

# DROWNING IN PLASTICS



MARINE LITTER AND PLASTIC WASTE  
VITAL GRAPHICS

# The plastic pollution challenge

## Tacking stock...

The global production of plastics increased from 2 million tonnes in the 1950s to more than 438 million tonnes in 2017,<sup>1</sup> a trend of rapid growth that is expected to continue.<sup>2</sup> The large majority of plastics continue to be made from oil and natural gas.<sup>3</sup> Plastic is all around us, from packaging, smartphones and cosmetics to fishing nets, fertilizers and construction materials. Like all plastic products, these items contain chemical additives. Some of the additives are hazardous to human health and the environment.<sup>4</sup>

Plastics can escape into the environment at every stage of their life cycle.<sup>5</sup> To date, around 6.9 billion tonnes of primary plastic waste have been generated and hundreds of millions of tonnes are added each year.<sup>6</sup> While plastic packaging accounts for a large share of plastic waste, sectors such as fisheries, construction, agriculture, transport and electronics are also significant. Only around 10% of the plastic waste generated to date has been recycled; 14% has been incinerated and 76% has been disposed of in landfills or released into the environment.<sup>7</sup> Natural disasters and, recently, the COVID-19 pandemic have intensified pressures of waste management systems, especially in developing countries.<sup>8</sup> Each year large amounts of plastic waste are exported, often to countries with limited waste management capacities. An alarming increase in the illegal trade of plastic waste has been occurred in recent years.<sup>9</sup>

Mismanagement of plastic waste has led to contamination of the entire marine environment, from shorelines to the deepest ocean sediments.<sup>10</sup> It has been estimated that approximately 8 million tonnes of plastic waste enter the oceans every year from rivers and land.<sup>11</sup> While precise estimates of inputs from sea-based activities, including fishing and aquaculture, are unavailable, these activities are considered significant sources of marine litter and plastics pollution. Once in the environment, plastics release additives and break down into micro- and nanoplastics.<sup>12</sup> Among other sources, microplastics are released as a result of abrasion of tyres on road surfaces. Microplastics find their way into wastewater (e.g. due to the use of microbeads in cosmetics and personal care products) and contaminate soils.

Marine litter and plastic waste are a serious environmental problem at a global scale. They have the potential to dramatically shift the ecology of marine systems.<sup>13</sup> Microplastics can have both physical and chemical effects on animals.<sup>14</sup> Some plastic additives and persistent waterborne chemicals are capable of activating hormone signal pathways and altering animals' metabolic and reproductive systems.<sup>15</sup>

There is concern about the potential of microplastics to adversely affect human health. Plastic particles make their way into the food we eat, the water we drink, and the air we breathe. They can enter the human body through ingestion and inhalation, while nanoplastics may also be able to enter through the skin.<sup>16</sup> Plastic particles have become a routine part of the human diet, including through seafood.<sup>17</sup> What happens to ingested plastic and any associated hazardous chemicals is an area of growing research.<sup>18</sup> Considerable economic costs are also associated with marine litter and plastic waste.<sup>19</sup>

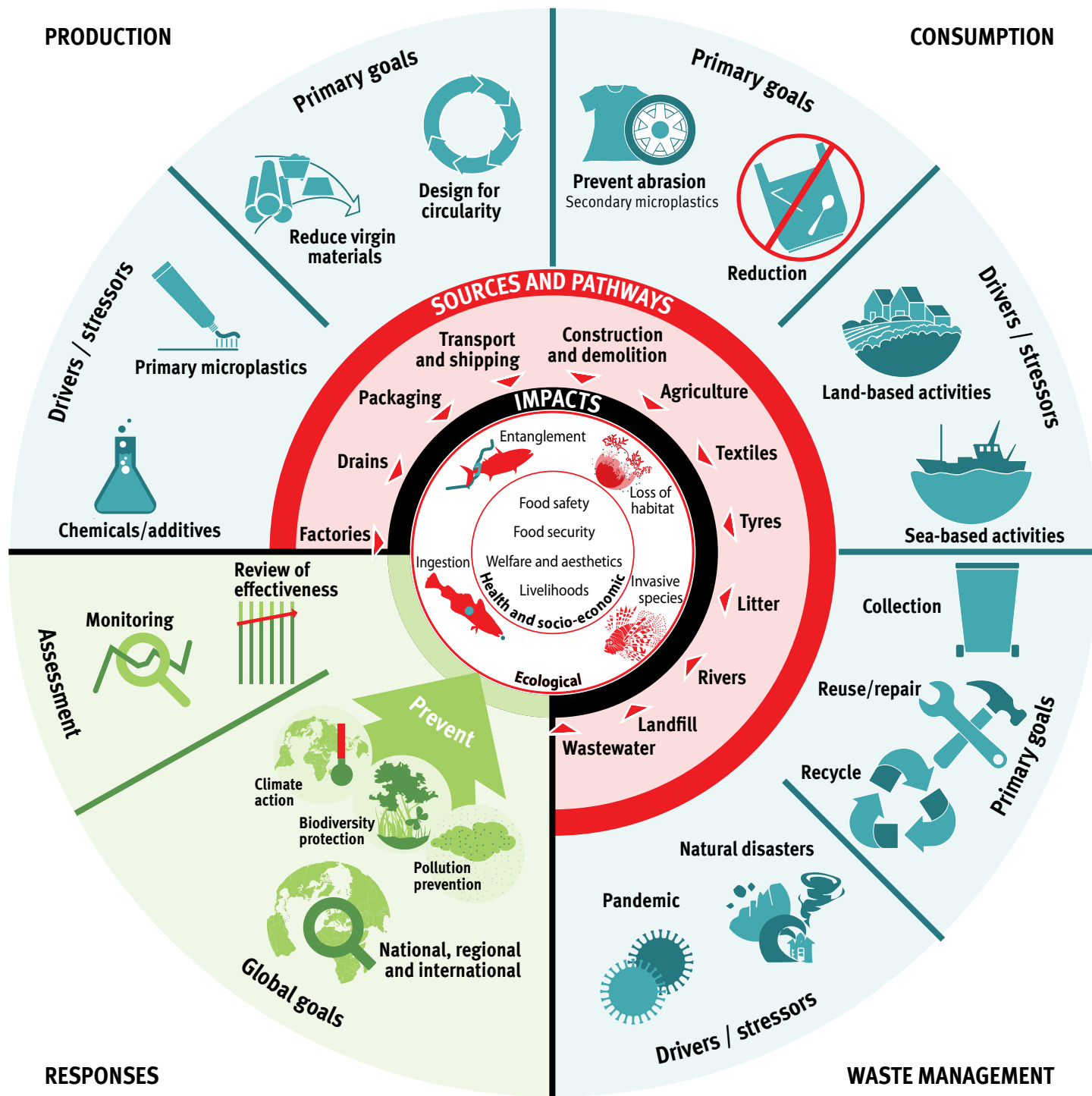
## ... and looking forward

Developing a circular plastic economy and limiting plastic pollution require actions by different stakeholders. These stakeholders include waste management and other government authorities, chemical and plastic manufacturers, consumers and companies that produce consumer goods, retailers, waste management operators, plastic recyclers and others, including the informal sector.<sup>20</sup> Moreover, actions are needed at all stages of the life cycle, thereby following the waste management hierarchy and prioritizing waste prevention and minimization.

Many governments have taken initial steps by banning certain single-use plastic packaging and microbeads, implementing extended producer responsibility and deposit-return schemes, and introducing product design standards. Better systems, materials and products need to be designed with the concept of circularity in mind and to reduce the use of hazardous additives. Biodegradable plastics and bioplastics may have potential in this context; however, they currently present a number of challenges and may in some cases even worsen the plastic pollution situation, thus requiring further investment and innovation. Consumer choices, and thus awareness-raising campaigns, are equally important.

Yet it will not be possible to avoid all plastic waste. Strengthened waste management systems and infrastructures covering collection, separation, recycling, recovery and final disposal are needed, especially in developing countries. Such systems require sustainable sources of financing. Policies supporting sustainable end-markets for recyclable materials can drive supply and demand, thereby promoting private sector investment.<sup>21</sup> Further steps also need to be taken to integrate the informal waste sector<sup>22</sup> and provide equal opportunities to women in plastic waste management.<sup>23</sup>

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1. Geyer 2020
  2. PlasticsEurope 2019
  3. British Plastics Federation 2019
  4. Steinmarck et al. 2017
  5. GESAMP 2016; ISWA 2017; UNEP 2020
  6. Geyer 2020
  7. Geyer 2020
  8. World Economic Forum 2020
  9. Interpol 2020
  10. E.g. Woodall et al. 2014; Ryan et al. 2016
  11. Jambeck et al. 2015
  12. Hahladakis et al. 2018
  13. Villarrubia-Gomez et al. 2018
  14. Galloway et al. 2017
  15. Galloway et al. 2017
  16. Schneider et al. 2009
  17. E.g. Besseling et al. 2015; Digka et al. 2018; Cho et al. 2019; Nelms et al. 2019
  18. Lehner et al. 2019
  19. UNEP 2018
  20. UNEP 2018; Hahladakis 2020
  21. OECD 2018
  22. UNEP 2020
  23. Chikarmane 2012; Aidis and Khaled 2019



GRID-Arendal/Studio Atlantis, 2021

Various international instruments exist to tackle marine litter and plastic waste. The Basel Convention promotes prevention and minimization, environmentally sound management, and control of transboundary movements of plastic waste. The Basel Convention Plastic Waste Amendments are crucial steps towards achieving these objectives. The Stockholm Convention plays an important role in addressing the use of certain hazardous additives. Prevention of marine plastic pollution is mandated in the Law of the Sea Convention, MARPOL Annex V, the London Convention and its Protocol. Moreover, a number of UNEA resolutions promote a life cycle approach to the issue and engagement with the private sector (including redesign of products) towards a globally agreed goal of long-term elimination of plastics entering the oceans.<sup>24</sup> National implementation of these approaches is supported at the regional level by 18 Regional Seas Conventions and Action Plans.

Underpinning these actions is an evidence-based science-policy interface which must be further strengthened through improved monitoring, assessment, and the development of indicators to track national and global progress towards the elimination of plastic pollution from all sources, supported by engagement by all stakeholders at all stages of the life cycle of plastics.

In summary, actions are needed at many levels, at all stages of the life cycle, and by all stakeholders. This publication shows that such actions are feasible and, in many areas, are already underway.<sup>25</sup>

24. UNEA 2017

25. References are provided in full in the main publication

