

# Trends and Opportunities for Using Economic Instruments, Incentives, and Market-Based Approaches for Waste Management in Asia

Gunnar Köhlin, Director Environment for Development



Sustainable Financing for Nature Positive Investments: Tools for Integrating Economic and Market-Based Instruments into Projects

*This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.*

# Background: The MBAEM report



- Market-based approaches increasingly important for environmental management globally
- Huge sustainability challenge demands efficient policies
- Review of the experiences and potential for management of **air, water and waste**
  - Systematic reviews of literature
  - Country policy reviews
  - Case studies
  - Validation workshops
- Today, presentation of the findings of applications of MBI on waste.
- Acknowledge important contributions by Reza Daniels and Leonard le Roux at University of Cape Town and Shivani Wadehra at CECFEE, Indian Statistical Institute

# Case studies



**India: Deposit Refund Scheme for Lead Acid Batteries**

**People's Republic of China: The Recycling of Waste Electrical and Electronic Equipment**

**Indonesia: Upstream Waste Reduction through Information Disclosure**

**India: Feed-in Tariffs and Reverse Auctions for Solar Power**

**Cambodia: Water Tariff Reform in Phnom Penh**

**Viet Nam: Payment for Forest Ecosystem Services for Watershed Protection**

# Overview



1. The Asian Waste Challenge and Trends
2. Experiences of Market-based Instruments Applied on Waste in Asia
3. Key messages
4. An (EfD) example of a policy framework for plastic pollution

# The Asian waste challenge

## Trends

- 4.5 billion people
- 1.5% growth in urban population
- Rapidly rising per-capita incomes
- Increased consumption

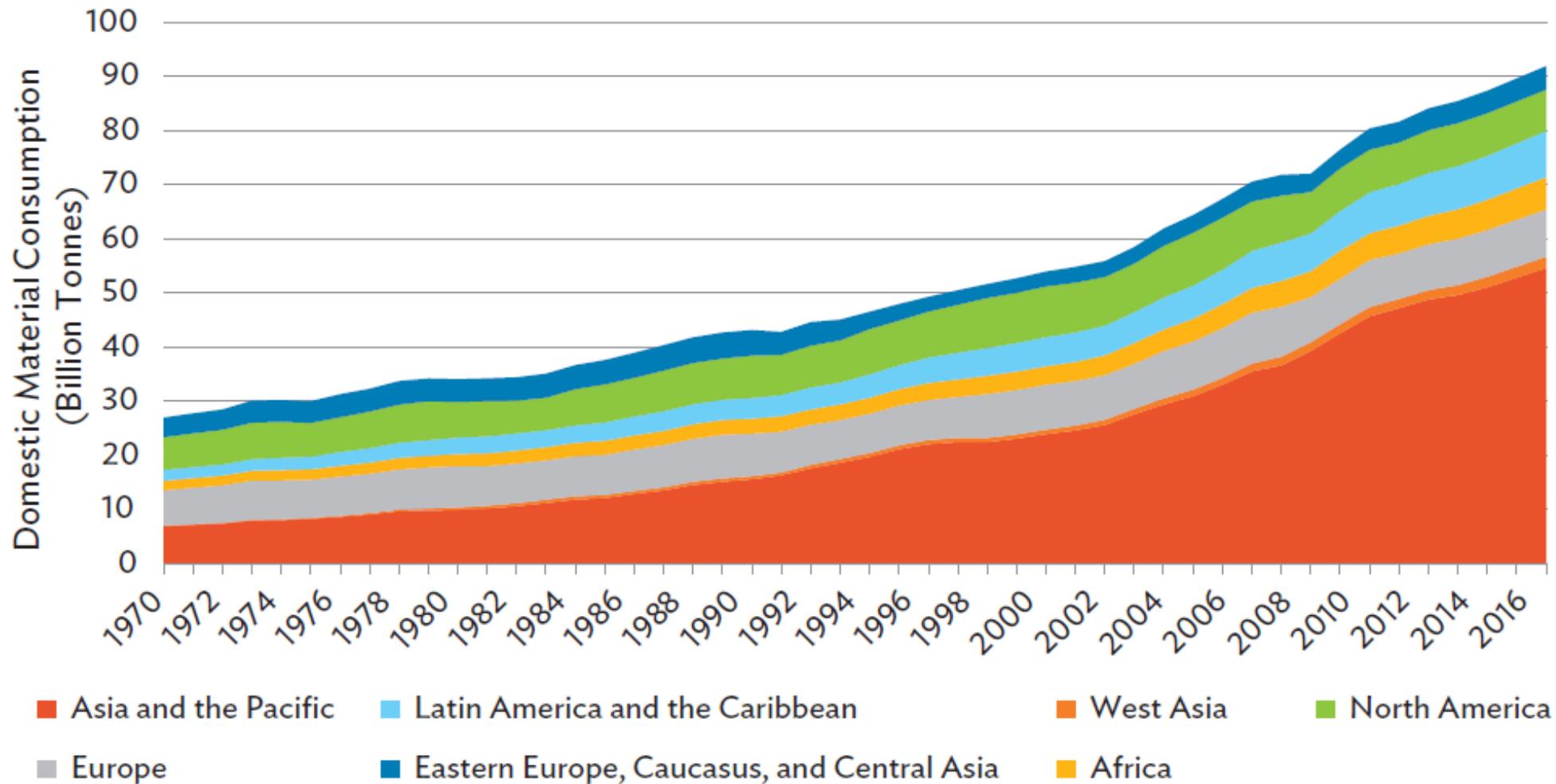
=> More waste

## Approaches

- Upstream waste reduction
- Waste collection
- Waste processing

Or the 3R's: Reduce, Reuse, Recycle.

### Figure 3: Domestic Material Consumption

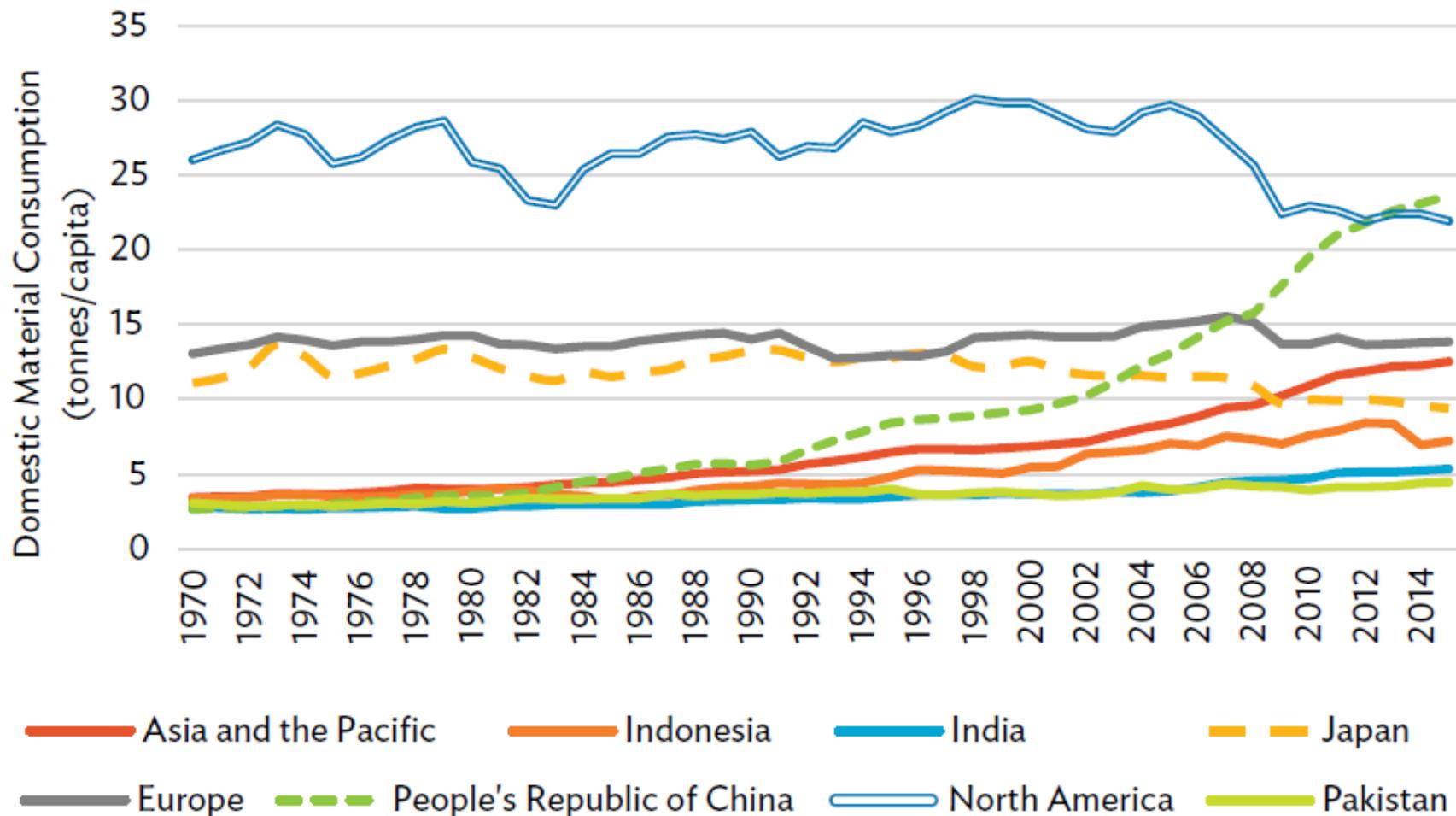


Note: Domestic material consumption is defined as direct, gross physical domestic extraction of materials from the environment within a nation's territory, plus direct physical imports minus direct physical exports of materials.

Source: United Nations Environment Programme, International Resource Panel. Global Material Flows Database (accessed 28 February 2018). <https://www.resourcepanel.org/global-material-flows-database>.



### Figure 4: Per Capita Domestic Material Consumption



Note: Domestic material consumption is defined as direct, gross physical domestic extraction of materials from the environment within a nation's territory, plus direct physical imports minus direct physical exports of materials.

Source: United Nations Environment Program International Resource Panel, Global Material Flows Database.

<https://www.resourcepanel.org/global-material-flows-database> (accessed 28 February 2018).



Figure 5: Municipal Solid Waste Generation and Gross Domestic Product Per Capita

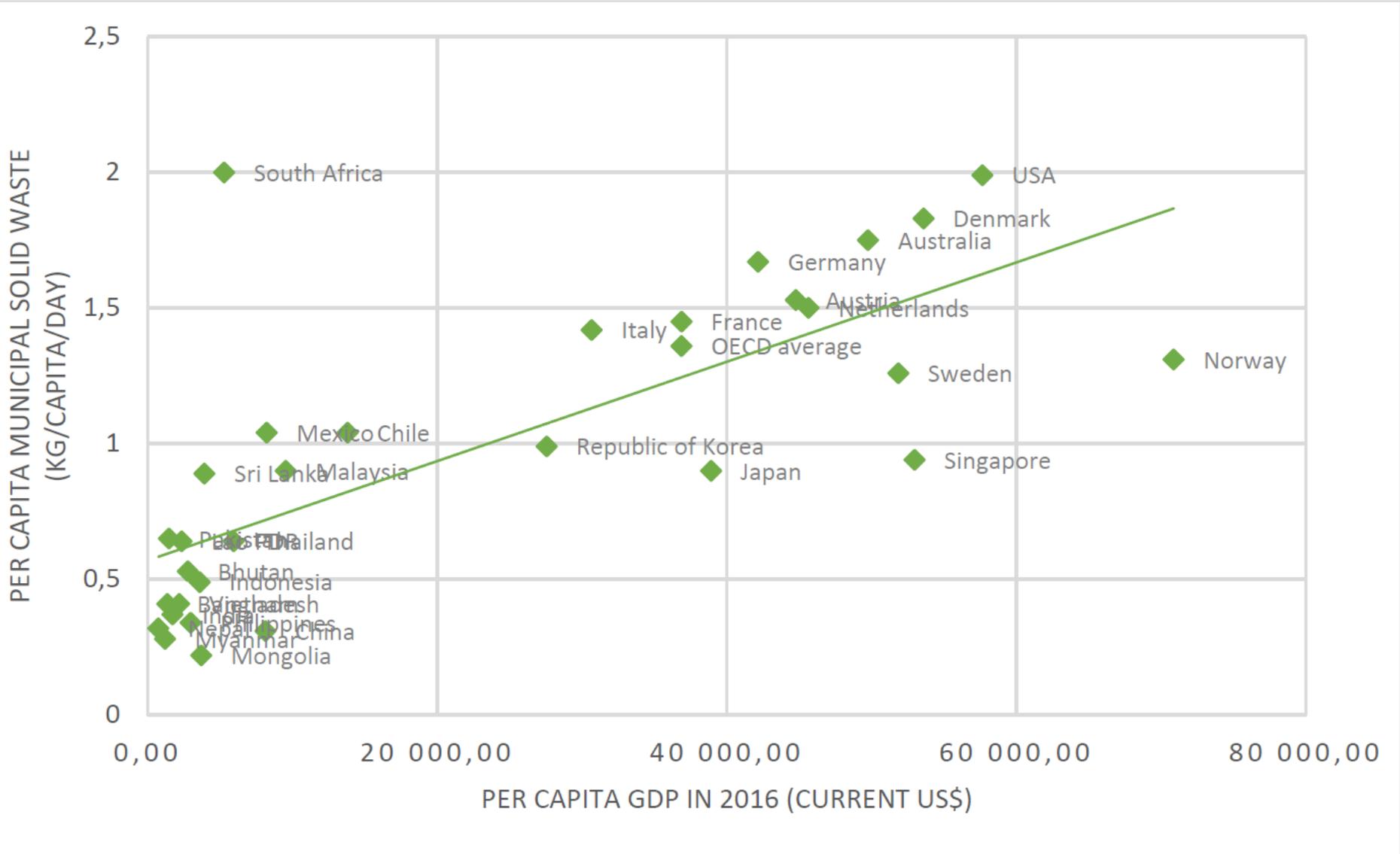
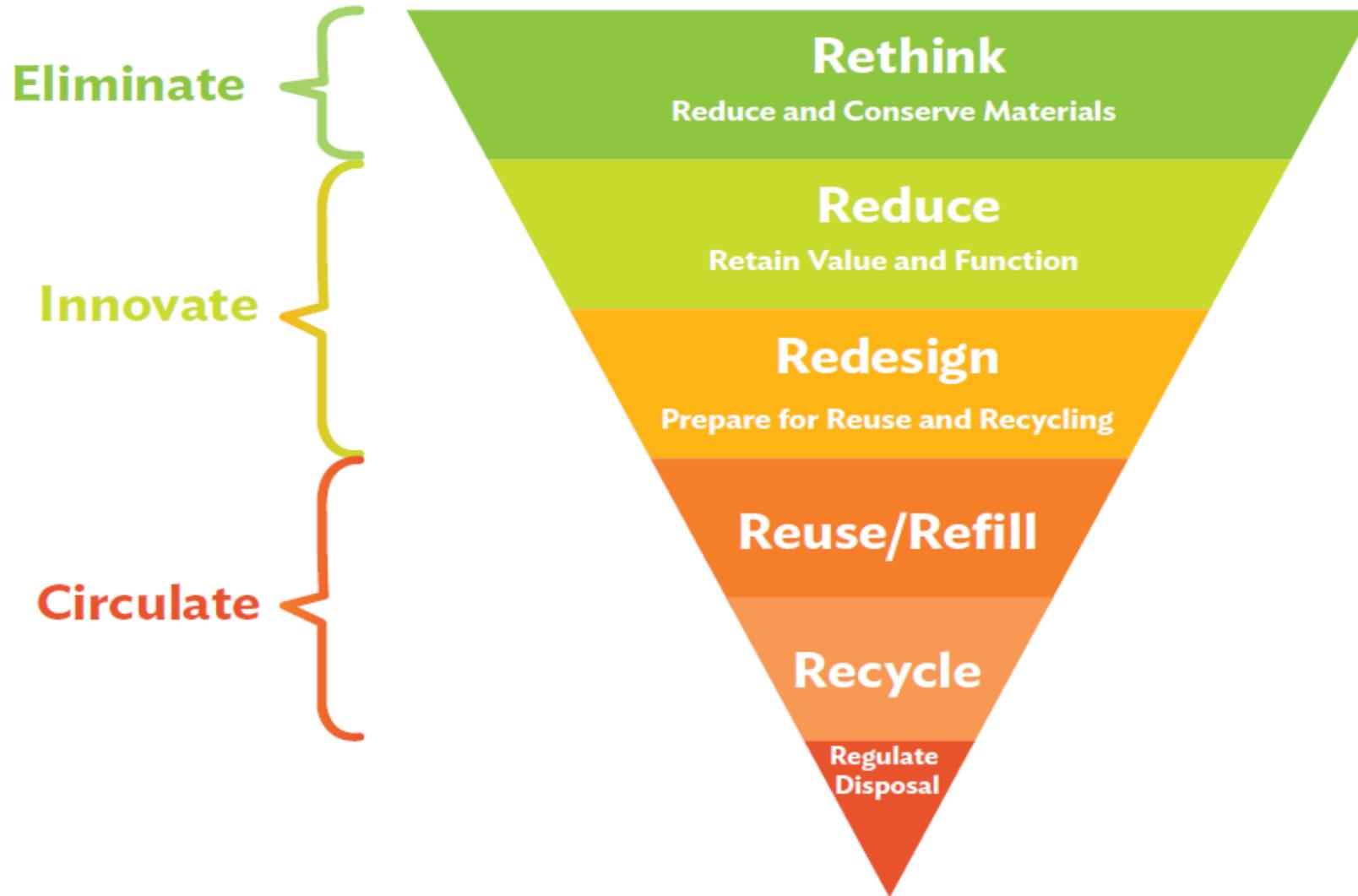


Figure 6: Action Hierarchy in the Circular Economy



Sources: Adapted from European Commission [EC]. Waste Framework Directive). [https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive\\_en](https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en); and M. Goorhuis and A. Bartl. 2011. International Solid Waste Association [ISWA] Key Issue Paper on Waste Prevention, Waste Minimization and Resource Management. [https://www.iswa.org/index.php?eID=tx\\_iswaknowledgebase\\_download&documentUid=2359](https://www.iswa.org/index.php?eID=tx_iswaknowledgebase_download&documentUid=2359).



# Methodology

1. Identify key applications in waste management:
  - Upstream waste reduction
  - Domestic and industrial waste collection
  - Waste Processing
2. Identify the economic tools available to policy makers.
  - (i) tradable permits;
  - (ii) taxes, fees, and charges;
  - (iii) subsidies;
  - (iv) hybrid policies or policy mixes; and
  - (v) information provision.
3. Systematic review of all peer-reviewed journal articles linking policy tools to applications published in recognized international scientific journals
4. Analysis of findings and case studies
5. Validation through workshops and peer review

## Table 16: Overview of the Current use of Market-based Instruments for Solid Waste Management in Asian

| Market-Based Instrument        | Upstream Waste Reduction  | Household and Industrial Waste Collection  | Waste Processing  |
|--------------------------------|---|--|---|
| <b>Tradable Permits</b>        |   |  | Carbon trading using animal feed wastes: PRC<br><br>Clean Development Mechanism (CDM) projects: Bangladesh, India   |
| <b>Taxes, Fees, or Charges</b> | User Charge/ Collection Fee: Bangladesh, Cambodia, Indonesia, Lao PDR, Thailand, Viet Nam<br><br>Treatment Fee by weight/PAYT: PRC<br><br>Pollution Charge/Tax: Mongolia, PRC<br><br>Environmental Tax: PRC<br><br>Environment Fund: Thailand<br><br>Penalties for noncompliance: PRC | Property and trade service tax: Malaysia<br><br>Differential collection fee and segregation: PRC<br><br>User charge for construction and demolition waste: PRC<br><br>Tax on Electronic and Electrical Producers and Importers: Thailand<br><br>User charge: Macau, China<br><br>Bag-based collection charge: Taipei,China | Recycling fee: India; Malaysia; Taipei,China<br><br>Recycling fee on electrical and electronic products: PRC; Taipei,China<br><br>User charge on emptying fecal waste: Bangladesh |

## Upstream waste reduction

- Taxes fees and charges are widely used for upstream waste reduction.
- Benefits:
  - Encourage businesses and households to internalize the cost of waste production
  - Cost recovery for utilities
- Keys to success:
  - Require monitoring and enforcement
  - Information collection on waste production

## Household and Industrial Waste Collection

- Successful policies focus on sorting of waste at source
  - Drives down the costs of waste beneficiation and enables recycling
  - Waste as a potential new resource/ income stream
  - Requires: easy ways for HH's and producers to sort waste (e.g. recycling collection sites in local communities)
- Hybrid policies such as deposit-refund schemes can be effective tools
  - Especially for electronic and electrical waste (batteries)
- Informal sector is an important aspect in waste markets in many Asian countries
  - Policies should be designed with this in mind

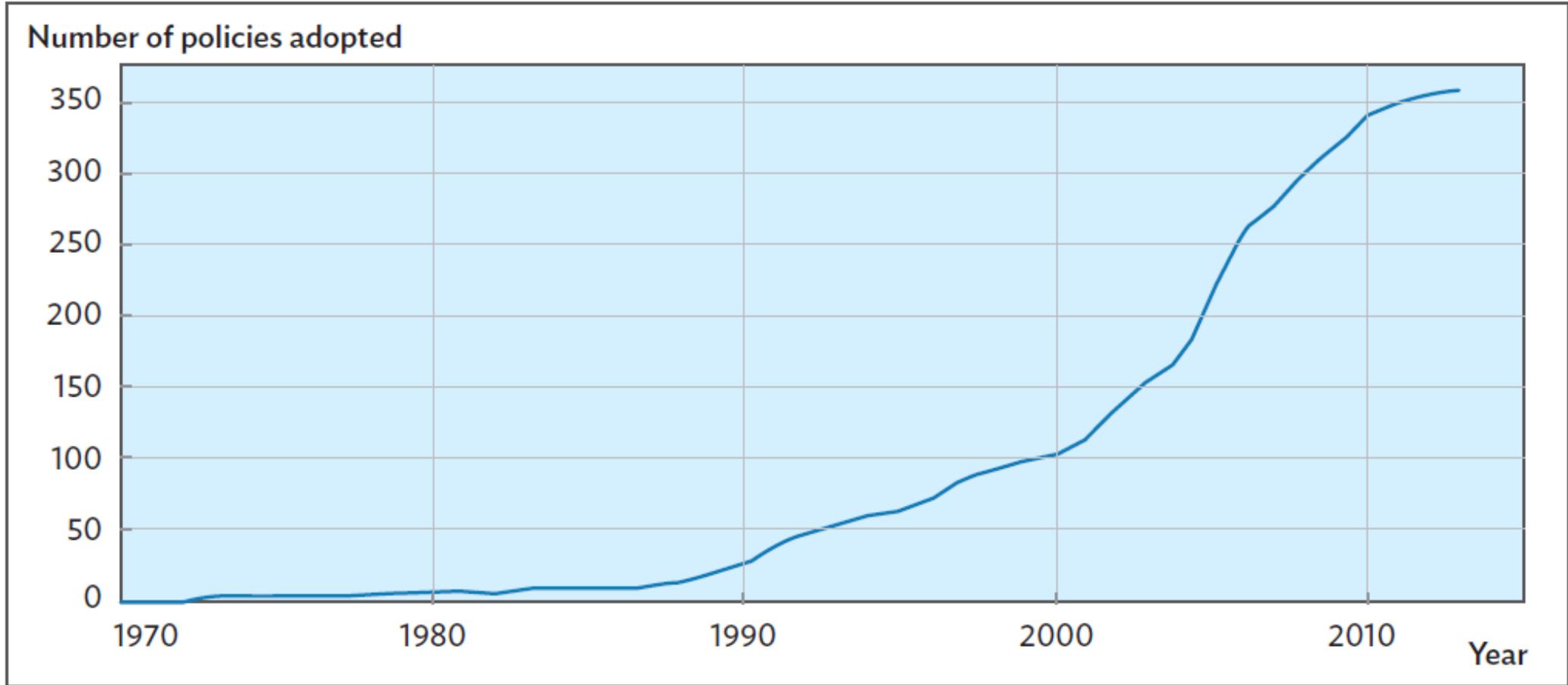
## Waste processing

- Focus on waste beneficiation
  - Extracting value
  - Employment generation
  - Potential to generate technological advances that have spillover effects in other industries
- Capital subsidies can be effective tools in encouraging the development of nascent waste beneficiation industries

## Market-Based Instruments for Converting Complex Waste Streams into Value (processing)

- Taxes, fees, and charges are useful tools to facilitate waste sorting at source.
- Information campaigns and deposit-refund schemes improve the collection of hazardous wastes.
- Extended producer responsibility schemes are widely used internationally but underutilized in Asia.

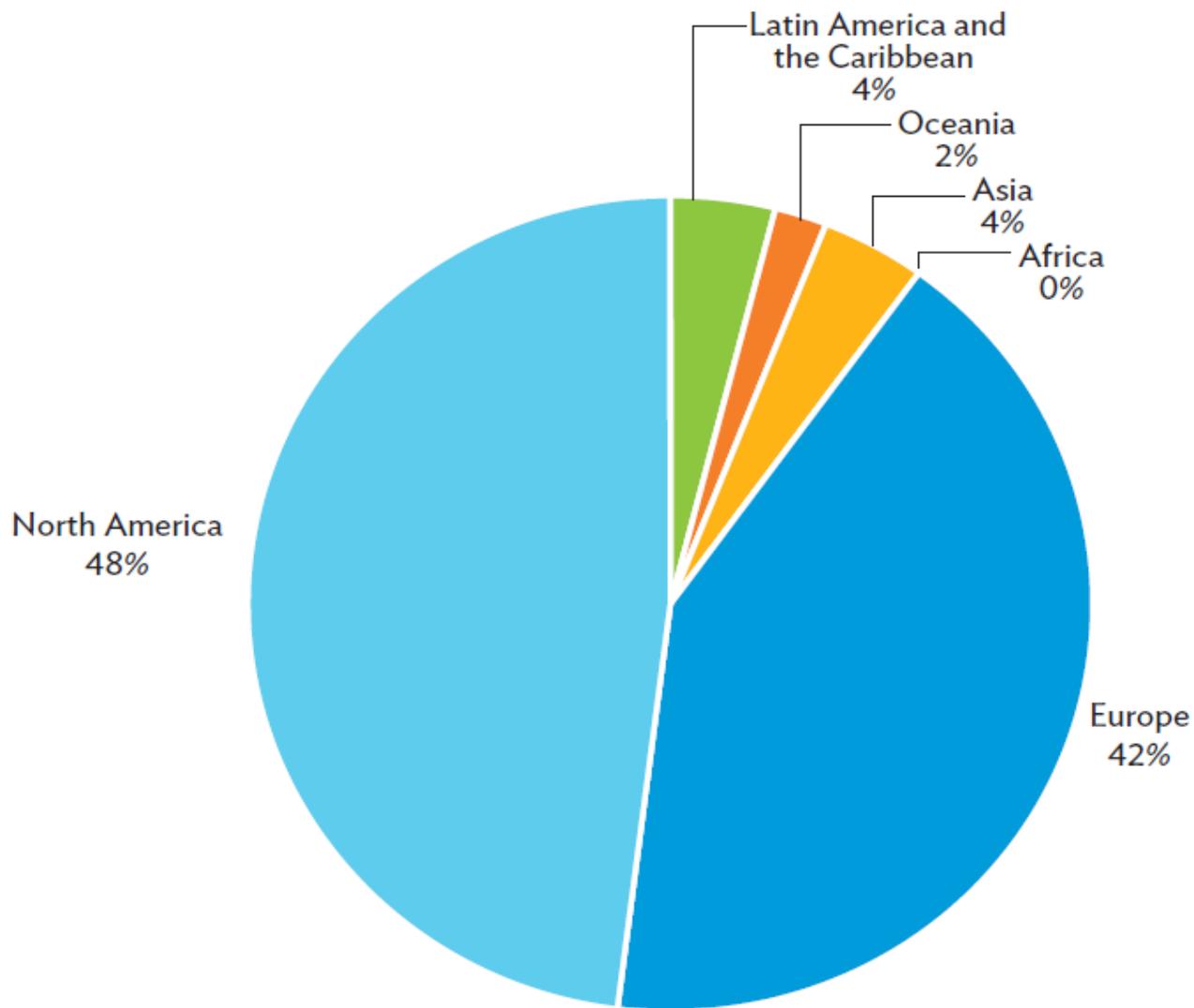
### Figure 8: Cumulative Extended Producer Responsibility Policies Adoption Globally, 1970-2015



Source: D. Kaffine and P. O'Reilly. 2013. What Have We Learned About Extended Producer Responsibility in the Past Decade? A Survey of the Recent EPR Economic Literature. [Organisation for Economic Co-operation and Development] OECD Working Party on Resource Productivity and Waste. 45.



Figure 9: Regional Distribution of Extended Producer Responsibility Policies



Source: D. Kaffine and P. O'Reilly. 2013. What Have We Learned About Extended Producer Responsibility in the Past Decade? A Survey of the Recent EPR Economic Literature. *OECD Working Party on Resource Productivity and Waste*. 45.



## Conclusions and lessons learned

- Waste management policies need to take the full waste stream—from production to waste processing—into account in an integrated fashion
- Market-based instruments should be seen as components in an integrated solid waste management plan and synergetic with regulation and enforcement.
- There is a need for better data and monitoring of waste levels, performance of policy tools, and environmental health in Asia.
- Voluntary agreements, information-related campaigns, and extended producer responsibility schemes can be utilized more as policy tools in the solid waste sphere in Asia.

## More lessons...

- Policy instruments can support cost recovery for waste collection and promote waste reduction.
- There is potential for economic benefits from waste.
- Support for the informal sector will help improve waste management.
- Deposit–refund schemes will be crucial to managing hazardous waste.

# Upscaling Market-Based Instruments for Waste Management

- Initiatives and policies to separate waste at the source can enable markets for downstream waste beneficiation.
- Micro-waste depots in informal settlements can create incentives for informal sector waste pickers.
- Useful command and control regulations can be scaled up in identified critical waste streams.
- Countries must ensure there is a suitable legal and regulatory framework for encouraging public-private partnerships.
- Setting aspirational goals can help support introduction and implementation of MBIs.
- Market-based instruments can facilitate the transition to circular economy models.

## An ambitious but aspirational goal would be to enact zero-waste policies

- an assessment of the clarity of property rights assignment for each waste stream or group of related waste streams (e.g., organic waste, dry recyclable materials, residual waste, hazardous waste);
- identification of policies that can be implemented to assign clear property rights where they are lacking;
- recommendations for how public–private partnerships can be further encouraged to enable the transition over time from CAC to a broader use of MBIs for waste management;
- identification of strategies to deal with legacy waste, which should also involve the informal sector and provide recommendations for pathways out of informality using waste management as the tool to achieve this;
- development of industrial support policies for each waste stream or group of related waste streams aimed at different parts of the waste hierarchy; and
- an assessment of the market- and nonmarket-based barriers to entry for private sector involvement in waste management value chains.



EfD Collaborative Program  
Sustainable Management



ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Environmental Science and Policy

journal homepage: [www.elsevier.com/locate/envsci](http://www.elsevier.com/locate/envsci)



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

F. Alpizar<sup>a,b,\*</sup>, F. Carlsson<sup>c,k</sup>, G. Lanza<sup>b</sup>, B. Carney<sup>d</sup>, R.C. Daniels<sup>e</sup>, M. Jaime<sup>f</sup>, T. Ho<sup>g</sup>, Z. Nie<sup>c</sup>, C. Salazar<sup>h</sup>, B. Tibesigwa<sup>i</sup>, S. Wahdera<sup>j</sup>



# A framework for designing behavioral & economic policies to reduce marine plastic pollution

Francisco Alpizar, Fredrik Carlsson, Reza Daniels, Thong Ho, Zihan Nie, Gracia Maria Lanza Castillo, César Salazar, Marcela Jaime, Byela Tibesigwa, Shivani Wahdera



EfD Central America



EfD Tanzania



EfD China



EfD South Africa



EfD Vietnam



UNIVERSITY OF  
GOTHENBURG

EfD Sweden



EfD Chile



EfD India



# Impact pathway framework

## IMPACT PATHWAY OF PLASTIC



Production

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



Consumption



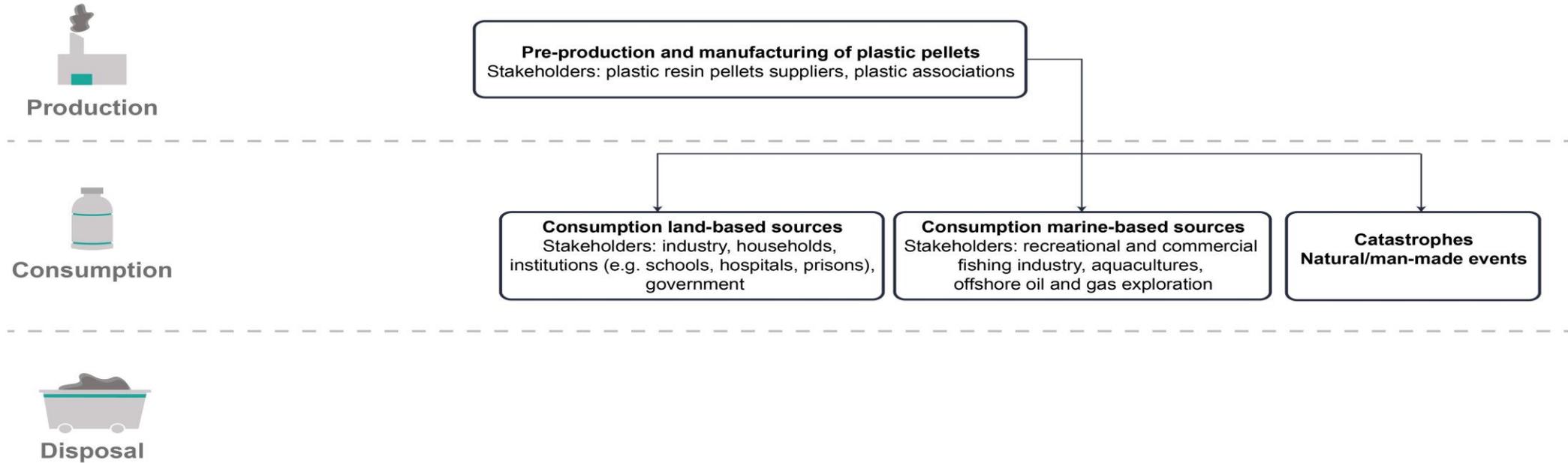
Disposal



Marine debris plastic pollution

# Impact pathway framework

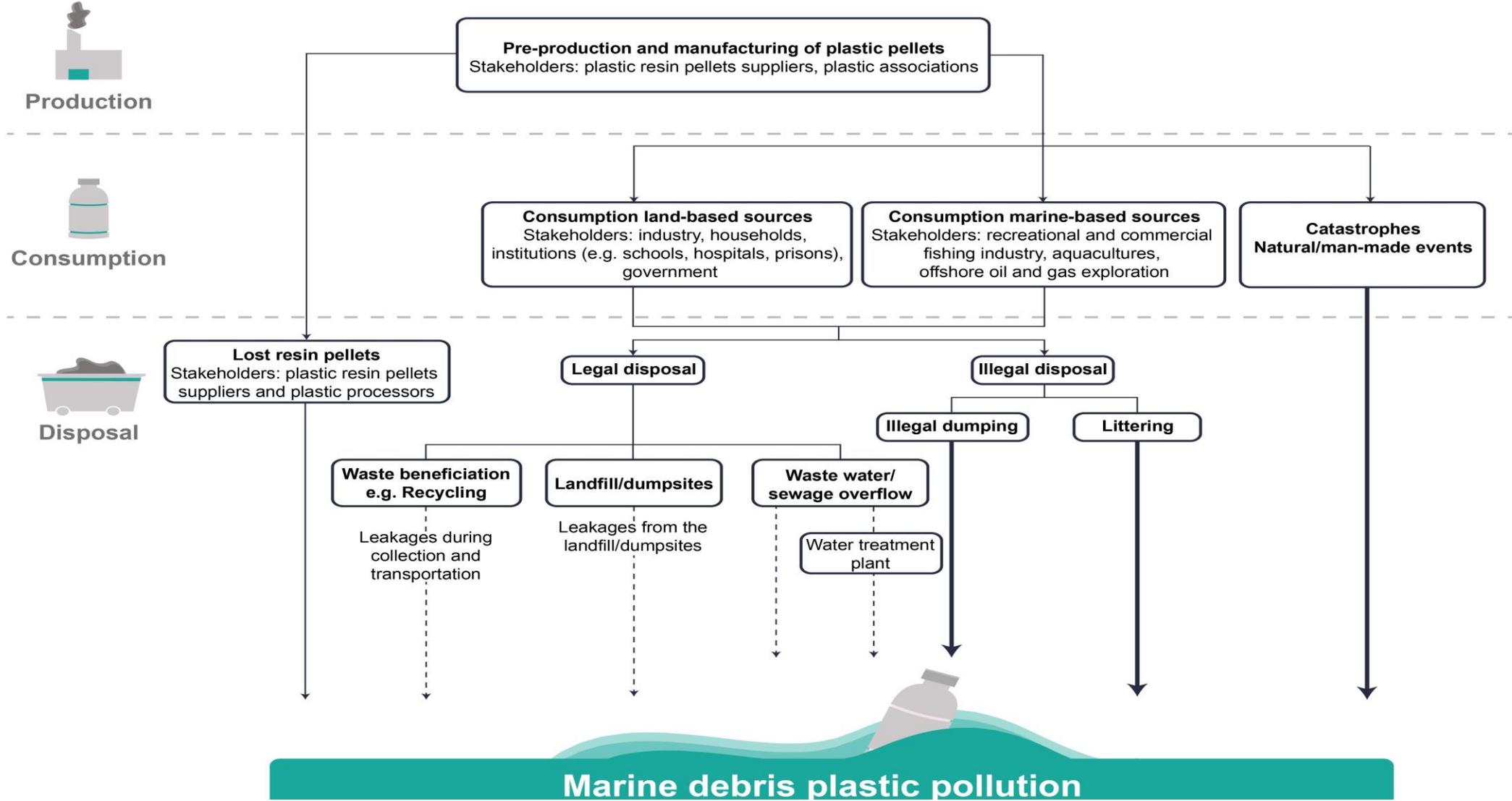
## IMPACT PATHWAY OF PLASTIC



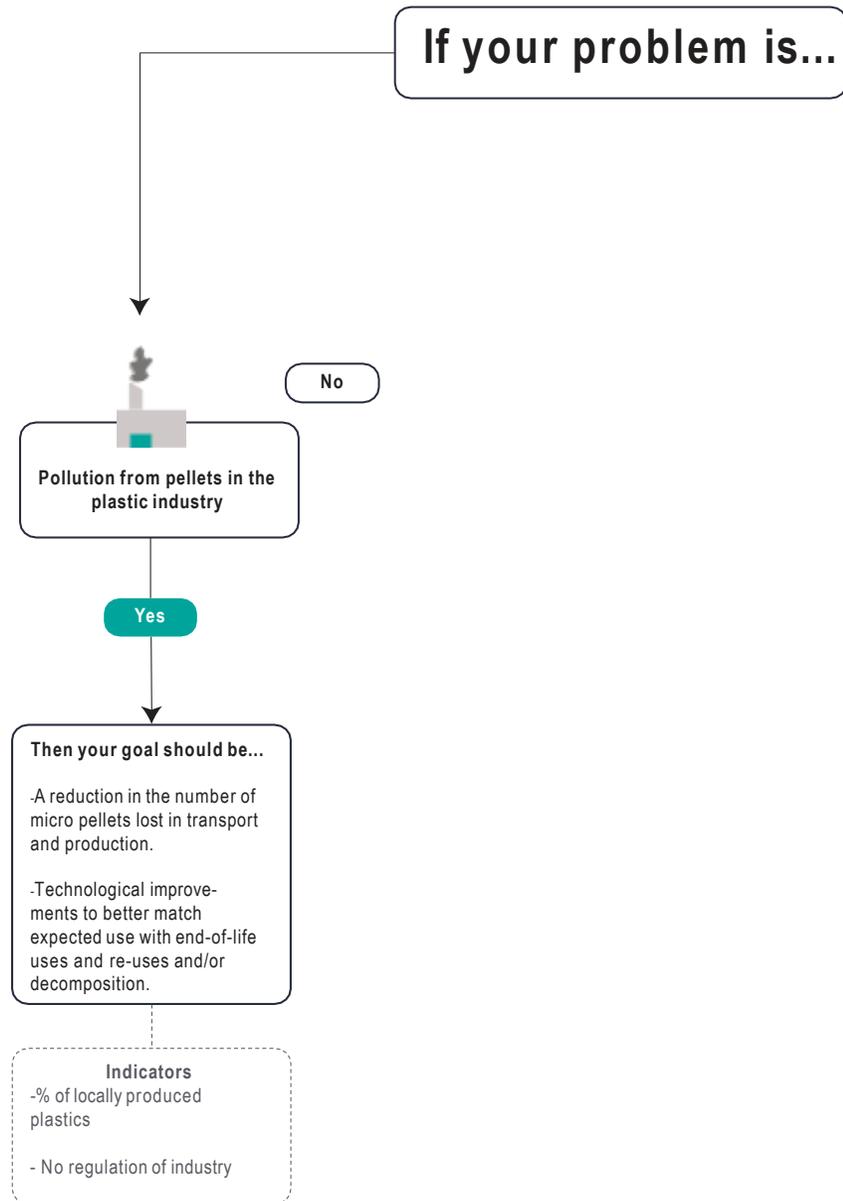
Marine debris plastic pollution

# Impact pathway framework

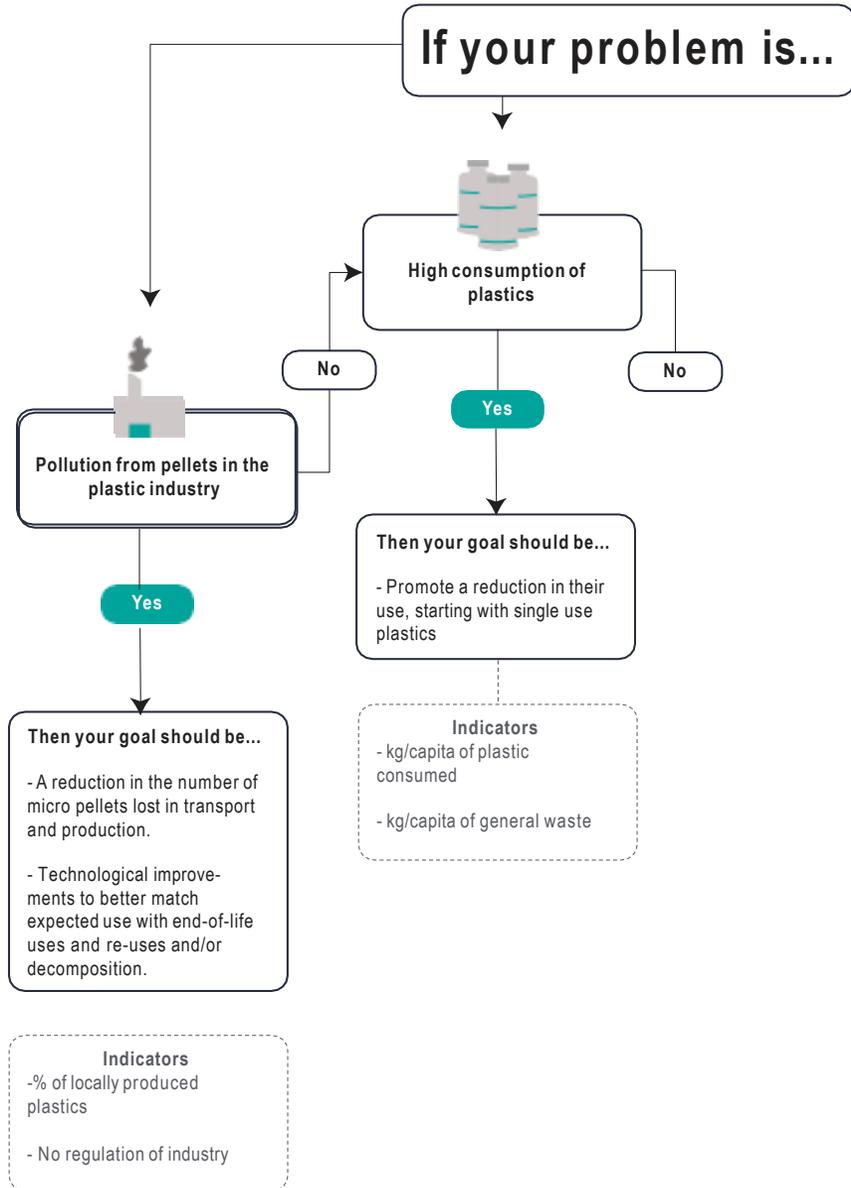
## IMPACT PATHWAY OF PLASTIC



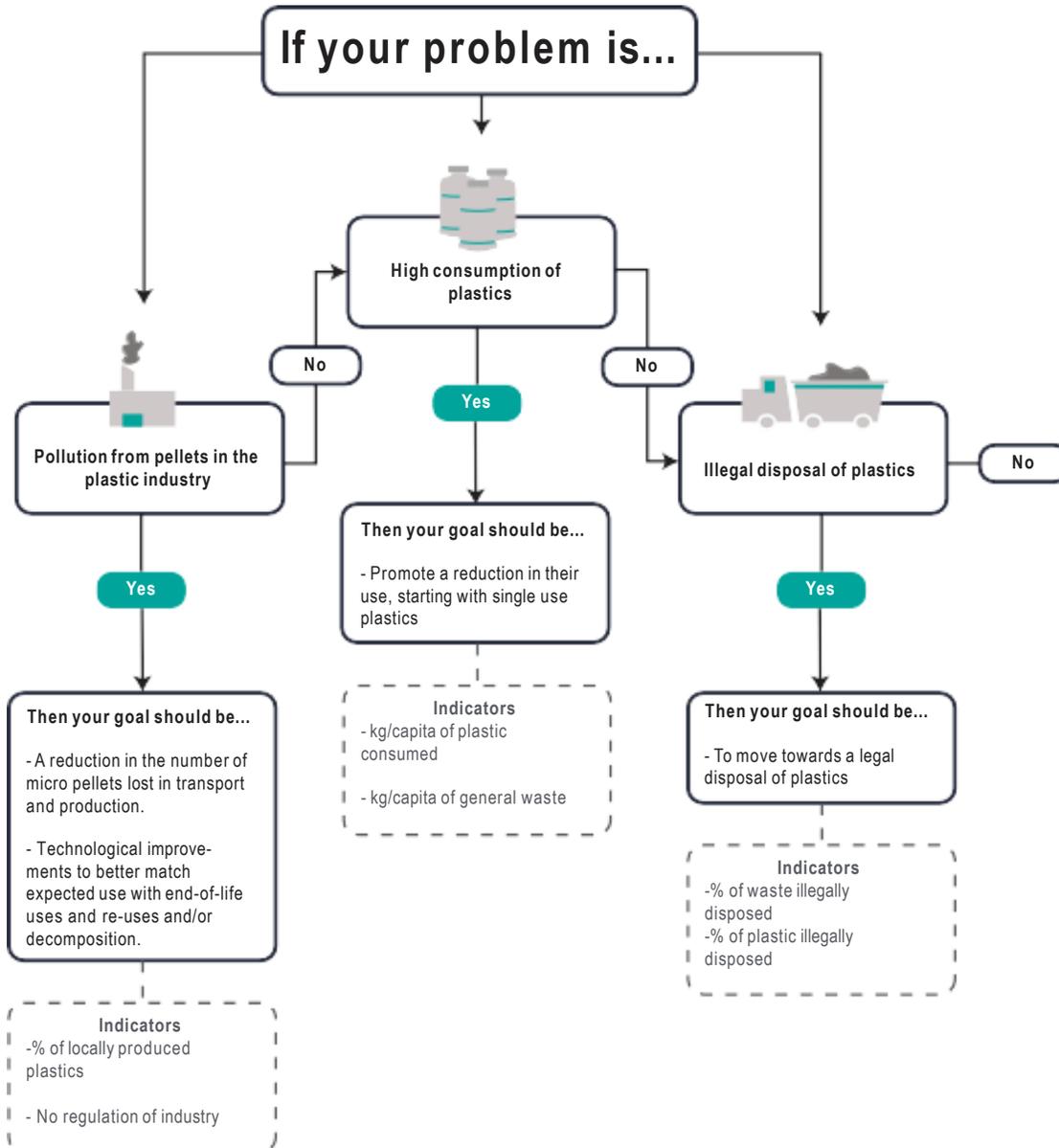
# Decision tree - setting policy goals



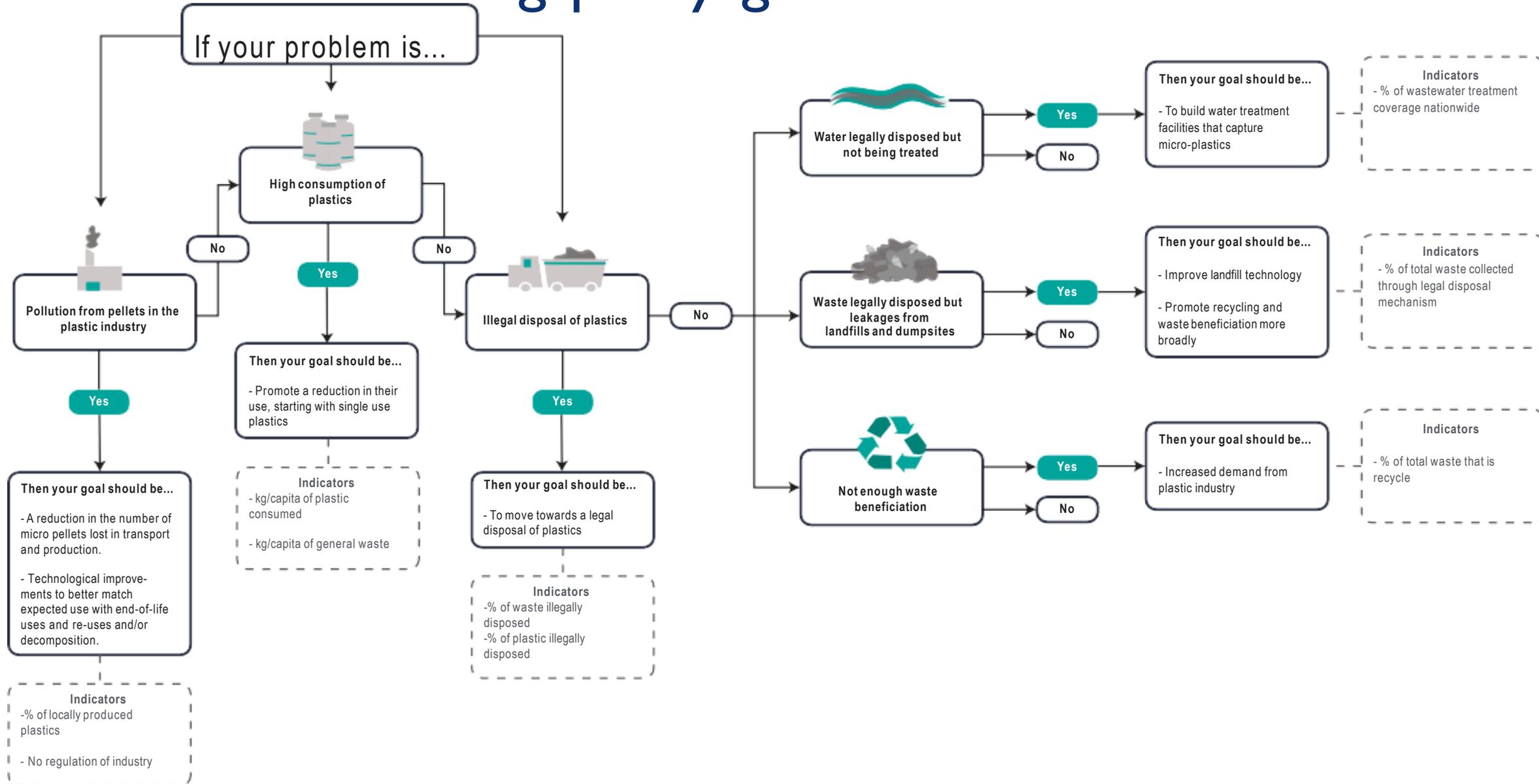
# Decision tree - setting policy goals



# Decision tree for setting policy goals



# Decision tree for setting policy goals



# Policy toolbox

If your problem is...



Production

## Behavioral

- Initiatives such as social influence (e.g., zero pellet lost).
- Social reputation
- Organizational and operational changes

## Regulation

- National regulation production, transport and usage of pellets.
- Environmental permits.
- Pellet spills regulation

## Technological

- Environmentally friendly substitutes
- Materials with a higher rate of biodegradability
- Bioplastic polymers

## Economic incentives

- Pigouvian taxes.
- Tax-subsidy schemes.
- Extended Producer Responsibility (treatment or disposal of post-consumer products)

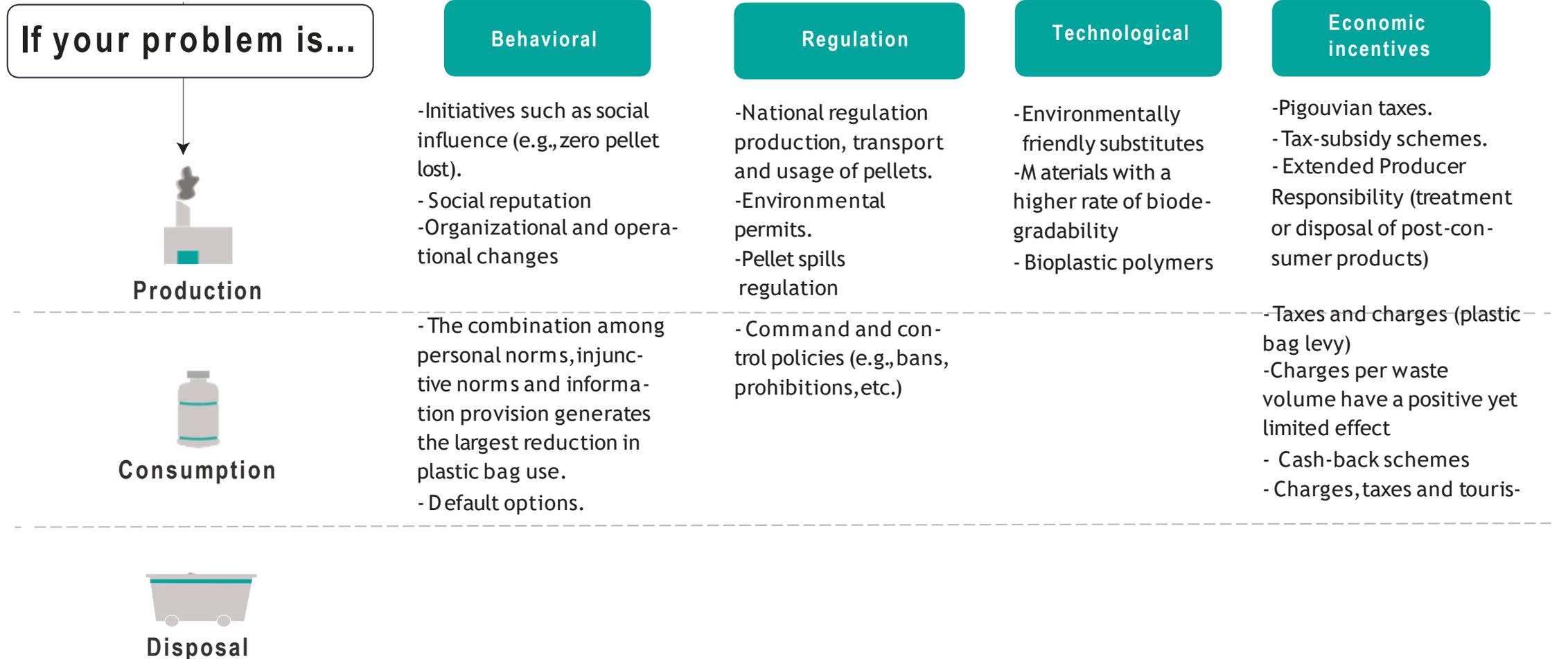


Consumption



Disposal

# Policy toolbox



# Policy toolbox

If your problem is...



Production



Consumption



Disposal

## Behavioral

- Initiatives such as social influence (e.g., zero pellet lost).
- Social reputation
- Organizational and operational changes

- The combination among personal norms, injunctive norms and information provision generates the largest reduction in plastic bag use.
- Default options.

- Pro-environmental messages with appeal to norm-based behavior
- Economic incentives are reinforced behavioral interventions.

## Regulation

- National regulation production, transport and usage of pellets.
- Environmental permits.
- Pellet spills regulation

- Command and control policies (e.g., bans, prohibitions, etc.)

- Landfill bans
- Divert biodegradable or combustible waste from landfills, returning plastic back into the system.
- stringent recycling laws

## Technological

- Environmentally friendly substitutes
- Materials with a higher rate of biodegradability
- Bioplastic polymers

- Chemical recycling methods consume less energy and reduce the need for sorting.
- New water treatment technologies (micro

## Economic incentives

- Pigouvian taxes.
- Tax-subsidy schemes.
- Extended Producer Responsibility (treatment or disposal of post-consumer products)

- Taxes and charges (plastic bag levy)
- Charges per waste volume have a positive yet limited effect
- Cash-back schemes
- Charges, taxes and tourism

- Landfill and incineration taxes
- Deposit-refund schemes.
- Direct and reward payments.
- Curbside collection and collection centers.