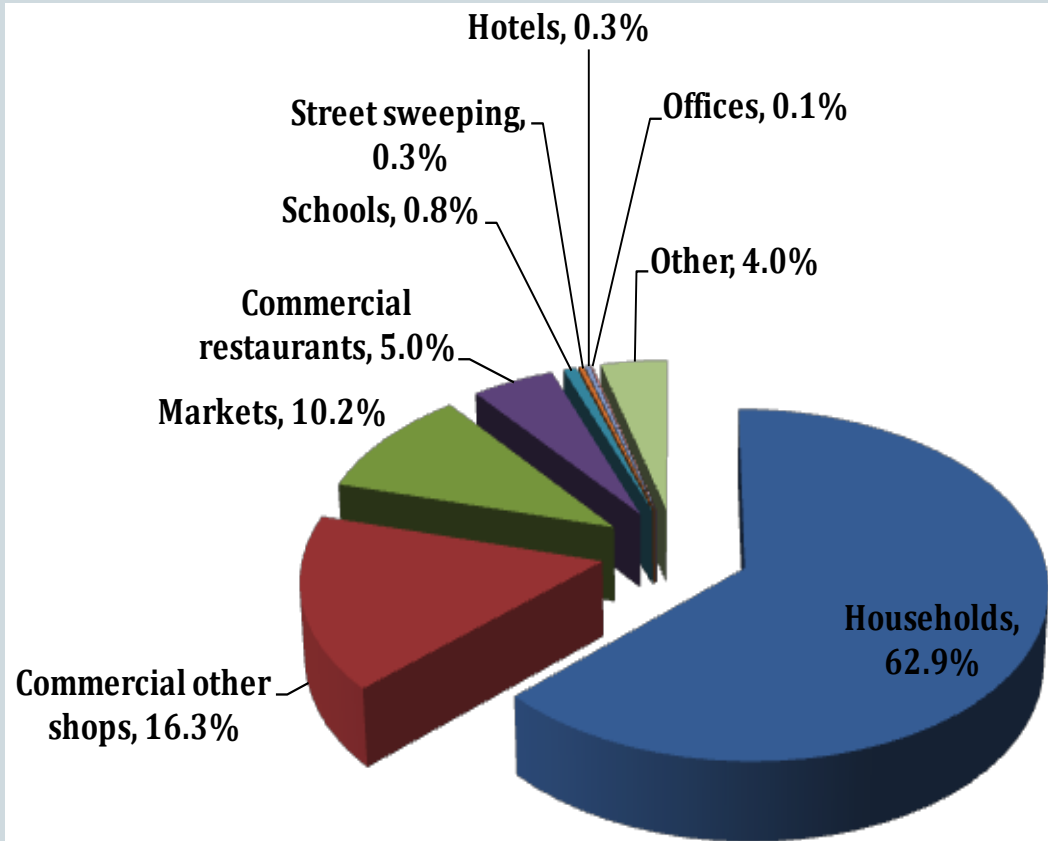


Fig. 3. Waste generation percentage by sources (JICA, 2005).

MSW Situation In Phnom Penh

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Population, GDP and amount of disposal waste from 1994 to 2010.

Year	Population ^a (million)			GDP ^b (current price)			Amount of waste (tone y ⁻¹)		
	Cambodia	MPP	MPP annual growth rate (%)	US\$ (million)	US\$ Capita ⁻¹	Growth rate (%)	^c	^d	^e
1994	9.752	0.812		2760	247	8.2	-	14,500	
1995	10.148	0.855		3420	297	20.3	136,388	14,5048	
1996	10.560	0.901		3481	295	-1.0	143,103	15,264	
1997	10.990	0.949		3387	281	-4.7	142,536	15,203	
1998	11.436	1.000	5.3	3105	253	-9.8	169,111	18,038	
1999	11.656	1.007		3515	282	11.4	191,625	20,440	
2000	11.881	1.014		3651	288	2.2	219,000	20,702	
2001	12.110	1.022		3970	308	7.0	-	21,050	
2002	12.344	1.029		4276	326	5.9	-	21,367	
2003	12.581	1.037		4591	345	5.6	-	240,859	253,569
2004	12.824	1.044	0.7	5265	389	12.8	-	227,910	261,457
2005	12.963	1.108		6278	454	15.7	-	266,781	283,076
2006	13.103	1.177		7265	513	13.0	-	324,159	328,902
2007	13.245	1.249		8332	575	12.0	-	343,657	343,742
2008	13.389	1.326	6.2	10.339	739	19.8	-	361,344	355,561
2009	-	-		-	765	0.0	-	393,141	-
2010	-	-		-	830	9.8	-	409,335	-

^a MoP (2008), ^b MoP (2006, 2008, 2011), ^c Kum et al., (2005), ^d MoE (2004), and additional data provided by MoE staff for 2003-2010, ^e JICA (2008).

MSW Situation In Phnom Penh

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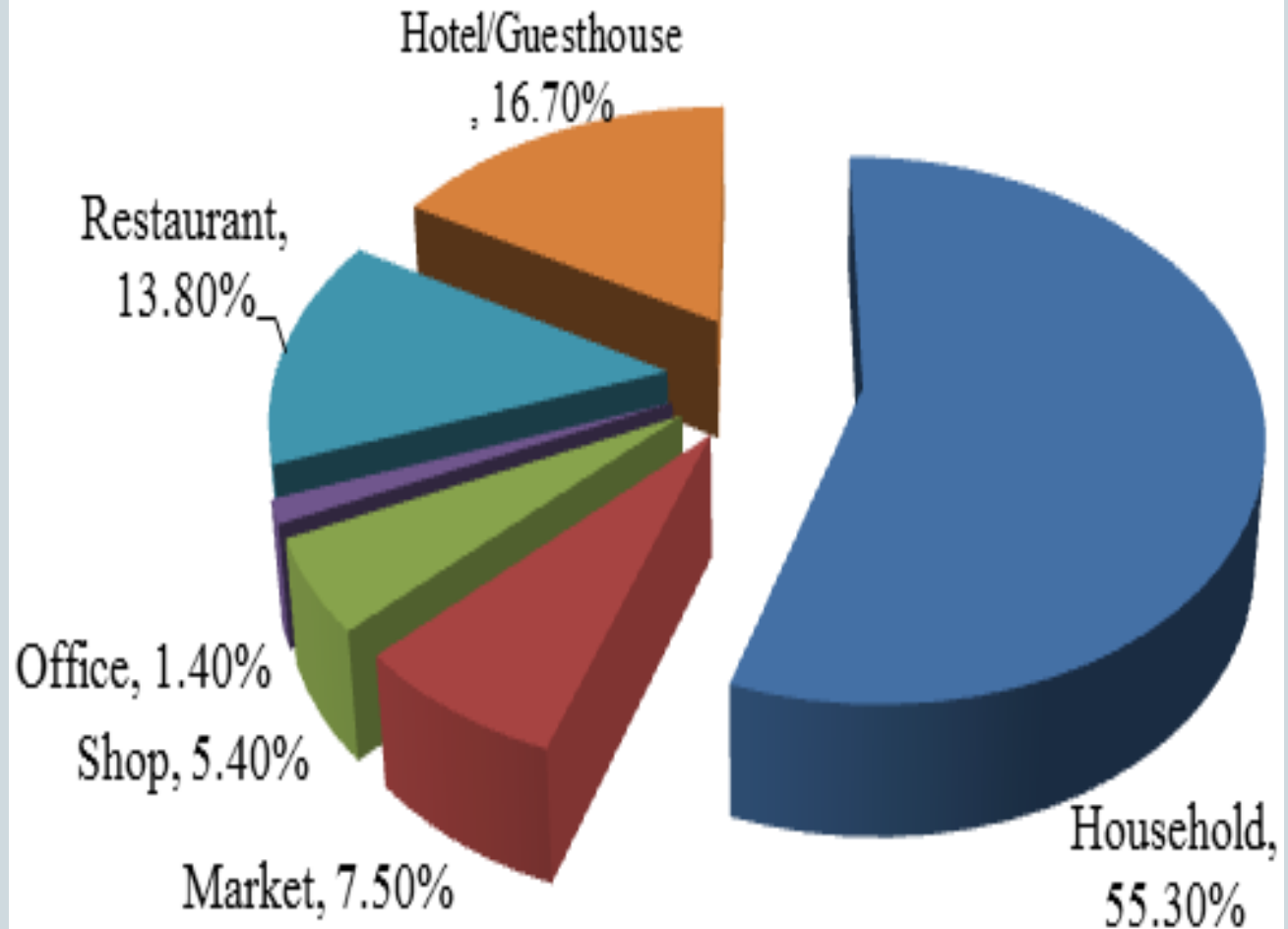
- Waste disposal
 - Collected waste is transported to an **open dumping site**, Steung Mean Chey (SMC), which the area of about 6.8 ha, located at **7 Km from city center**, and operated since 1965. Now it is inside the city center
 - 20 July in 2009, a new landfill was operated at Dangkor site, called Dangkor landfill, with an area of about 26 ha located about **15 km from city center**. Full in less than 5 years
 - **1200 tons/day** of waste is being disposed of in this new landfill (JICA, 2005).



Results And Discussion

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Household,
market, shops,
office,
restaurant,
and hotel/
guesthouse



Waste of different sectors

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➤ Moisture content of solid waste in Phnom Penh

The moisture content of waste generated from different sources shows in the range of **57.11% to 70.0%**.

Moisture content (%) of waste generated from different sources

Source	Household	Market	Office	Shop	Hotel/Guesthouse	Restaurant
Moisture Content (%)	63.8	60.4	57.11	72.1	58.0	70.0

Municipal Solid Waste Composition

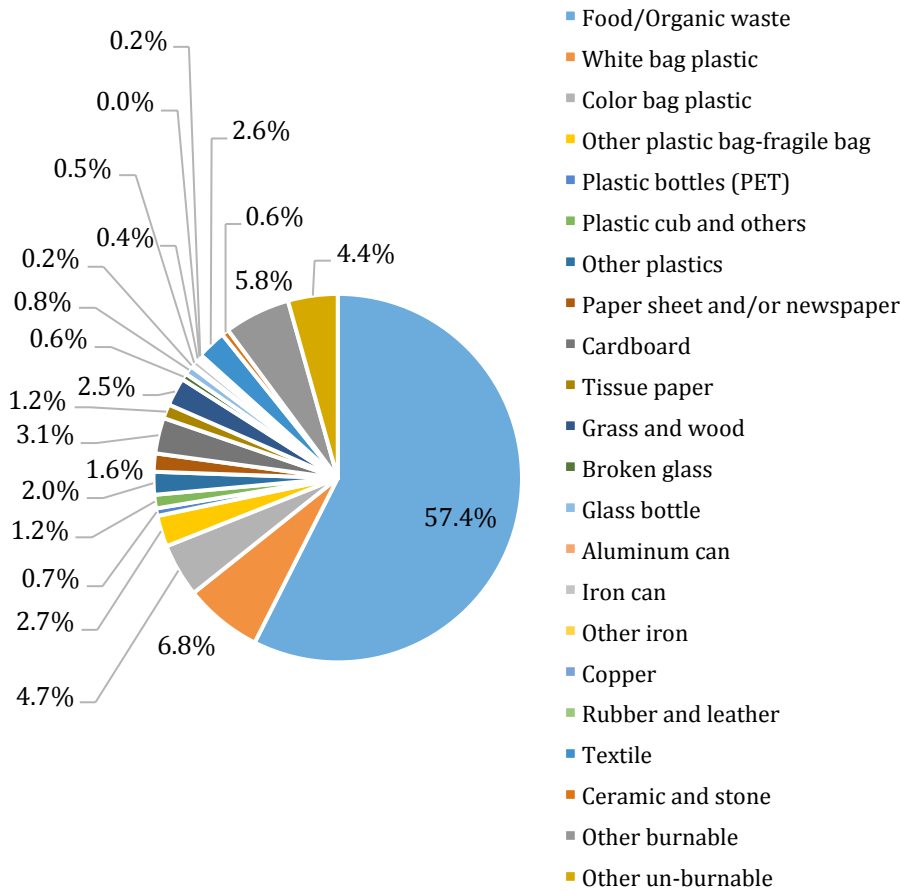


Fig. MSW composition from household in MPP.

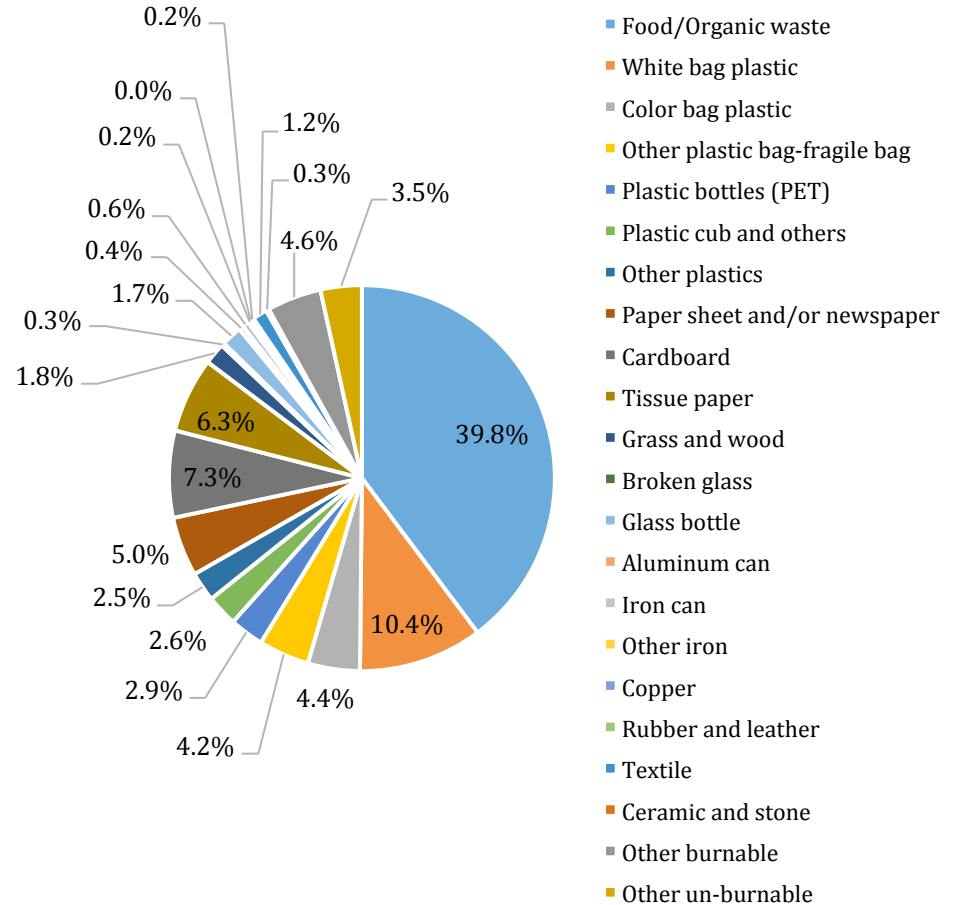
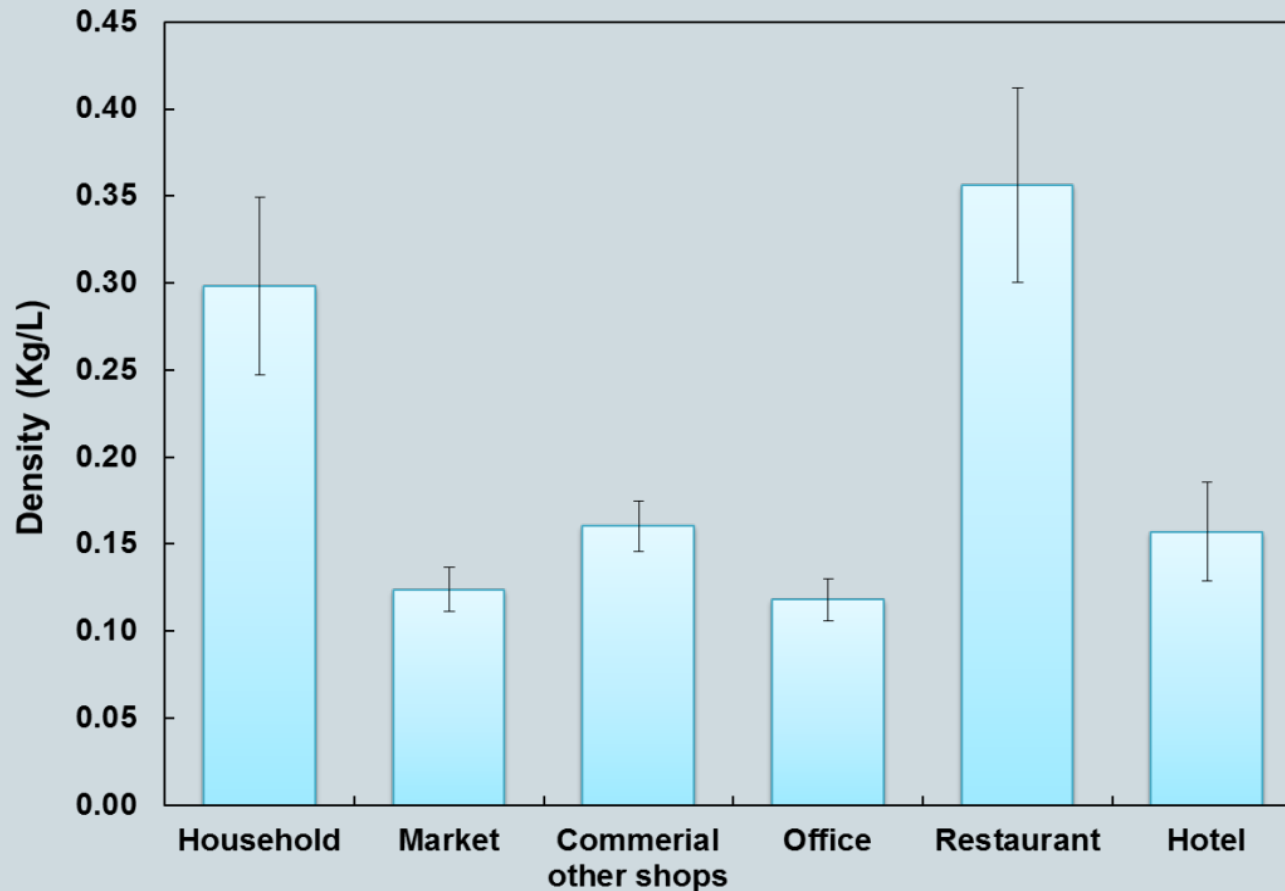


Fig. MSW composition from non-household in MPP.

Results And Discussion

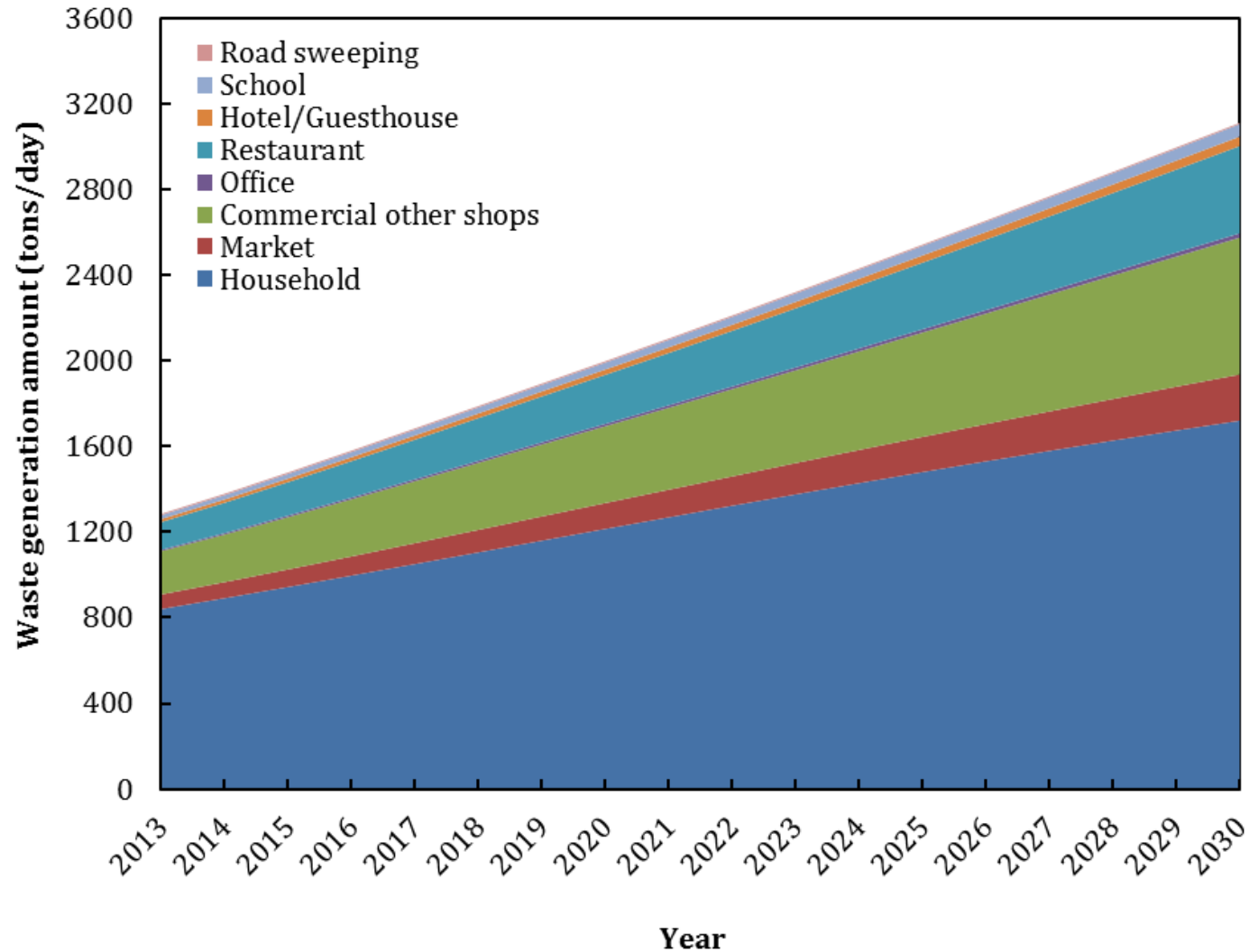
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➤ Density of Solid waste in Phnom Penh



Waste generation sources

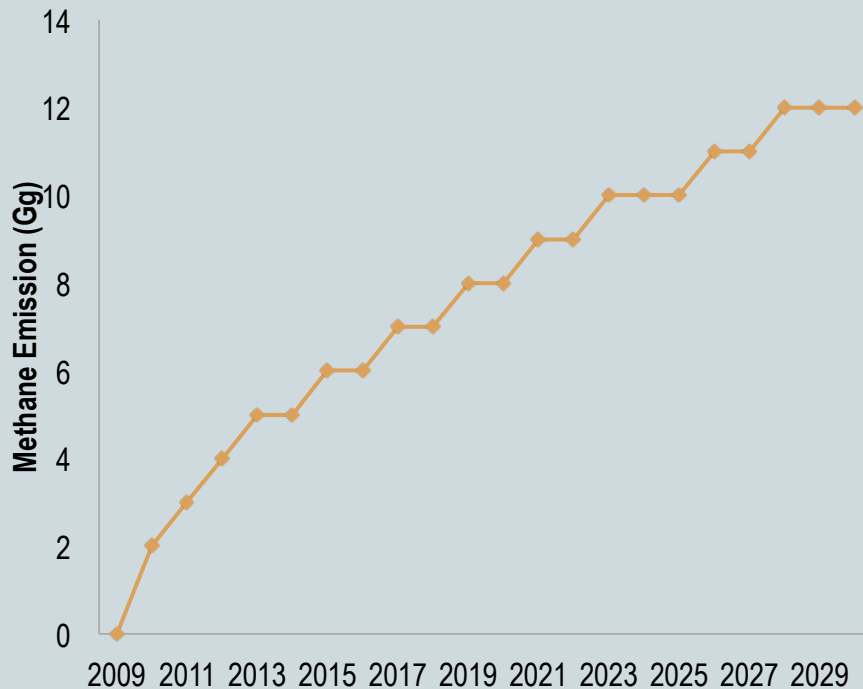
Forecast MSW Generation



GHGs emission

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- Methane emission from solids waste in Dangkor landfill

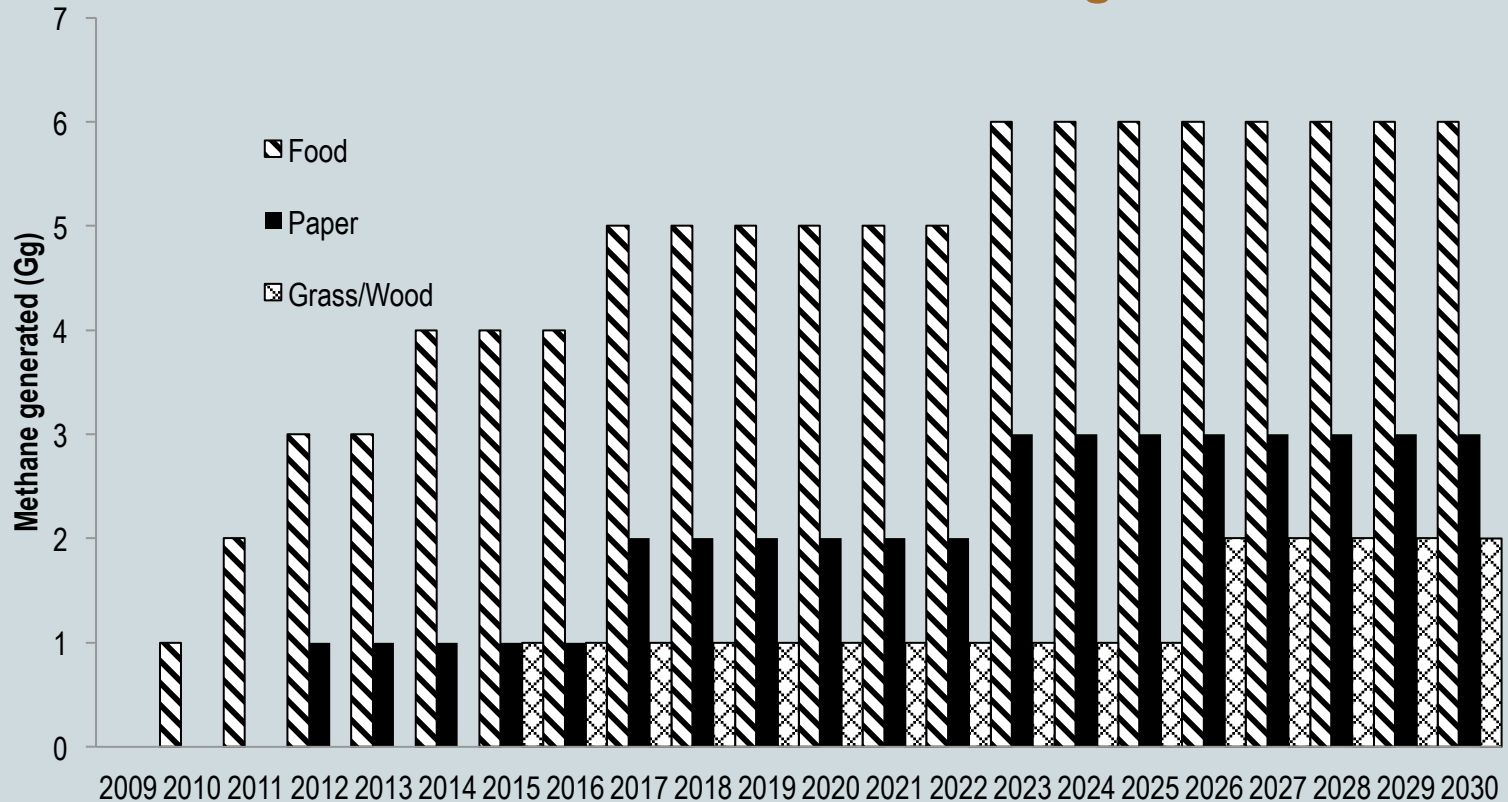


IPCC model: The methane emission was rapidly increase 5.0Gg in 2013, then 12.0Gg in 2030.

GHGs emission

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Methane emission from solids waste in Dangkor landfill



CHALLENGES

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- ❖ Structure of GHGs inventory at city level and national level
- ❖ Financial Mechanism
- ❖ Technologies
- ❖ Practically-sound policy
- ❖ Emerging cities result from tourism



Conclusion

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- **Household waste** shared the largest portion of generated waste around **55.3%**, followed by the hotel/guesthouse (16.7%), restaurant (13.8%), market (7.5%), shop (5.4%), and office (1.4%)
- Forecasting of solid waste generated of all sources was around **3045.63 tons/day in 2030**
- Methane emission generation about **12 Gg in 2030**
- **More critical** in the future as a result of a large quantity of waste generated in 2030.

Thank You.