Environment for Development Collaborative Program
Sustainable Management of Oceans and Marine Resources

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A framework for selecting and designing policies to reduce marine plastic pollution in developing countries

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INTRODUCTION

The pollution of marine ecosystems with plastic debris is both a global and a local problem with potentially severe consequences for wildlife, economic activity and human health.

It is a problem that originates in countries' inability to adequately manage the growing flow of waste in general, and plastic, in particular.

OBJECTIVE

We aim at producing a tool box for policy choice that is suitable to different countries. Policy makers should identify their country's situation in the impact pathway, which will in turn open a menu of suitable policy instruments at their disposal.

Better policies should bring the world closer to efficiently reducing marine plastic debris at the source.
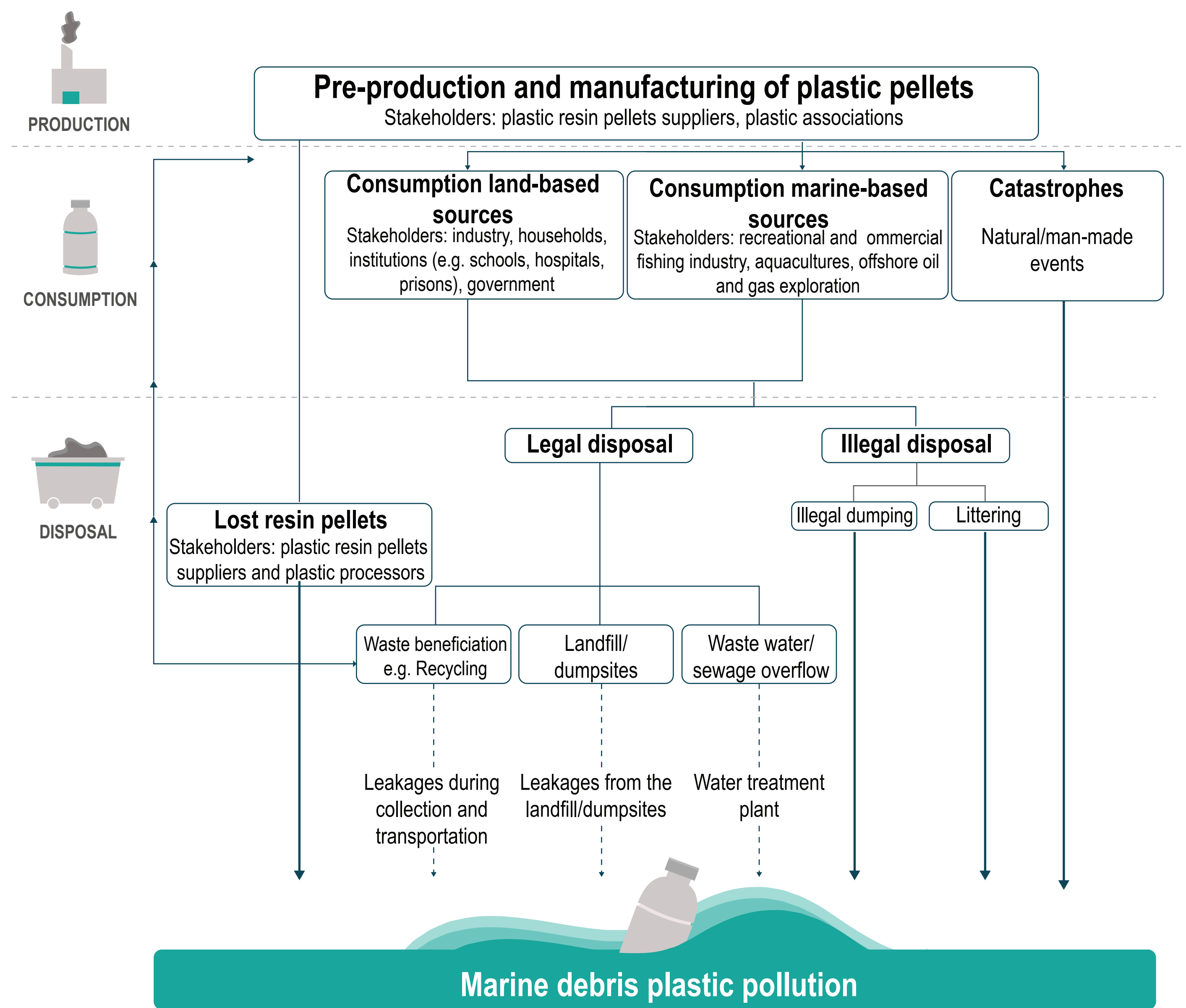
METHODOLOGY

We use an impact pathway framework to trace the flow of plastics through the socio-ecological system, and identify the role of specific policy instruments in achieving behavioral changes in favor of reduced marine plastic debris.
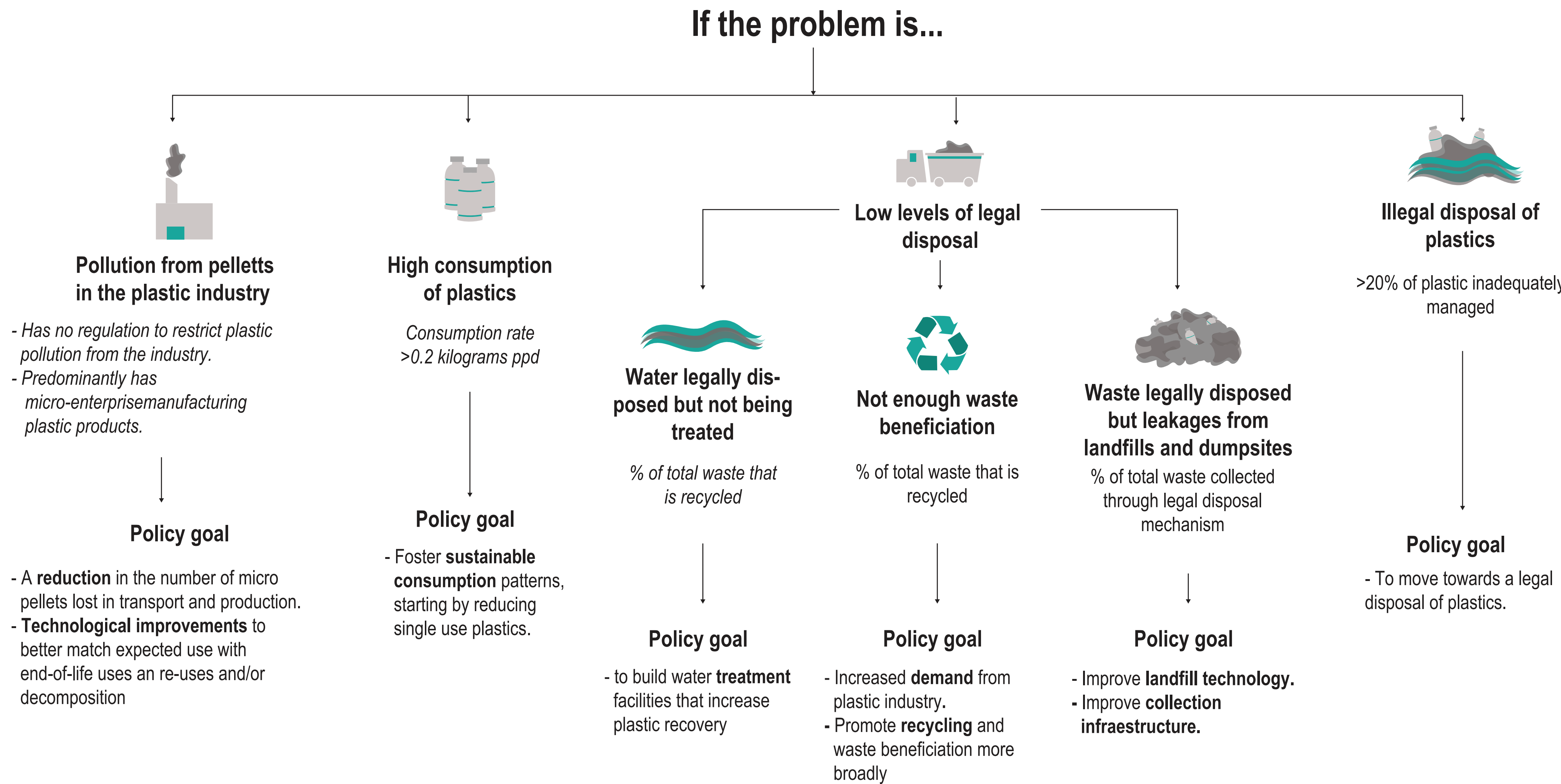
We then use this framework to make country specific recommendations that reflect the reality of solid waste management in each of the countries selected as examples.
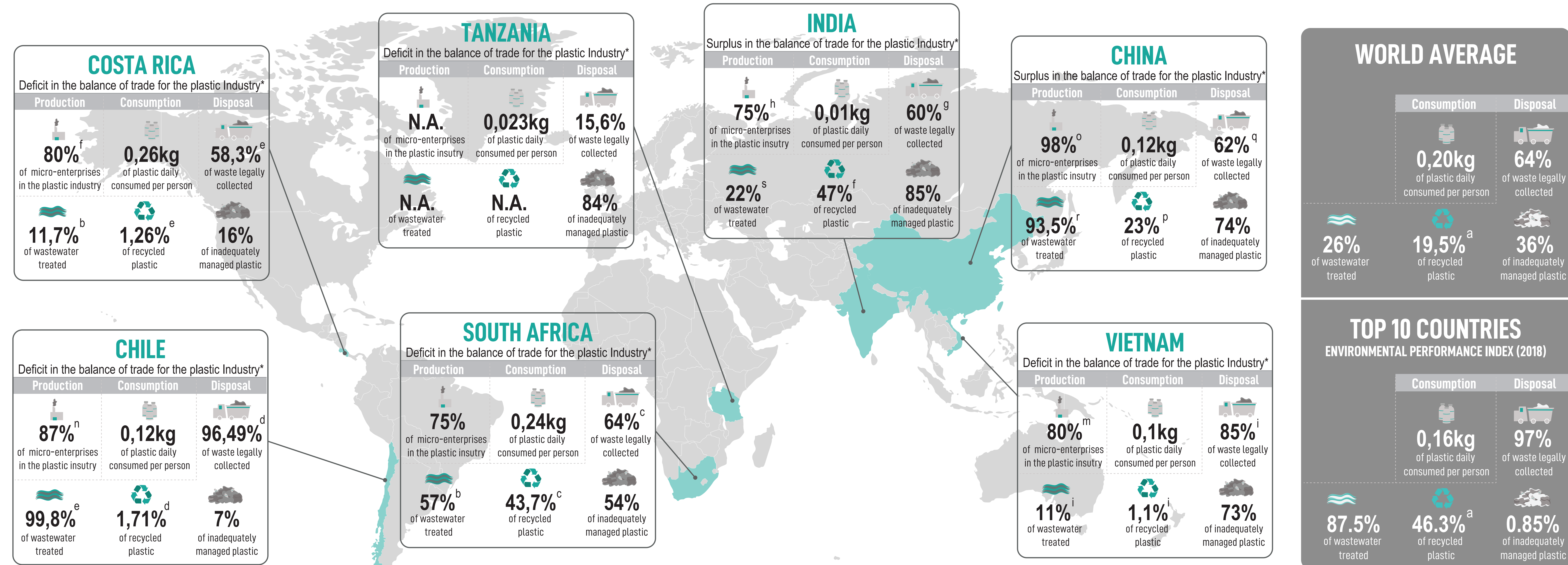
RESULTS

IMPACT PATHWAY OF PLASTIC

PRODUCTION

Pre-production and manufacturing of plastic pellets
Stakeholders: plastic resin pellets suppliers, plastic associations

CONSUMPTION

Consumption land-based sources
Stakeholders: industry, households, institutions (e.g. schools, hospitals, prisons), government

Consumption marine-based sources
Stakeholders: recreational and commercial fishing industry, aquacultures, offshore oil and gas exploration

Catastrophes
Natural/man-made events

DISPOSAL

Lost resin pellets
Stakeholders: plastic resin pellets suppliers and plastic processors

Legal disposal

Illegal disposal

Illegal dumping | Littering

Waste beneficiation e.g. Recycling | Landfill/dumpsites | Waste water/sewage overflow

Leakages during collection and transportation | Leakages from the landfill/dumpsites | Water treatment plant

Marine debris plastic pollution

SETTING POLICY GOALS TO REDUCE MARINE PLASTIC POLLUTION

If the problem is...

Pollution from pelletts in the plastic industry
- Has no regulation to restrict plastic pollution from the industry.
- Predominantly has micro-enterprisemanufacturing plastic products.

Policy goal
- A reduction in the number of micro pellets lost in transport and production.
- Technological improvements to better match expected use with end-of-life uses an re-uses and/or decomposition

High consumption of plastics
Consumption rate >0.2 kilograms ppd

Policy goal
- Foster sustainable consumption patterns, starting by reducing single use plastics.

Low levels of legal disposal

Water legally disposed but not being treated
% of total waste that is recycled

Policy goal
- to build water treatment facilities that increase plastic recovery

Not enough waste beneficiation
% of total waste that is recycled

Policy goal
- Increased demand from plastic industry.
- Promote recycling and waste beneficiation more broadly

Waste legally disposed but leakages from landfills and dumpsites
% of total waste collected through legal disposal mechanism

Policy goal
- Improve landfill technology.
- Improve collection infrastructure.

Illegal disposal of plastics
>20% of plastic inadequately managed

Policy goal
- To move towards a legal disposal of plastics.

THE COUNTRIES

COSTA RICA
Deficit in the balance of trade for the plastic Industry*

Production	Consumption	Disposal
80%[f] of micro-enterprises in the plastic industry	0,26kg of plastic daily consumed per person	58,3%[e] of waste legally collected
11,7%[b] of wastewater treated	1,26%[e] of recycled plastic	16% of inadequately managed plastic

TANZANIA
Deficit in the balance of trade for the plastic Industry*

Production	Consumption	Disposal
N.A. of micro-enterprises in the plastic insutry	0,023kg of plastic daily consumed per person	15,6% of waste legally collected
N.A. of wastewater treated	N.A. of recycled plastic	84% of inadequately managed plastic

INDIA
Surplus in the balance of trade for the plastic Industry*

Production	Consumption	Disposal
75%[h] of micro-enterprises in the plastic industry	0,01kg of plastic daily consumed per person	60%[g] of waste legally collected
22%[s] of wastewater treated	47%[f] of recycled plastic	85% of inadequately managed plastic

CHINA
Surplus in the balance of trade for the plastic Industry*

Production	Consumption	Disposal
98%[o] of micro-enterprises in the plastic industry	0,12kg of plastic daily consumed per person	62%[q] of waste legally collected
93,5%[r] of wastewater treated	23%[p] of recycled plastic	74% of inadequately managed plastic

CHILE
Deficit in the balance of trade for the plastic Industry*

Production	Consumption	Disposal
87%[n] of micro-enterprises in the plastic insutry	0,12kg of plastic daily consumed per person	96,49%[d] of waste legally collected
99,8%[e] of wastewater treated	1,71%[d] of recycled plastic	7% of inadequately managed plastic

SOUTH AFRICA
Deficit in the balance of trade for the plastic Industry*

Production	Consumption	Disposal
75% of micro-enterprises in the plastic insutry	0,24kg of plastic daily consumed per person	64%[c] of waste legally collected
57%[b] of wastewater treated	43,7%[c] of recycled plastic	54% of inadequately managed plastic

VIETNAM
Deficit in the balance of trade for the plastic Industry*

Production	Consumption	Disposal
80%[m] of micro-enterprises in the plastic insutry	0,1kg of plastic daily consumed per person	85%[i] of waste legally collected
11%[i] of wastewater treated	1,1%[i] of recycled plastic	73% of inadequately managed plastic

WORLD AVERAGE

Consumption	Disposal
0,20kg of plastic daily consumed per person	64% of waste legally collected
26% of wastewater treated / 19,5%[a] of recycled plastic	36% of inadequately managed plastic

TOP 10 COUNTRIES
ENVIRONMENTAL PERFORMANCE INDEX (2018)

Consumption	Disposal
0,16kg of plastic daily consumed per person	97% of waste legally collected
87.5% of wastewater treated / 46.3%[a] of recycled plastic	0.85% of inadequately managed plastic

* Country data for 2018. Trade Balance = Total Value of Exports – Total Value of Imports; a trade surplus occurs when the result of the calculation is positive, a trade deficit occurs when the result of the calculation is negative.
N.A. = not available. Sources: a. Jambeck et al. (2015), b. UNdata (2018), c. Plastics South Africa (2017), d. SUBDERE 2018; Tello Espinoza et al. 2010, e. SUBDERE (2018; Tello Espinoza et al. 2010), f. BFP (2011), g. Chalmin and Gaillochet (2009), h. FICCI (2017), i. MONRE (2018), j. Lower-middle income countries average 64% (Kaza et al. 2018), k. OECD (2019), l. Kaza et al (2018), m. IVI (2019), n. Sii (2016), o. NBS (2018), p. NDRC (2014), q. Guojun (2015), r. Ministry of Environmental Protection of the People's Republic of China (2017), s. CSE (2014).