



Executive Summary:

Investigating Solutions to Marine Plastic Pollution in Cambodia

A Review and Synthesis of Scoping Research from Coastal & Marine Sites

This Executive Summary was prepared by Bianca Roberts as an initiative of the Coastal & Marine Conservation Programme, Fauna & Flora International, Cambodia. For a copy of the full report please use the contact information below.

Authors

Bianca Roberts, Kieran Murray, Marianne Teoh

Contributors

Vin Spoann, Chandara Phat, Cyrielle Noel, Shauna Doll, Chhoeng Sotheavann, Roger Bruget, Robert Hughes, Remy Ouellet, Matt Glue, Kim Sour, Tim Bergman, Julie Courret, Amy Vos, Rylida Vong, Chea Phallin, Georgina Magin, Henry Duffy, Hazel Akester and Annkathrin Sharp.

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About FFI Cambodia's Coastal & Marine Conservation Programme

This report is part of FFI's programme of work that supports the Fisheries Administration (FiA) and the Ministry of Environment of the RGC to protect coastal and marine biodiversity, sustainably manage fisheries resources and improve livelihoods of local fishers and communities. FFI is a leading international NGO working on marine and coastal conservation in Cambodia.

Contact Information

Marianne Teoh

Coastal & Marine Conservation Programme

Fauna & Flora International, Cambodia

Address: PO Box 1380, #19 St. 360, Boeng Keng Kang I, Phnom Penh, Cambodia

Email: fficambodia@fauna-flora.org / info@fauna-flora.org

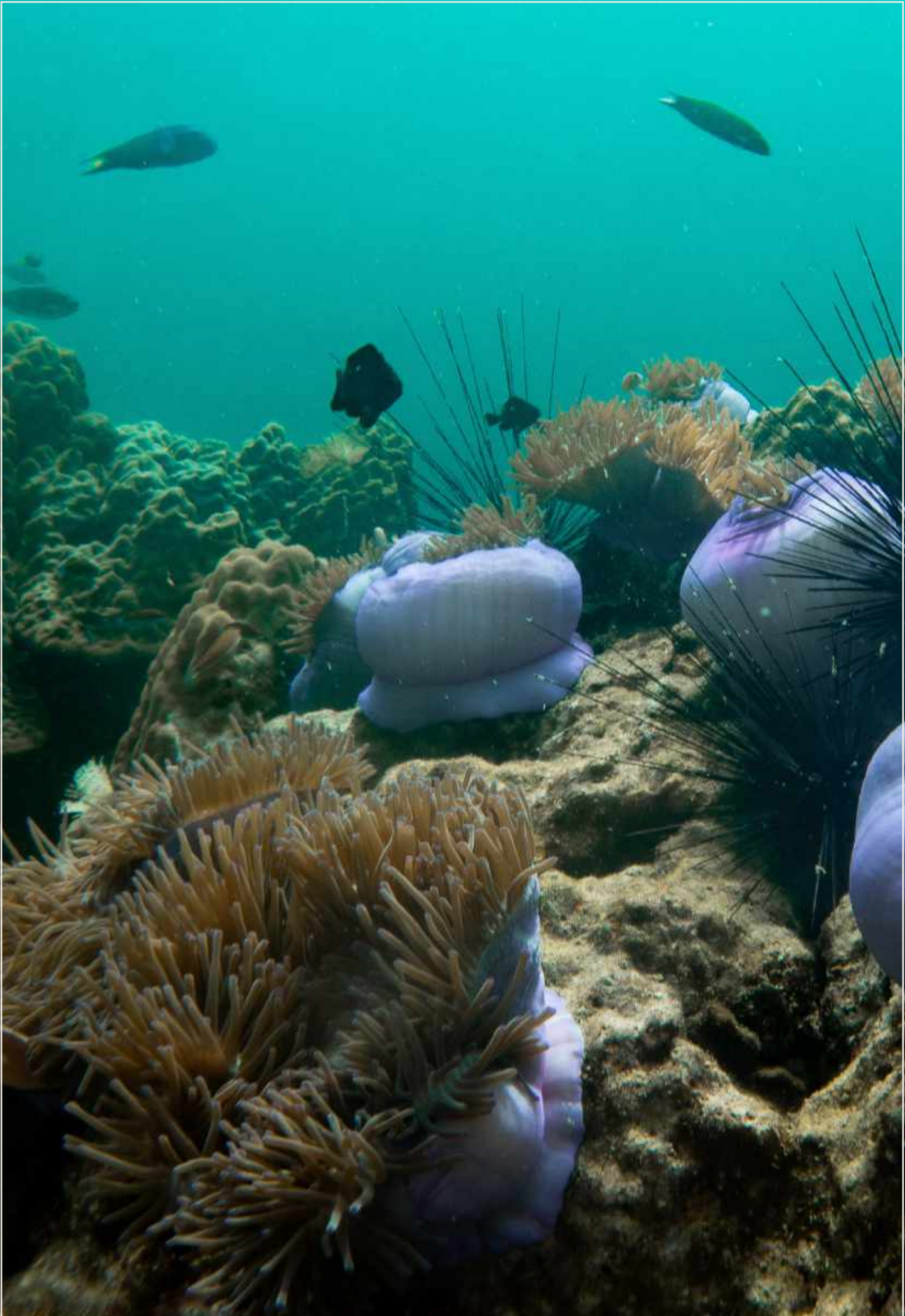
Phone: +855 (0) 77 211 142 / +855 (0) 23 211 142

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Abbreviations

FFI	Fauna & Flora International
FiA	Fisheries Administration
KII/KIIs	Key Informant Interview/s
KR-MNP	Koh Rong Marine National Park
KSA	Koh Sdach Archipelago
MPA	Marine Protected Area
RGC	Royal Government of Cambodia
SWM	Solid Waste Management



The immense and increasing volume of plastic in the oceans has been identified as a significant global threat (2–7), with the unique physical characteristics of plastic leading to wide spread and lasting pollution across a vast array of natural environments (8). Marine plastic pollution has far reaching implications, harming species and habitats, threatening human health & wellbeing, altering the function of ecosystems and their capacity to deliver goods & services, and inhibiting potential for economic growth (6,9–11). Investigating and addressing plastic pollution is crucial to safeguard the environmental, social and economic outputs of coastal and marine ecosystems.

Plastic contamination in the natural environment has drawn much attention in recent years, with the overwhelming visual presence and ubiquity of plastic pollution driving responses globally. Whilst limited data has been collected in Cambodia, the omnipresence of plastic waste, high volume of plastic use in daily life, and absence of effective waste management systems leaves little doubt that plastic pollution presents a challenge. Cambodia is developing rapidly, claiming one of the fastest rates of improvement in the global Human Development Index (13,14), and the rate of plastic consumed is rising in line with the Kingdom's rapid growth (1). A study investigating the use of plastic bags in Cambodian cities found that consumption is “extremely high”, with social & cultural norms surrounding shopping habits and disposal behaviours driving use and pollution from littering (25).

Inadequate waste management is a key determinant of the amount of waste entering the ocean (12). Despite Cambodia's rapid development and economic growth, national infrastructure and administrative resources for waste management remain limited, especially outside of urban centres (15–18). The volume of waste produced annually is also increasing in line with economic growth, and it was estimated in 2010 that 87% of Cambodia's plastic waste was inadequately managed (1,12,19–23). Whilst governance around Solid Waste Management (SWM) has evolved over time and political will is strong, gaps remain, and limited capacity, resourcing and enforcement mean existing governance mechanisms are rarely utilised to their full potential.

In response to these challenges, Fauna & Flora International (FFI) began scoping studies in 2018, engaging a number of research partners to quantify and characterize marine plastic pollution in Cambodia in order to identify avenues to address this threat. The primary study, conducted in an island community within the Koh Sdach Archipelago (KSA), included household surveys, waste characterisation analysis and stakeholder mapping. The second complementary study took place in Sihanoukville, a coastal city on Cambodia's mainland, situated at the gateway to the Koh Rong Marine National Park (KR-MNP). This study included Key Informant Interviews (KIIs) to articulate waste management practices and perceptions, and waste characterisation to quantify coastal debris. Additionally, through FFI's programme of work protecting marine biodiversity and strengthening coastal community resilience in Cambodia, data from socio-economic surveys and coral reef surveys has been included. Contextual considerations are also articulated, especially important given the unique characteristics of coastal and island areas which face the challenges of absent of waste management infrastructure, logistical complexities and deficient administrative resources.

Key findings from the research, detailed in Section 4 of the full report, reveal the significant burden of plastic waste on coastal communities and habitats. Nearly a third of household waste from one island community was comprised of plastic (27%), with the majority found to be bags (57%) and bottles (35%). At this same study site, 96.5% of household waste was disposed of directly into the ocean or onto the shoreline, and 42% of respondents reported burning plastic waste in open areas.

A review of the constitution of household waste and current behaviours highlighted opportunities for reducing plastic use, encouraging waste separation, re-use and recycling of plastics. We identify a need for social and behavioural change methodologies to shift disposal practices and motivate stewardship behaviours. The research also highlighted waste management opportunities, with 75% of respondents being concerned or very concerned about plastic waste, and 92% willing to pay for waste collection services at an average of \$2 per month.

Discarded fishing gear was also revealed to be a key source of marine plastic pollution alongside household waste; 52% of respondents from a coastal fishing village reported discarding fishing nets directly in the ocean. This is reflected in coral reef surveys, which show that 78% of reef debris found was fishing gear - primarily nylon nets and monofilament lines. With the community driven to change waste disposal practices, an existing informal economy centred on fishing net recycling was identified, with 30% of nets being sold to local waste buyers. There is scope to expand market-based and circular economy solutions to tackle fisheries waste.

In Sihanoukville, the key port and tourism town of Cambodia, 81% of debris on beaches was plastic, with cigarettes, plastic food wrappers and plastic bags most frequently found. There are indications that the source of macroplastic pollution is from land as well as washed ashore from other areas. Assessments of perceptions and attitudes in Sihanoukville highlight the need to engage private sector actors, especially those working in hospitality and tourism. Additionally, an investigation into the generation and management of waste by the rapidly growing construction and property development sectors is recommended, to inform strategies to reduce their environmental footprint.

These findings are presented with a comprehensive gap assessment, which highlights where opportunities exist to improve knowledge, research, governance and management in Cambodia. A number of priority recommendations are set out based upon the findings, which include site and context specific interventions, as summarised below:

Recommendation 1. Reduce plastic use: Reducing unnecessary and wasteful plastic use is viewed as a priority recommendation as it addresses plastic pollution generation at the source.

Intervention Opportunity 1.1: Reducing plastic use to stem plastic waste generation and marine plastic pollution, by:

1.1.1 Reducing plastic use in coastal communities, focusing on plastic use by both private households and the fisheries sector, including:

- a. *Household:* incentivising affordable and reusable alternatives; improving access to clean water; regulating imports and/or use of certain plastic products at key locales; and
- b. *Fisheries:* enabling the use of higher quality fishing gear with a longer lifespan; gear and gear use restrictions; fishing gear recycling initiatives.

1.1.2 Reducing plastic use by the private sector, through market-based solutions and improved stewardship behaviours; with a focus on the hospitality, tourism, construction and development sectors.

Recommendation 2. Support opportunities to move towards a circular plastics economy: Opportunities exist for current practices to be optimised or adapted to enable coastal stakeholders to step towards circularity, however, framing such opportunities within the Cambodian context will be key to success.

Intervention Opportunity 2.1: Investigating and enabling circular economy opportunities at coastal sites, by:

2.1.1. Assessing and strengthening existing opportunities, with a focus on supporting communities to develop and expand their existing recycling and re-use practises and livelihoods; dovetailing existing circular practices with improved SWM systems; and

2.1.2 Investigating novel opportunities, through private and third sector partnerships, including scoping new enterprises that adopt circular approaches.

Recommendation 3. Improve residuals management: Establishing and improving SWM systems is a critical measure to prevent plastic waste entering coastal and marine ecosystems. Two main sources of marine plastic pollution were identified at the focal site, that is 1) household waste and 2) fisheries waste.

Intervention Opportunity 3.1: Managing household waste to prevent marine plastic pollution and support community wellbeing, by:

3.1.1 At the focal site, supporting local leaders to trial feasible and measurable SWM methods; and

3.1.2 Outside of the focal site, utilising lessons learnt from the SWM trial to inform interventions at other sites.

Intervention Opportunity 3.2: Managing fishing waste to prevent disposal into the environment and secure sustainable livelihoods, by:

3.2.1 Enabling and strengthening livelihoods opportunities through collaborative partnerships, with a focus on recycling & repurposing of used fishing gear;

3.2.2 Fisheries regulation and enforcement, including adapting existing legislation, regulation and enforcement mechanisms to include locally appropriate measures that reduce fishing gear discards and gear use; and

3.2.3 MPA planning, monitoring and management, especially ensuring that measure to reduce and manage fishing waste are taken into account in MPA frameworks.

Intervention Opportunity 3.3: Coastal and marine clean ups to address marine plastic pollution currently in situ. It is recommended that best practice guidelines be developed to maximise the effectiveness and impact of clean-ups.

Enabling conditions for each intervention are set out in Section 6 of the full report. These enabling conditions describe pathways to foster change in support of each intervention, including: (1) **building capacity** of key actors and stakeholders to enable informed action and leadership (2) strengthening and operationalising **governance mechanisms** to empower action by local authorities, private sector and communities; and (3) fostering **social and behavioural change** to address barriers to change, motivate the adoption of new habits and incentivise stewardship behaviours.

Finally, the findings highlight the critical need for Cambodia to adopt circular economy approaches. The circular economy model is targeted at moving beyond the current take-make-waste extractive model of linear resource use, towards a closed loop use of circular resource use that aims to eliminate waste (24) – a vision that requires iterative, large scale and systemic change. This report considers interventions through a circular economy lens, identifying feasible opportunities to reduce, reuse and recycle across the plastics lifecycle to support movement away from linearity, with the ultimate goal of reducing marine plastic pollution.



A bag of rubbish on a popular tourist beach in the Koh Rong Archipelago. Credit: Bianca Roberts / FFI

References

1. Quicksand. Cambodia's Plastic Bag Ecosystem and Usage. 2015.
2. Sutherland WJ, Clout M, Côté IM, Daszak P, Depledge MH, Fellman L, et al. A horizon scan of global conservation issues for 2010. Vol. 25, Trends in Ecology and Evolution. Elsevier Ltd; 2010. p. 1–7.
3. Thompson RC, Swan SH, Moore CJ, Vom Saal FS. Our plastic age. Vol. 364, Philosophical Transactions of the Royal Society B: Biological Sciences. Royal Society; 2009. p. 1973–6.
4. Thompson RC, Olson Y, Mitchell RP, Davis A, Rowland SJ, John AWG, et al. Lost at Sea: Where Is All the Plastic? Science. 2004;304(5672):838.
5. Law KL, Morét-Ferguson S, Maximenko NA, Proskurowski G, Peacock EE, Hafner J, et al. Plastic accumulation in the North Atlantic subtropical gyre. Science. 2010 Sep 3;329(5996):1185–8.
6. Li WC, Tse HF, Fok L. Plastic waste in the marine environment: A review of sources, occurrence and effects. Vols. 566–567, Science of the Total Environment. Elsevier B.V.; 2016. p. 333–49.
7. Villarrubia-Gómez P, Cornell SE, Fabres J. Marine plastic pollution as a planetary boundary threat – The drifting piece in the sustainability puzzle. Marine Policy. 2018 Oct 1;96:213–20.
8. Barnes DKA, Galgani F, Thompson RC, Barlaz M. Accumulation and fragmentation of plastic debris in global environments. Philosophical Transactions of the Royal Society B: Biological Sciences. 2009 Jul 27;364(1526):1985–98.
9. Williams M, Gower J, Whitebread E, Lenkiewicz Z, Schröder P. No Time To Waste: Tackling the plastic pollution crisis before it's too late. No Time to Waste. 2019.
10. Gall SC, Thompson RC. The impact of debris on marine life. Marine Pollution Bulletin. 2015 Mar 15;92 (1–2):170–9.
11. Secretariat of the Convention on Biological Diversity and the Scientific and Technical Advisory Panel—GEF. Impacts of Marine Debris on Biodiversity: Current Status and Potential Solutions. Montreal; 2012.
12. Jambeck JR, Geyer R, Wilcox C, Siegler TR, Perryman M, Andrady A, et al. Plastic waste inputs from land into the ocean. Science. 2015 Feb 13;347(6223):768–71.
13. Ministry of Environment, United Nations Environment Programme. Cambodia Environment Outlook. 2009.
14. UNDP. Human Development Report Inequalities in Human Development in the 21st Century - Cambodia [Internet]. 2019 [cited 2020 Jan 2]. Available from: <http://hdr.undp.org/en/data>
15. Asian Development Bank. Second Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project (RRP REG 49387): Tourism Demand Analysis and Forecasts [Internet]. 2018 [cited 2020 Jan 31]. Available from: <https://www.wttc.org/datagateway/>.
16. Kham V, Heilmann D. Waste Management Challenges in Cambodia and Experiences from other countries. 2015.
17. Curea C. Sustainable societies and municipal solid waste management in Southeast Asia. In: Sustainable Asia: Supporting the Transition to Sustainable Consumption and Production in Asian Developing Countries. World Scientific Publishing Co. Pte. Ltd.; 2016. p. 391–415.
18. Spoann V, Fujiwara T, Seng B, Lay C, Yim M. Assessment of public-private partnership in municipal solid waste management in Phnom Penh, Cambodia. Sustainability (Switzerland). 2019;11(5).
19. Ritchie H, Roser M. Plastic Pollution [Internet]. Our World in Data. 2018. Available from: <https://ourworldindata.org/plastic-pollution>
20. Beresford N, Jensen MS, Edgar G, Sargren M. Our Plastic Problem Is Out Of Control. Here's How We Can Fight It [Internet]. United Nations Development Programme Cambodia. 2018 [cited 2019 May 27]. Available from: <http://www.kh.undp.org/content/cambodia/en/home/presscenter/articles/2018/our-plastic-problem-is-out-of-control--here-s-how-we-can-fight-i.html>
21. Ellis-Petersen H. "Mountains and mountains of plastic": life on Cambodia's polluted coast. The Guardian [Internet]. 2018 [cited 2019 Dec 23]; Available from: <https://www.theguardian.com/world/2018/apr/25/mountains-and-mountains-of-plastic-life-on-cambodias-polluted-coast>
22. Kunthea M. Ministry to crack down on littering scourge [Internet]. Khmer Times. 2019 [cited 2019 Dec 23]. Available from: <https://www.khmertimeskh.com/50657109/ministry-to-crack-down-on-littering-scourge/>
23. Pech S. Environment Ministry prepares to ban single-use plastic products [Internet]. Khmer Times. 2019 [cited 2019 Dec 19]. Available from: <https://www.khmertimeskh.com/659041/environment-ministry-prepares-to-ban-single-use-plastic-products/>
24. Ekins P, Domenech T, Drummond P, Bleischwitz R, Hughes N, Lotti L. The Circular Economy: What, Why, How and Where. Managing environmental and energy transitions for regions and cities. Paris; 2019.
25. 17 Triggers. Reducing plastic bag waste in major cities of Cambodia: Market Research Report. 2015.

