

# WASTEWATER POLLUTION ON CORAL REEFS

Science-to-Policy Brief on Managing Wastewater  
to Support Coral Reef Health and Resilience





# WASTEWATER POLLUTION ON CORAL REEFS

Science-to-Policy Brief on Managing Wastewater  
to Support Coral Reef Health and Resilience



Healthy coral reef in  
Misool, Raja Ampat,  
Indonesia.

## About

The overall purpose of this brief is to provide policy and management recommendations for addressing and reducing the impacts of wastewater on coral reefs, based on current scientific knowledge. In doing so, the brief will contribute to achieving the related global, national and regional goals and targets, including the Sustainable Development Goals (SDGs).

The brief promotes integrated planning and management, awareness-raising, capacity-building and other efforts to improve monitoring of wastewater loading and its impacts, among key stakeholder groups.

It is primarily aimed at national and state policymakers. The supporting scientific basis (available as a White Paper) provides further rationale for recommendations and more detailed information for government officials with technical roles, as well as regional environmental organizations and conservation organizations.

## Acknowledgements

This brief has been prepared by the United Nations Environment Programme (UNEP), through the [Global Coral Reef Partnership](#) and the [Global Wastewater Initiative](#) (GW2I, one of three global partnerships under the Global Programme of Action for the protection of the marine environment from land-based activities), and in collaboration with [Coasts Climate Oceans](#) (C2O).

The contributions of the following reviewers are gratefully acknowledged: Christopher Corbin, Christopher Cox, Sahr Abraham Grass-Sessay, Birguy Lamizana, John McCarroll, Karen McDonald Gayle, Kakuko Nagatani-Yoshida, Alexander R. Dawson Shepherd, Jerker Tamelander, Stephanie Wear, Mette Wilkie.

This brief should be cited as:

United Nations Environment Programme (2017) Wastewater Pollution and Coral Reefs: Science-to-Policy Brief. Johnson, J.E., Brodie, J. and Waterhouse, J. (Authors).

United Nations Environment Programme, Nairobi, Kenya (16pp.).





Local fishermen in Papua New Guinea.

For years, oceans have been used as dumping grounds for many types of waste, including sewage, industrial waste, chemicals and litter. More than 80 percent of marine pollution originates from land-based wastewater and sediment and nutrients delivered via waterways. In South-East Asia alone, 600,000 tonnes of nitrogen are discharged from major rivers into the ocean each year, and it is expected that by 2030, these nitrogen inputs will increase globally by at least 14 percent. More recently, policy changes in many countries have reflected the opinion that oceans do not have an infinite capacity to absorb society's waste. However, marine pollution remains a major problem that threatens marine life, and consequently, the provision of marine ecosystem services.

Sources of land- and marine-based pollution in coastal ecosystems are wide-ranging. The focus of this science-to-policy brief is on wastewater pollution impacting coral reefs, including from point sources (single identifiable sources) that discharge directly into coral reef environments, and indirect or diffuse sources such as urban, rural and industrial activities on land that discharge into the ocean via waterways. Accidental pollution, such as oil or chemical spills, is not considered here.

More than **80%** of marine pollution originates from land-based wastewater and sediment and nutrients delivered via waterways.

Sediment dredged from a waterway is dumped into the ocean in Florida, United States. Most of the sediment goes right out into the water, resulting in a turbidity plume that may harm coral reefs.



## A GLOBAL PRIORITY

The Manila Declaration<sup>1</sup> adopted in 2012 identifies wastewater as a priority source category of land-based pollution in the marine environment. As such, governments have stressed the need to significantly reduce water pollution and improve water quality and wastewater treatment.

Coral reefs are vulnerable to wastewater pollution, which consequently threatens the health and well-being of hundreds of millions of people who depend on coral reef ecosystem services for nutrition, livelihoods and a safe living environment. However, awareness and data on how wastewater pollution impacts coral reefs remain limited in most reef regions. Many countries, including several Small Island Developing States (SIDS), did not achieve the 2015 sanitation target of the Millennium Development Goals.<sup>2</sup>

The 2030 Agenda for Sustainable Development now provides a holistic and comprehensive framework through which wastewater and its impacts on coral reefs can be addressed. SDG 14 – *Conserve and sustainably use the oceans, seas and marine resources for sustainable development* – is directly relevant to coral reefs; target 14.1 specifically addresses marine pollution and targets 6.3 and 11.6 specifically address wastewater:

**Target 6.3:** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

**Target 11.6:** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

**Target 14.1:** By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

With the 2030 Agenda in mind, in 2016 the UN Environment Assembly adopted Resolution 2/12 on sustainable coral reefs management, which encourages governments to formulate, adopt and implement integrated, ecosystem-based and comprehensive approaches to managing coral reefs sustainably. The resolution calls on countries to undertake the priority actions to achieve Aichi Target 10 in COP 12 Decision XII/23, one of which is: implementation of watershed management policies that include reforestation; erosion control; runoff reduction; sustainable agriculture and mining; reduction of pesticides, herbicides, fertilizer, chemicals, hormones and other agrochemical use; and wastewater management and treatment.

Coral reefs are vulnerable to wastewater pollution, which consequently **threatens the health and well-being of hundreds of millions of people** who depend on coral reef ecosystem services for nutrition, livelihoods and a safe living environment.



1. <http://bit.ly/ManilaDeclaration>



2. <http://www.un.org/millenniumgoals/>



Small-scale fishermen in Indonesia.

## WASTEWATER IMPACTS ON CORAL REEFS

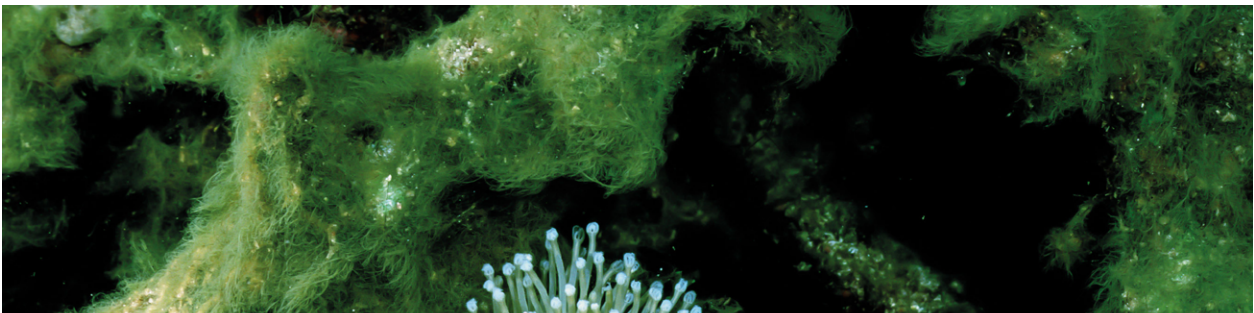
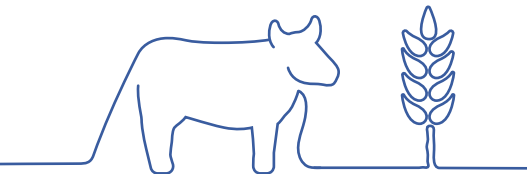
Many wastewater pollutants, including agricultural fertilizers, pesticides and organochlorine compounds, domestic and municipal waste, trace metals and petroleum products are known to have adverse effects on coral reefs, even in small volumes. Understanding their impact is therefore important for informing policy and management.

Agricultural run-off threatens approximately 25 percent of the global reef area, with further increases projected by 2035. Rangeland grazing and logging (extensive clearing) are the main contributors of sediment load, whereas intensive cropping (e.g. sugar cane) and horticulture are the main contributors of nutrients and herbicides. Most of these pollutants are delivered through waterways during high-flow periods, and flood plumes often carry elevated concentrations of several pollutants, simultaneously exposing near-shore reef systems to toxic combinations of chemical stressors. Livestock operations can also constitute significant point sources of agricultural wastewater pollution.

Rising sediment and nutrient loads have been linked to declines in coral cover in reef systems around the world. The release of excess nutrients into coastal waters causes eutrophication, resulting in macroalgal proliferation, algal blooms and the creation of hypoxic 'dead zones', which can kill large numbers of organisms, such as fish. Furthermore, sediment input stresses coral reefs by reducing light penetration in water and smothering reef organisms.

Most petroleum hydrocarbon pollution (including biologically highly toxic and persistent polycyclic aromatic hydrocarbons) in the near-shore marine environment is delivered by heavy manufacturing, ports and shipping, primarily through operational losses, but also in the event of accidents.

Agricultural run-off threatens approximately **25%** of the global reef area, with further increases projected by 2035.



预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_14700](https://www.yunbaogao.cn/report/index/report?reportId=5_14700)

