

# Module 2 – Identifying indicators for IGE modelling

Course: Inclusive Green Economy (IGE) modelling

Date / Place / Name

## OVERVIEW

- 1 Introduction to IGE indicators
- 2 Issue identification
- 3 Policy formulation
- 4 Policy assessment
- 5 Policy monitoring and evaluation
- 6 The GEP Measurement Framework

# 1 Introduction to IGE indicators





## INTRODUCTION

The definition of IGE includes:



Increased human well-being and social equity;



Reduced environmental risks and ecological scarcities.

These factors need to be measured in a comprehensive manner:



The state of a green economy and how it is reached;



The way a green economy is applied in policymaking processes to deliver on this global agenda.

## POLICYMAKING AND INDICATORS

Indicators are needed in all phases of the policy cycle, in particular:

### 1. Issue Identification

Environmental issues and targets

### 2. Policy Formulation

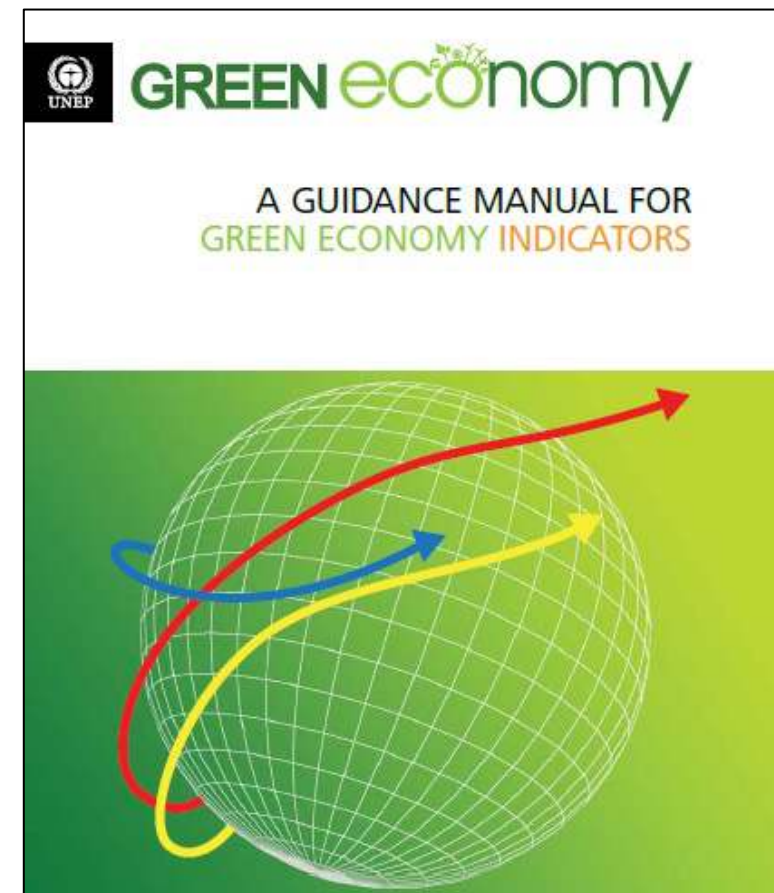
Policy interventions, costs and effectiveness

### 3. Policy Assessment

Expected policy impacts across sectors and actors

### 4. Policy Monitoring & Evaluation

Actual impacts on well-being and equity



Source: UNEP, 2014

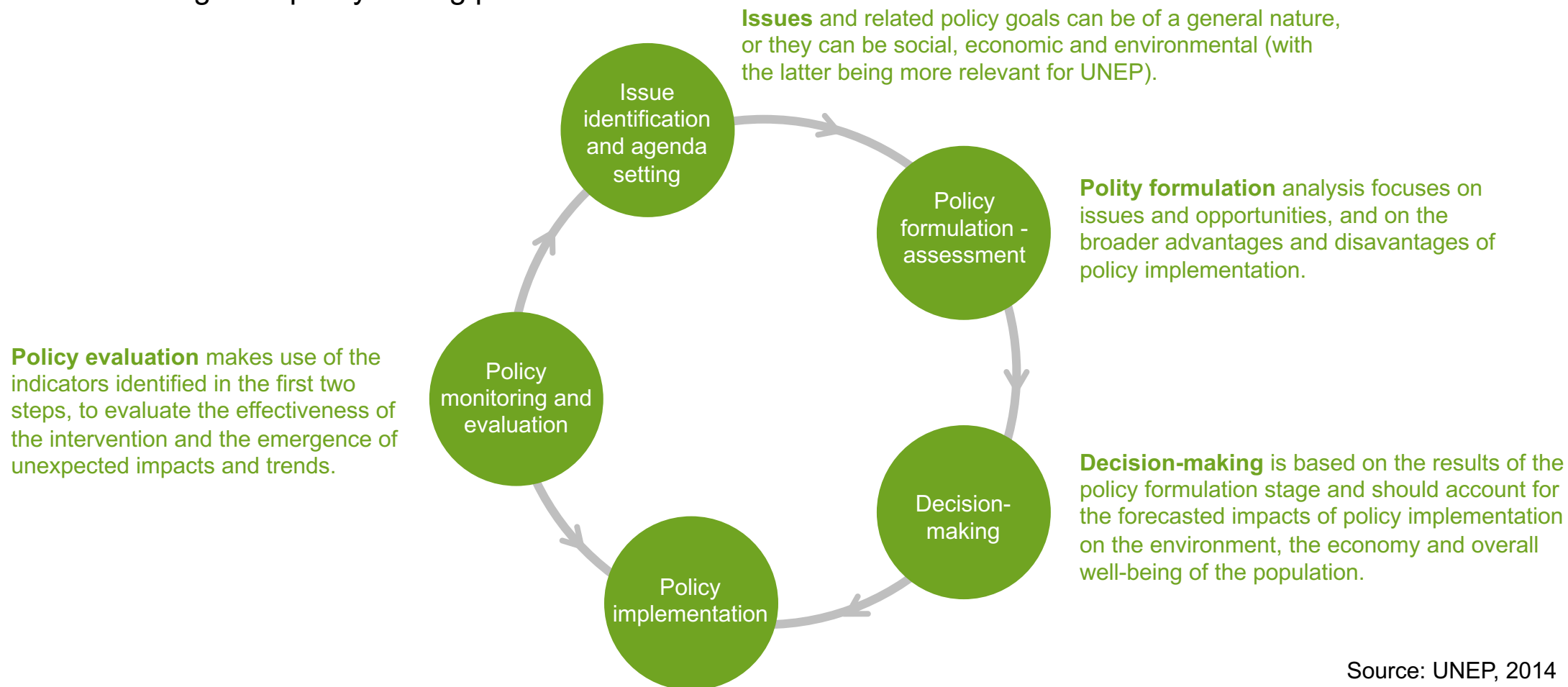
## REFLECTION POINT



**What type of  
indicators have  
you primarily used  
so far?**

## POLICYMAKING AND INDICATORS

### Overview of the integrated policymaking process



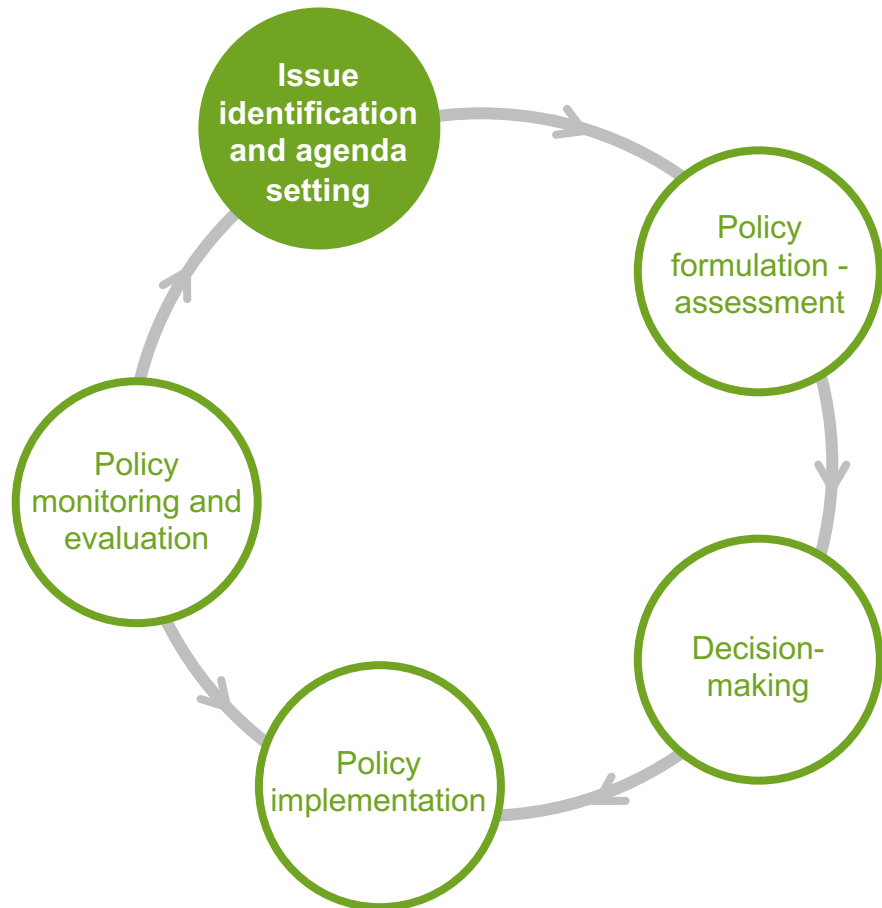
Source: UNEP, 2014



## 2 Issue Identification



## INDICATORS FOR ISSUE IDENTIFICATION



- Support decision makers in identifying and prioritising problems.
- IGE issues require combining indicators for environmental, social and economic trends.

## EXAMPLES OF INDICATORS FOR ISSUE IDENTIFICATION

Issues	Examples
Climate Change	<ul style="list-style-type: none"> <li>• Carbon emissions (ton/year)</li> <li>• Renewable energy (share of power supply) (%)</li> <li>• Energy consumption per capita (Btu/person)</li> </ul>
Ecosystem Management	<ul style="list-style-type: none"> <li>• Forestland (ha)</li> <li>• Water stress (%)</li> <li>• Land and marine conservation area (ha)</li> </ul>
Resource Efficiency	<ul style="list-style-type: none"> <li>• Energy productivity (Btu/\$)</li> <li>• Material productivity (ton/\$)</li> <li>• Water productivity (m<sup>3</sup>/)</li> <li>• CO<sub>2</sub> productivity (ton/\$)</li> </ul>
Chemicals and Waste Management	<ul style="list-style-type: none"> <li>• Waste collection (%)</li> <li>• Waste recycling and reuse (%)</li> <li>• Waste generation (ton/year) or landfill area (ha)</li> </ul>



## INDICATORS FOR ISSUE IDENTIFICATION - STEPS

1

Identify potentially worrying trends.



2

Assess the issue and its relation to the natural environment.



3

Analyze more fully the underlying causes of the issue of concern.



4

Analyze more fully how the issue impacts society, the economy and the environment.



 **STEP 1**  
Identify potential worrying trends - Tasks

Identify indicators of sectoral performance related to the problem.

Collect data relevant to the issue under consideration.

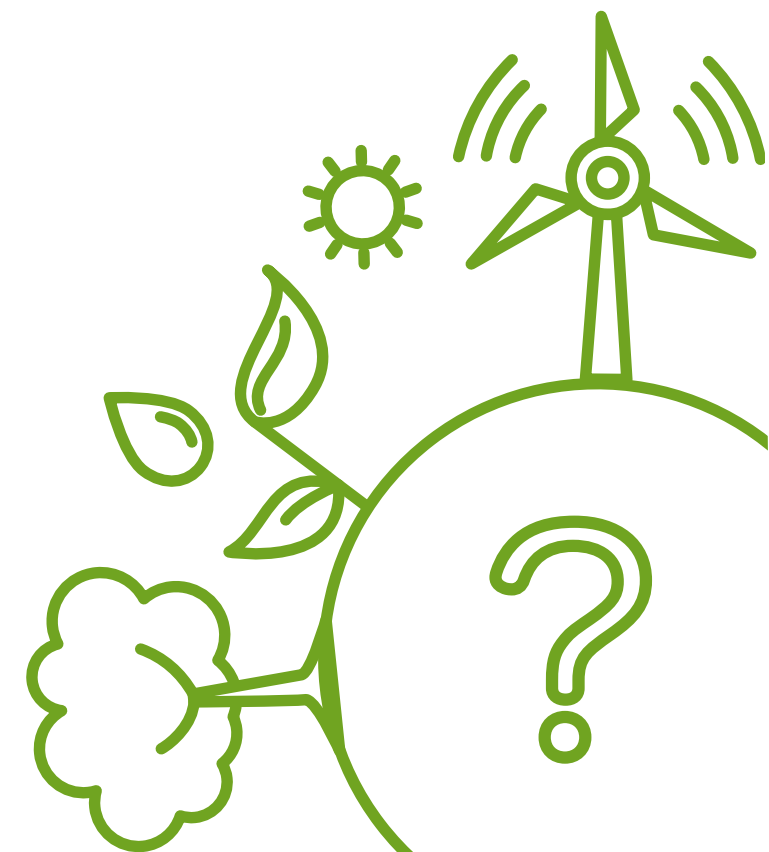
Identify national trends and compare them with existing national, regional and global targets.

Compare trends with the performance of comparable countries and/or regions.



## KEY QUESTIONS

- *Has the trend worsened in recent years?*
- *Is the trend in line with national, regional or global targets?*
- *Is the trend in line with the performance of similar countries?*





## STEP 2

### Assess the issue and its relation to the natural environment - Tasks

Identify indicators of environmental performance related to the problem.

Collect data relevant to the issue under consideration.

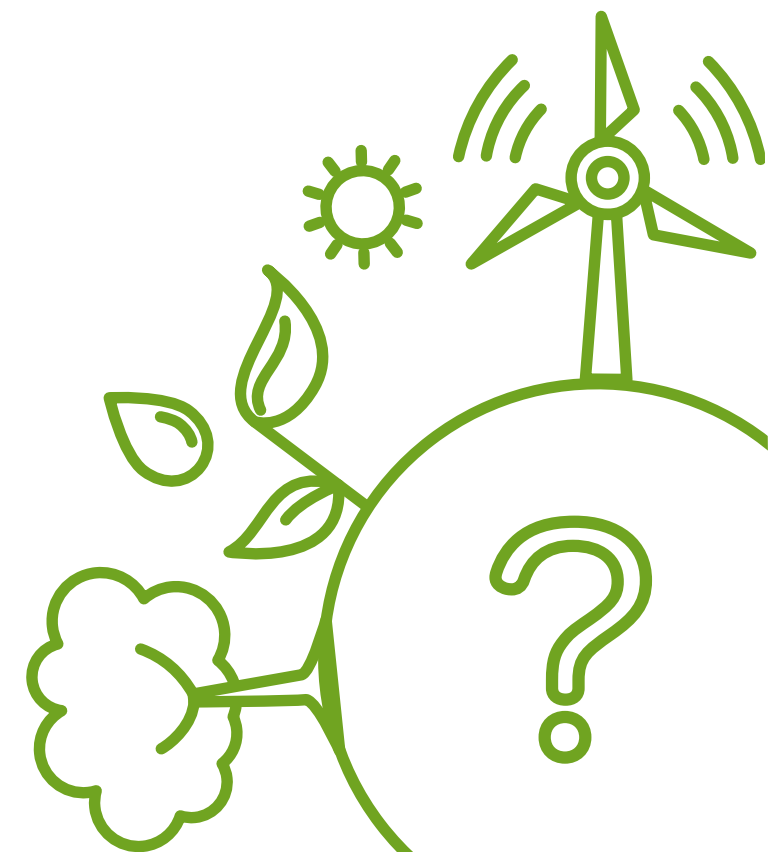
Identify national trends and compare them with existing national, regional and global targets.

Compare trends with comparable countries and regions.



## KEY QUESTIONS

- *Is the issue influenced by the environment?*
- *Is the issue influenced by natural resource depletion or degradation, erosion of ecosystem services or the reduced provision of ecosystem services?*







## STEP 3

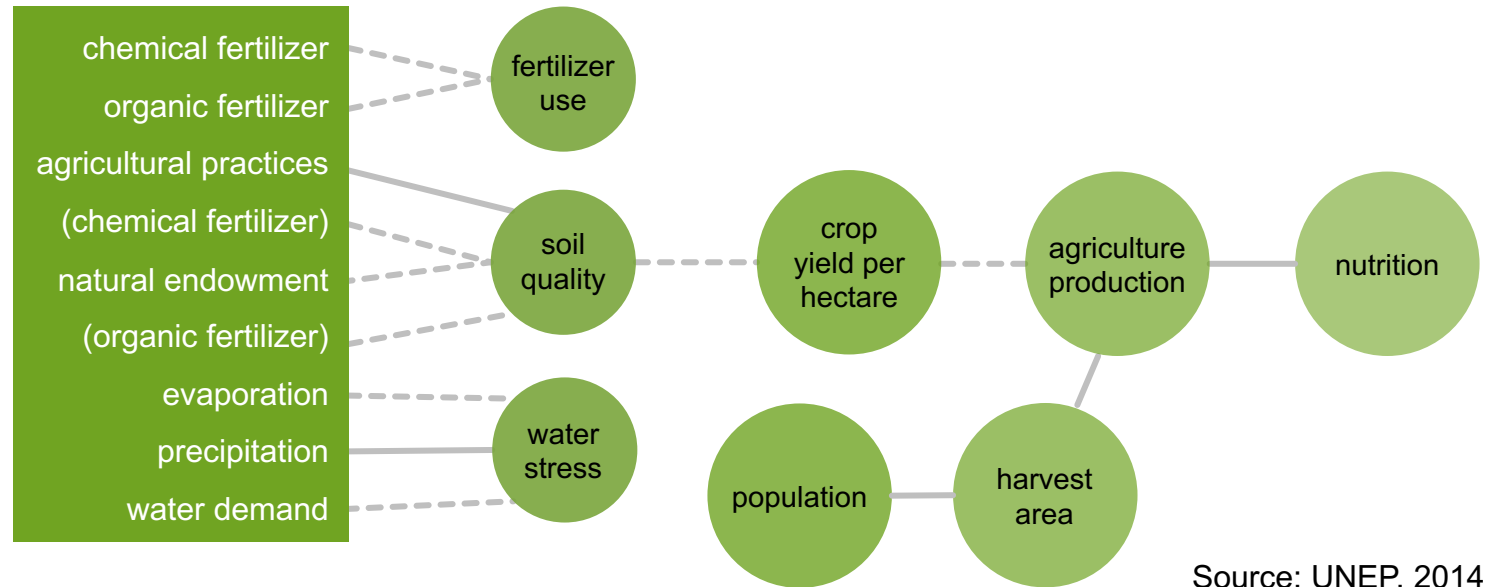
### Analyze more fully the underlying causes of the issue - Tasks

Identify causal relations and map them systemically.

Evaluate whether multiple causes act simultaneously and are also causally linked with each other.

Evaluate their respective strength.

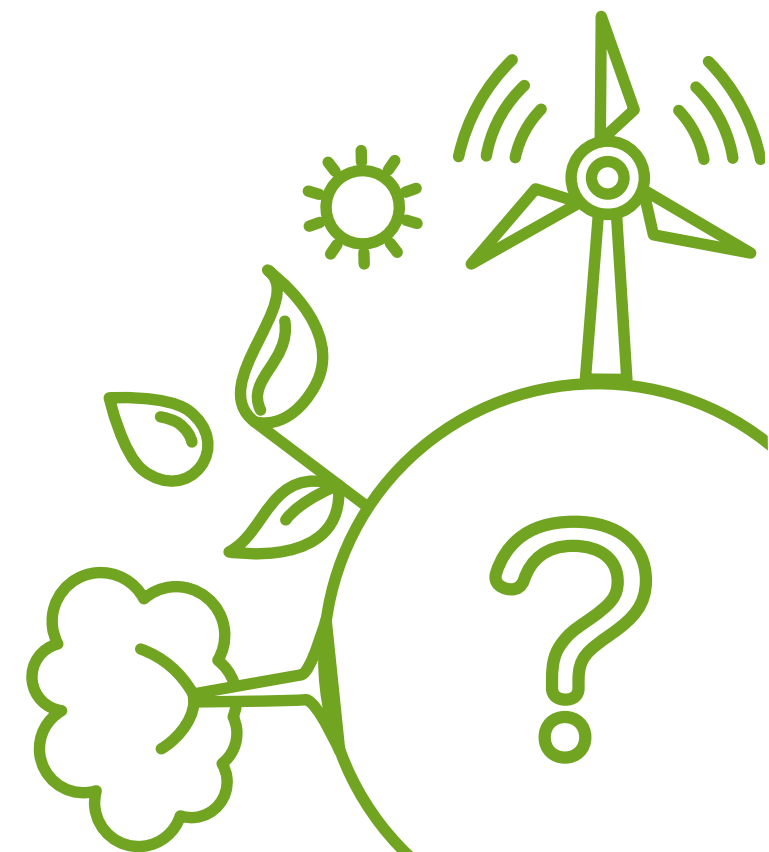
Simplified (and partial) causal tree diagram for the issue of nutrition and possible key drivers, where indicators are linked to each other, representing the causal chain leading to the problem.



Source: UNEP, 2014

## KEY QUESTIONS

- *Is there a causal relation between the trend observed and economic, social or environmental variables?*
- *What are the key drivers and pressures?*
- *Are there multiple and simultaneous causes?*



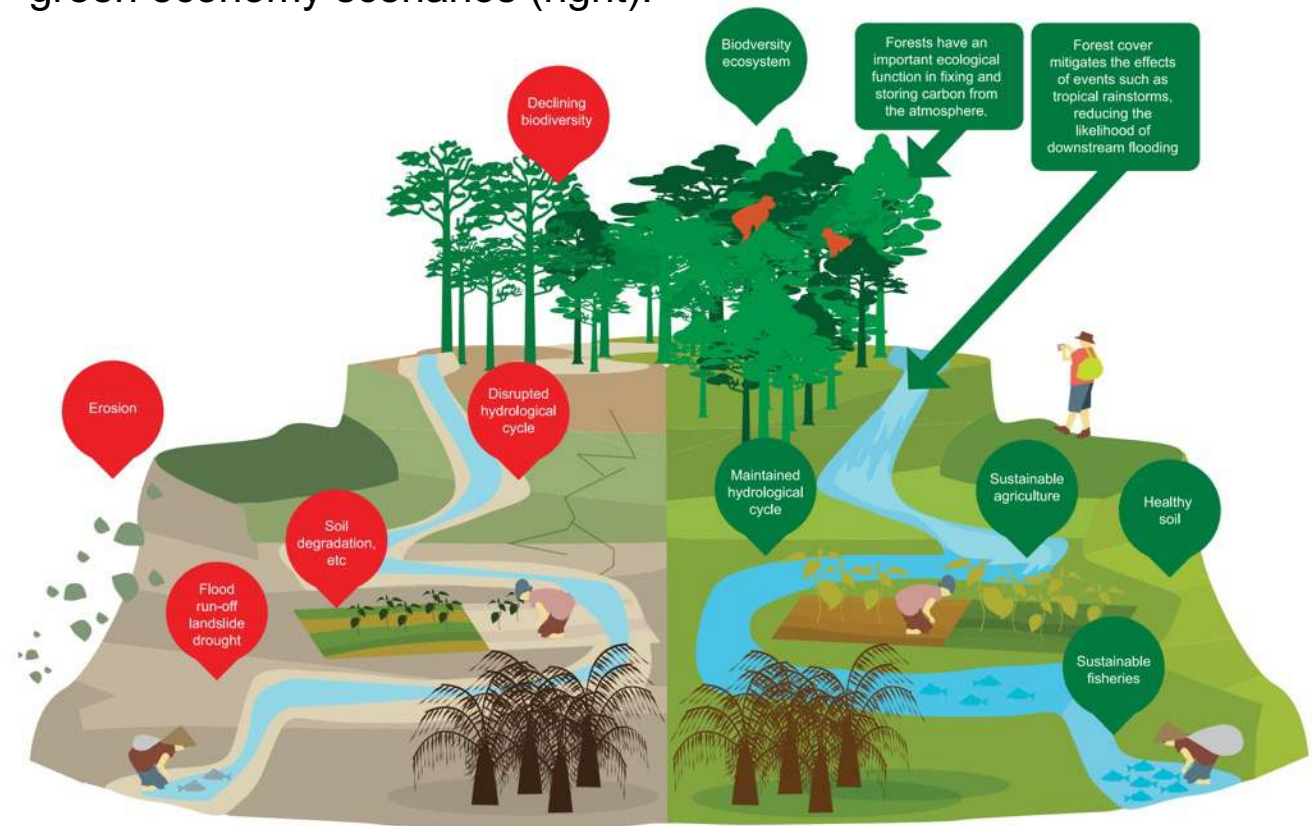
## **STEP 4** Analyze impacts on society, economy and the environment - Tasks

Identify impacts of the issue on society, the economy and the environment.

Identify indicators relevant to the issue analyzed, considering its social, economic and environmental impacts.

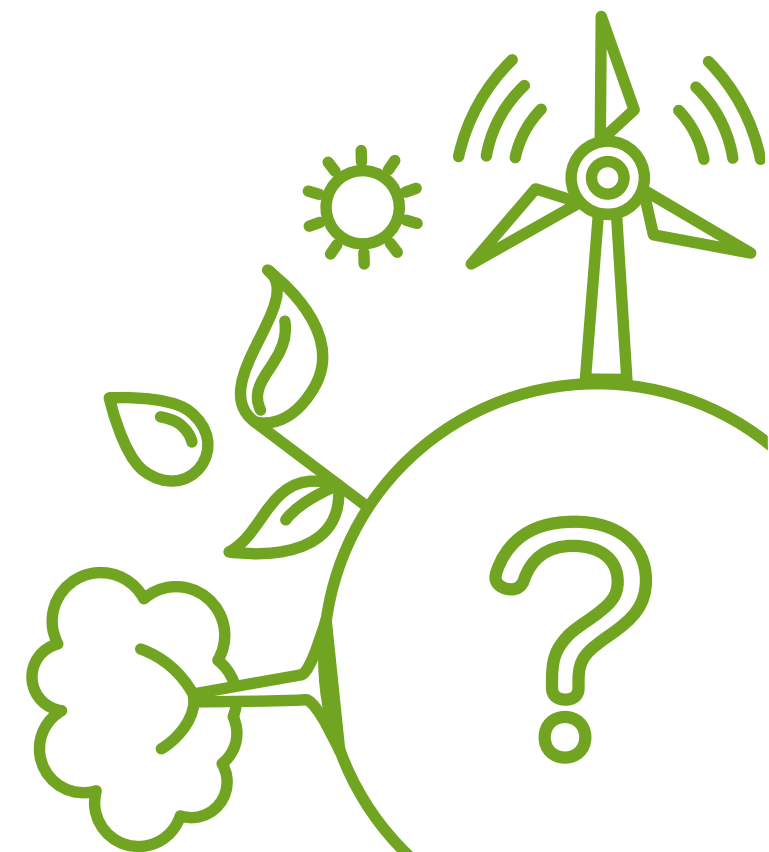
Relate causes to sectoral impacts using the causal relations identified in step 3.

Diagram illustrating the impacts of business as usual (left) and green economy scenarios (right).



## KEY QUESTIONS

- *How does the problem affect the system and its socio-economic and environmental performance?*
- *Are the impacts of the problem immediate or emerging slowly, and do they last for a long time?*

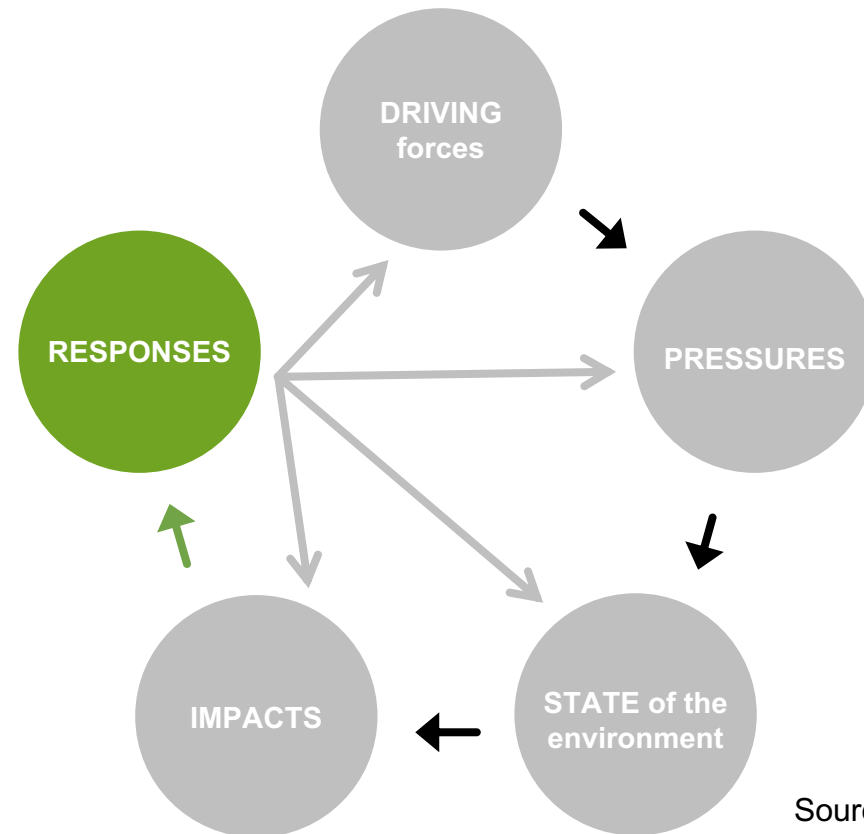


## THE DRIVERS, PRESSURES, STATE, IMPACT AND RESPONSE MODEL OF INTERVENTION

Indicators are a tool to identify, prioritise and track issues, as well as their causes and **cross-sectoral** effects.

The **DPSIR** provides a step-by-step description of the causal chain between economic activity and impacts, such as loss of biodiversity, ecosystem degradation and diminished human welfare or well-being.

A schematic representation of the DPSIR Framework.



Source: UNEP, 2014

## EXAMPLE: SUSTAINABLE AGRICULTURE IN BOSNIA AND HERZEGOVINA

Strengths	Weaknesses	Challenges	GE Opportunities
<ul style="list-style-type: none"> <li>• 42% of the total land is mountain area.</li> <li>• 62% of agricultural soil in mountain areas.</li> <li>• Sheep and goat rearing (dairy products, meat, skins).</li> <li>• Growing organic honey production.</li> </ul>	<ul style="list-style-type: none"> <li>• Only 0.03% of total agriculture area is under organic cultivation (UNEP et al., 2007; FIBL and IFOAM, 2013).</li> <li>• Sheep milk yield amounted to only 18,774 tons in 2008 (FAO, 2009).</li> <li>• Dairy products, meat and skins are mainly used for subsistence.</li> </ul>	<ul style="list-style-type: none"> <li>• Unsustainable expansion of agriculture production may lead to land use changes and deforestation.</li> <li>• Increase in the exposure of mountain areas to floods, landslides and erosion.</li> <li>• Climate change effects (e.g. increased rainfall) could deplete mountain resources.</li> </ul>	<ul style="list-style-type: none"> <li>• The expansion of ecological agriculture and organic farming, to avoid damage to the ecosystem while increasing food production and creating employment and income.</li> <li>• Incentivize the survival of mountain traditions, creating wealth for shepherds and farmers.</li> </ul>

## REFLECTION POINT



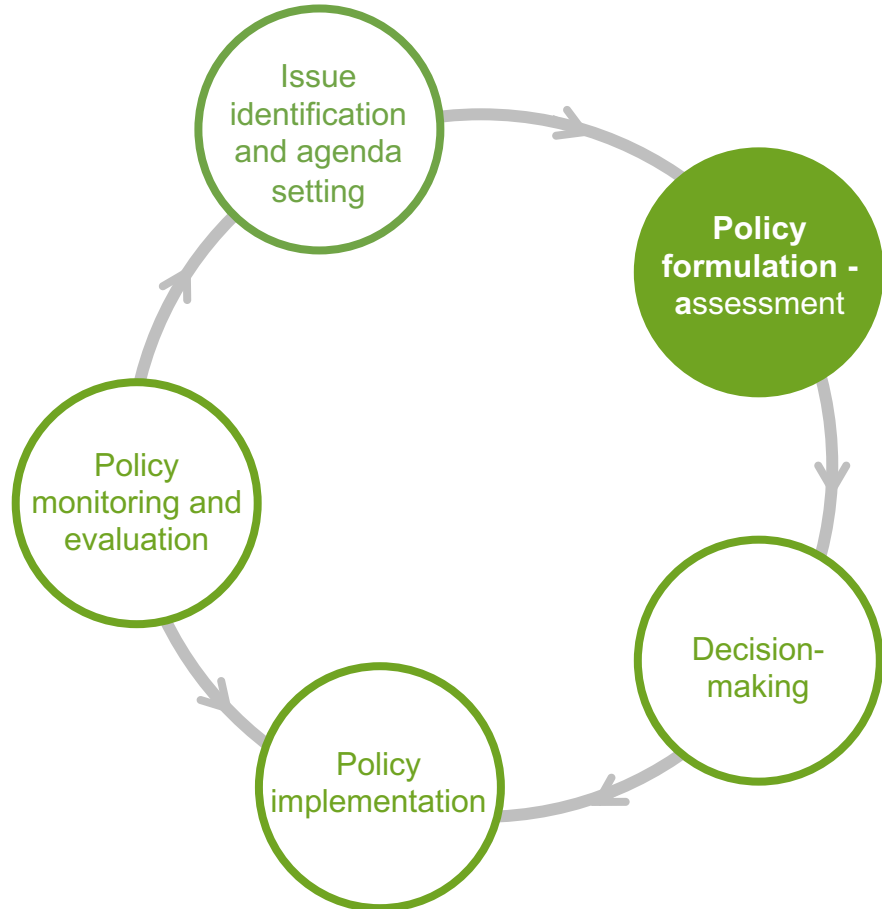
**What indicators  
would you consider  
to be relevant for  
GHG emissions?**

### 3 Policy Formulation





## INDICATORS FOR POLICY FORMULATION



- While indicators for problem identification help to frame the issue, indicators for policy formulation help to design solutions.

## EXAMPLES OF INDICATORS FOR POLICY FORMULATION

POLICY	EXAMPLES
Green investment	<ul style="list-style-type: none"> <li>• R&amp;D Investment (% of GDP)</li> <li>• EGSS Investment (\$/year)</li> </ul>
Fiscal reform	<ul style="list-style-type: none"> <li>• Fossil fuel, water and fishery subsidies (\$ or %)</li> <li>• Fossil fuel taxation (\$ or %)</li> <li>• Renewable energy incentive (\$ or %)</li> </ul>
Pricing	<ul style="list-style-type: none"> <li>• Carbon price (\$/ton)</li> <li>• Value of ecosystem services (e.g. water provision)</li> </ul>
Green procurement	<ul style="list-style-type: none"> <li>• Expenditure in sustainable procurement (\$/year and %)</li> <li>• CO<sub>2</sub> and material productivity of government operations (ton/\$)</li> </ul>
Green job skills training	<ul style="list-style-type: none"> <li>• Training expenditure (\$/year and % of GDP)</li> <li>• Number of people trained (people/year)</li> </ul>



## INDICATORS FOR POLICY IDENTIFICATION - STEPS

1

Establish targeted, measurable, ambitious, while achievable or realistic, and time-bound (SMART) objectives.



2

Analyze costs and benefits of available options, such as investments, and enabling conditions, including incentives or disincentives, regulations and social interventions.



 **STEP 1**  
Identify desired outcomes: define policy objectives - Tasks

Analyze indicators of sectoral and environmental issues.

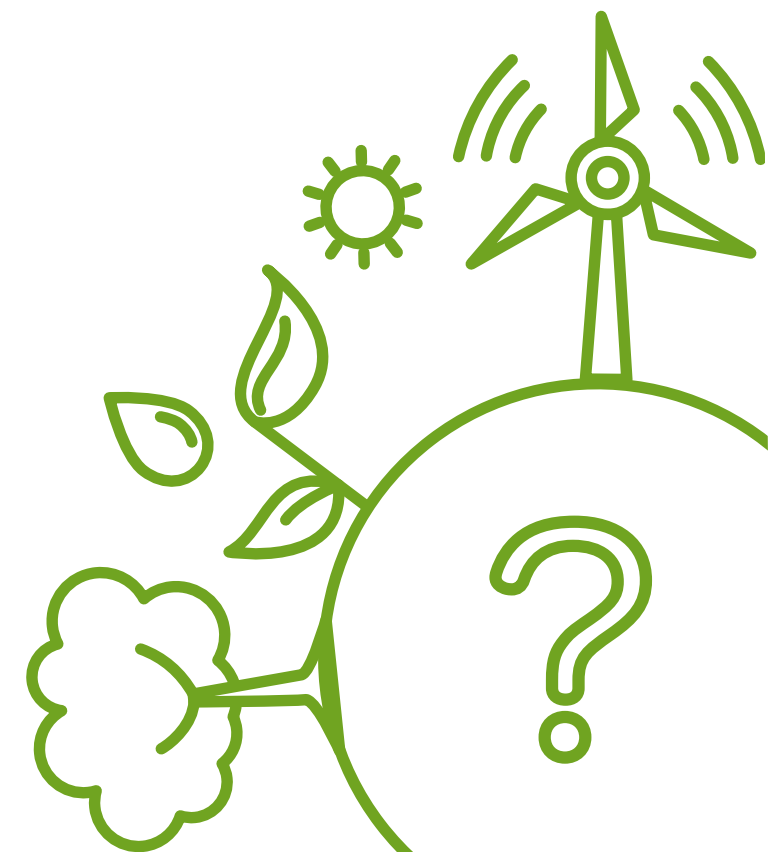
Select target indicators tailored to the national context, with the help of existing global and regional targets:

- Set specific targets to address the causes of the problem.
- Set specific targets to reduce the impacts of the problem.



## KEY QUESTIONS

- *What is the desired outcome that can be reached through investment and enabling policies?*
- *What is the key target to be reached?*



 **STEP 2**  
Identify intervention options and output indicators - Tasks

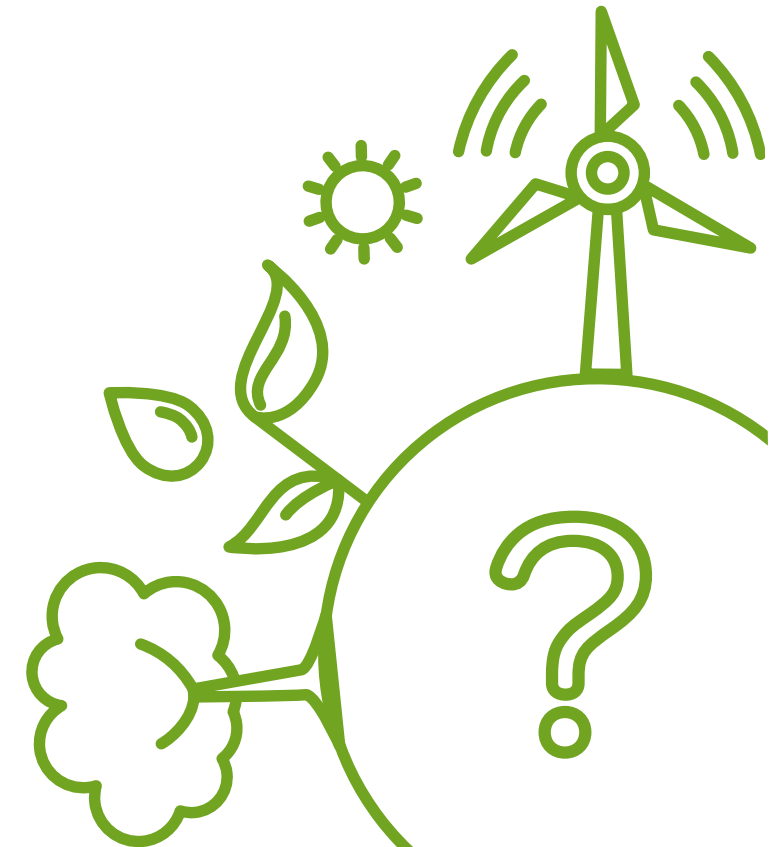
Identify indicators representing and measuring the main investment and the policy enabling conditions considered.

Identify indicators representing and measuring the sectoral effectiveness of the intervention considered.



## KEY QUESTIONS

- *What is the level of investment required to achieve stated targets?*
- *What are the policy instruments available to address the negative environmental trends?*
- *What are current and past policies adopted for the same objective?*
- *What should be changed?*



## EXAMPLE: RENEWABLE ENERGY IN TUNISIA

- Subsidy: 20% of the cost of Solar Water Heaters (SWH) served by the National Agency for Energy Conservation (ANME) through the National Fund for Energy.
- Credit from commercial banks for financing the residual cost of an SWH for the consumer, granted over a period of five years.
- Three types of commercialized SWH in the residential sector: 200L, 300L and 500L.





## REFLECTION POINT

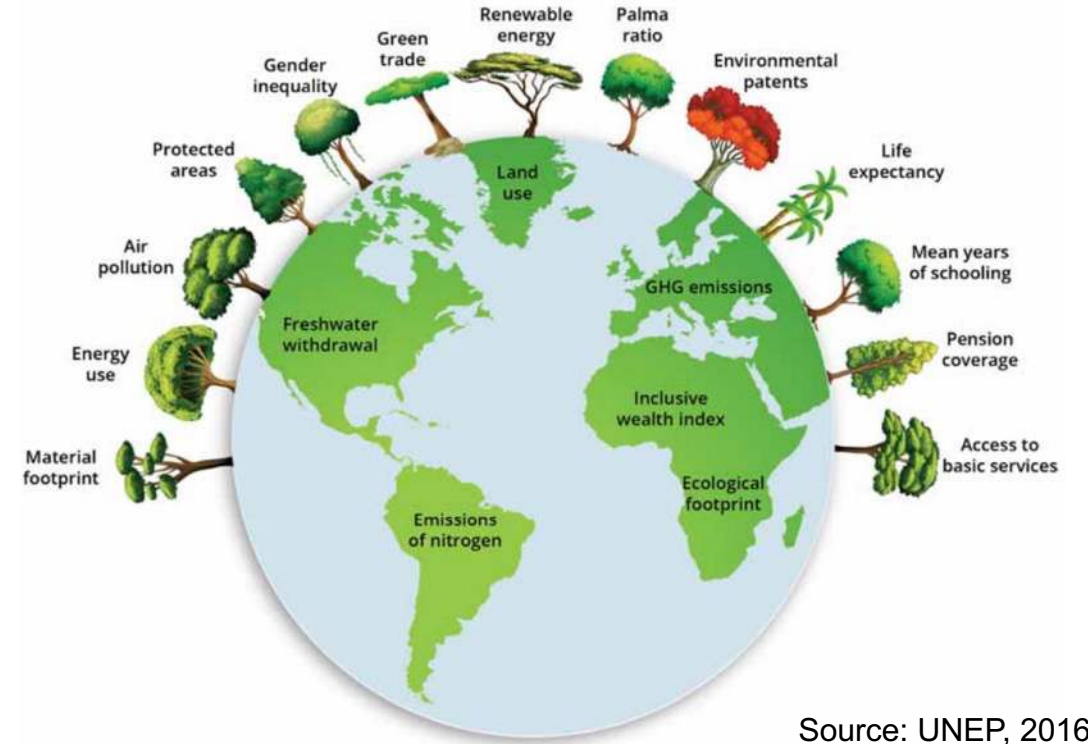
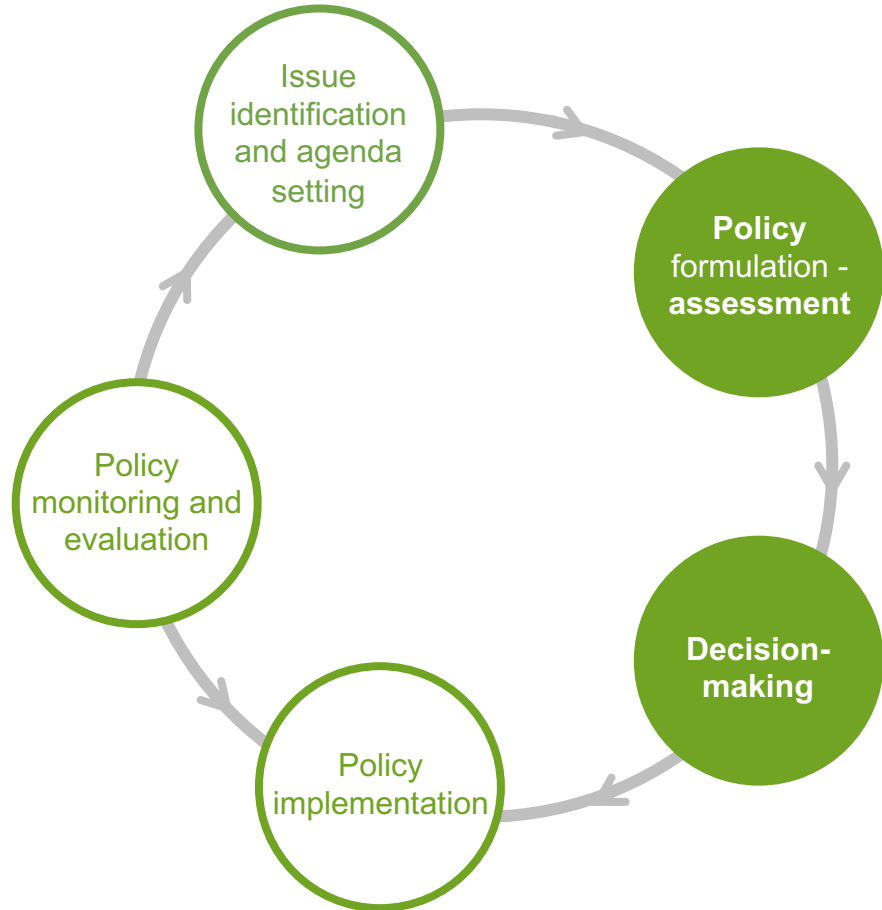


**What indicators  
would you use if you  
were to analyze the  
introduction of  
incentives for  
electric cars?**

## 4 Policy Assessment



## INDICATORS FOR POLICY ASSESSMENT



- Support the estimation and evaluation of policy impacts across sectors, with a focus on indicators for socio-economic impacts and well-being.



## INDICATORS FOR POLICY ASSESSMENT - STEPS

1

Estimate policy impacts  
across sectors.



2

Analyze impacts on  
the overall well-being  
of the population.



3

Analyze advantages and  
disadvantages, and  
inform decision-making.



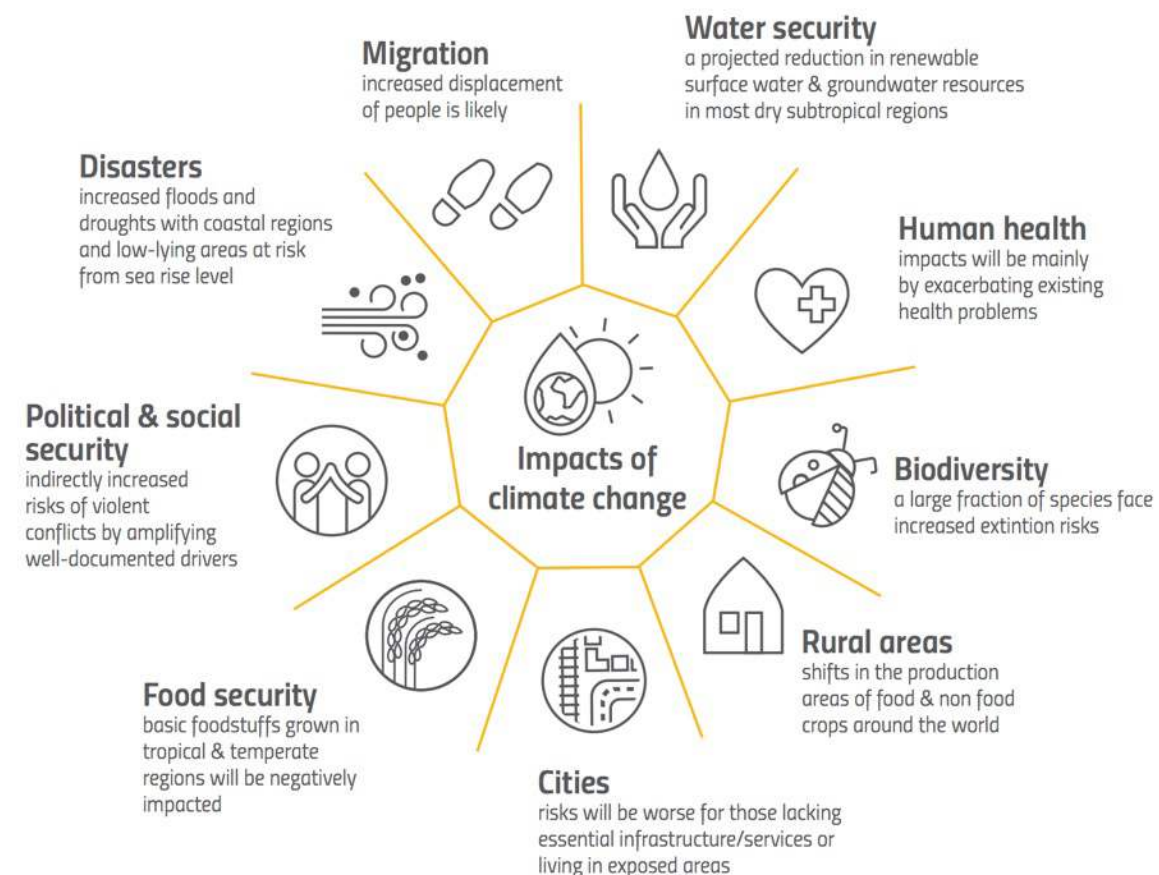


## STEP 1

### Estimate policy impacts across sectors - Tasks

Select and analyze indicators of investment realized and policy impacts on other sectors.

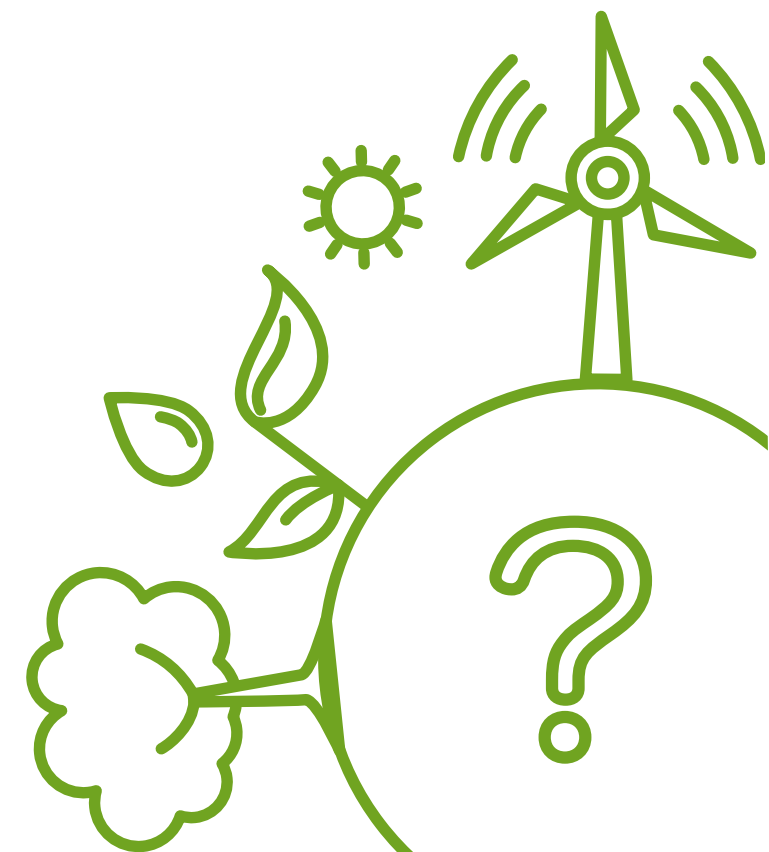
#### Impacts of climate change



Source: UNCCD, 2017

## KEY QUESTION

- *Is the policy having positive/negative impacts on other sectors?*



## EXAMPLE: FEED-IN TARIFFS IN KENYA

- Estimated electricity generation capacity: 1300 MW.
- Increased economic competitiveness.
- Reduced greenhouse gas emissions.





## STEP 2

### Analyze impacts on the overall well-being of the population - Tasks

Select and analyze indicators of policy impacts on investment, employment, total wealth, access to resources, etc.

Select and analyze composite indicators of well-being, such as Inclusive Wealth, Human Development Index (HDI), Gender-related Development Index (GDI) and Genuine Progress Indicator (GPI).

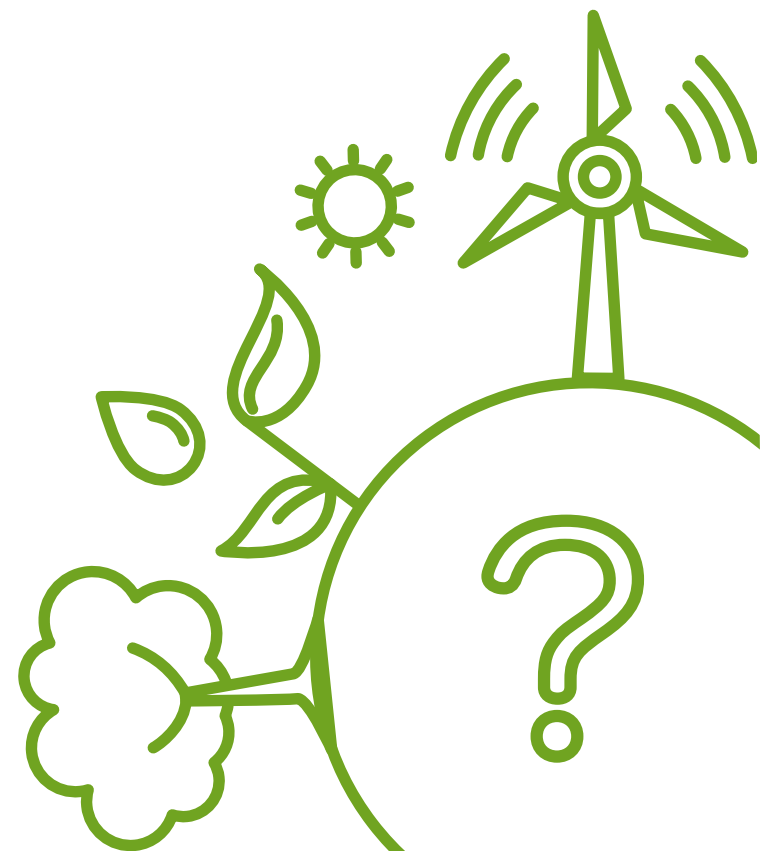
#### What's inclusive health?





## KEY QUESTION

- *What is the impact of the investment or policy on the overall well-being of the population?*



## EXAMPLES OF INDICATORS FOR POLICY ASSESSMENT

WELL-BEING & EQUITY	EXAMPLES
Employment	<ul style="list-style-type: none"> <li>• Construction (person, %)</li> <li>• Operation and management (person, %)</li> <li>• Income generated (\$/year)</li> <li>• Gini coefficient</li> </ul>
EGSS performance	<ul style="list-style-type: none"> <li>• Value added (\$/year)</li> <li>• Employment (jobs)</li> <li>• CO<sub>2</sub> and material productivity (e.g. \$/ton)</li> </ul>
Total wealth	<ul style="list-style-type: none"> <li>• Value of natural resource stocks (\$)</li> <li>• Net annual value addition/removal (\$/year)</li> <li>• Literacy rate (%)</li> </ul>
Access to resources	<ul style="list-style-type: none"> <li>• Access to modern energy (%)</li> <li>• Access to water (%)</li> <li>• Access to sanitation (%)</li> <li>• Access to health care (%)</li> </ul>
Health	<ul style="list-style-type: none"> <li>• Level of harmful chemicals in drinking water (g/litre)</li> <li>• Number of people hospitalised due to air pollution (person)</li> <li>• Road traffic fatalities per 100,000 inhabitants (transport-related)</li> </ul>



### STEP 3:

## Analyze advantages and disadvantages and inform decision-making - Tasks

Identify indicators to estimate the cost of reaching selected targets (i.e. required investments).

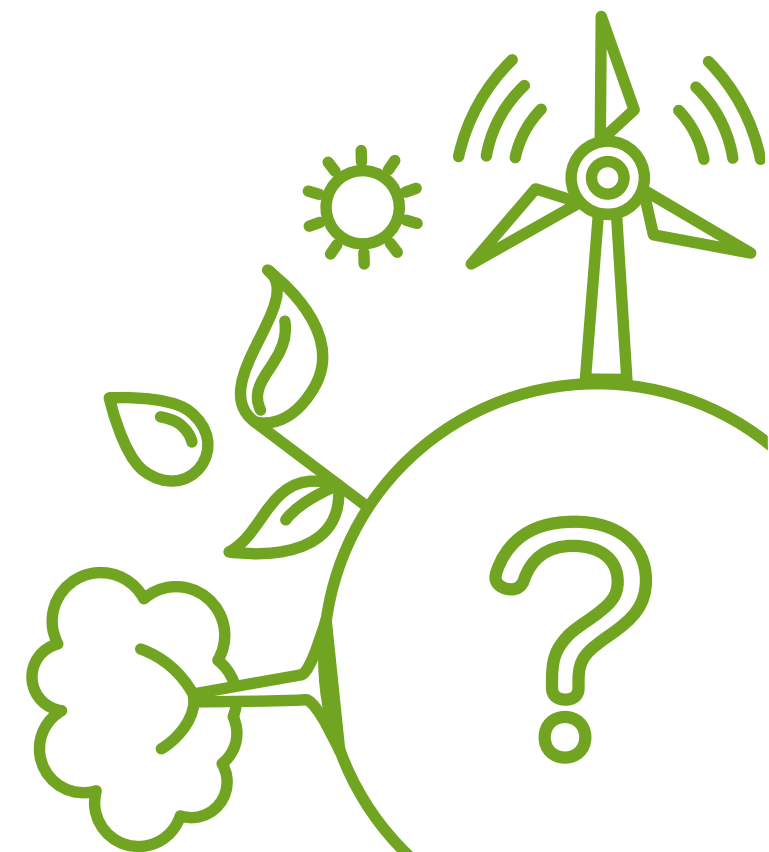
Identify indicators to evaluate expected benefits and avoided costs of the investment and interventions considered.

Identify and analyze indicators that highlight the presence of possible synergies and/or side effects.



## KEY QUESTIONS

- *What is the economic cost of the targets, with the enabling intervention(s) selected?*
- *How does it compare to the cost of inaction?*
- *What are the economic and cross-sectoral benefits of policy options in the short-, medium- and long-term?*
- *Which options are expected to generate the maximum cross-sectoral benefit with the least cost?*



## APPLICATION OF INDICATORS FRAMEWORK IN PRIORITY SECTORS AT COUNTRY LEVEL

### Ghana

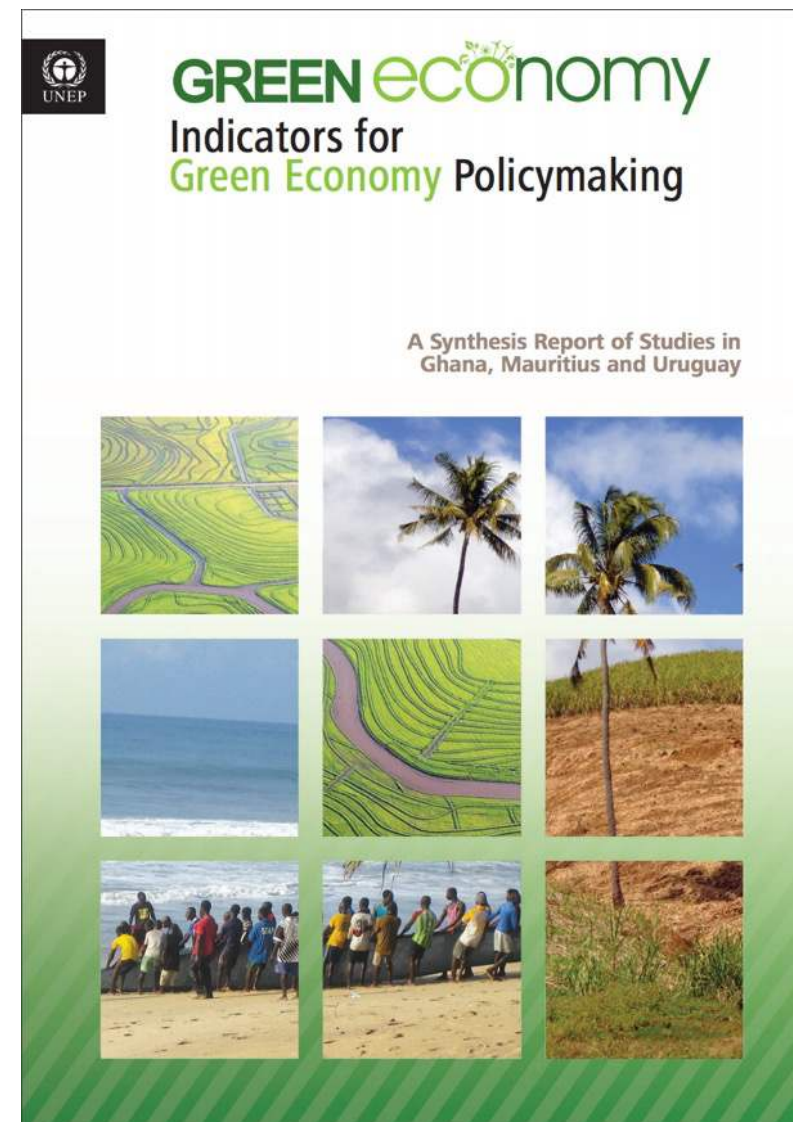
- Agriculture, forestry, water, waste management and sanitation, energy and extractive industries.

### Mauritius

- Agriculture, energy, transport, manufacturing, tourism, waste and water sectors.

### Uruguay

- Agriculture, industries, livestock and transport sectors.



## REFLECTION POINT

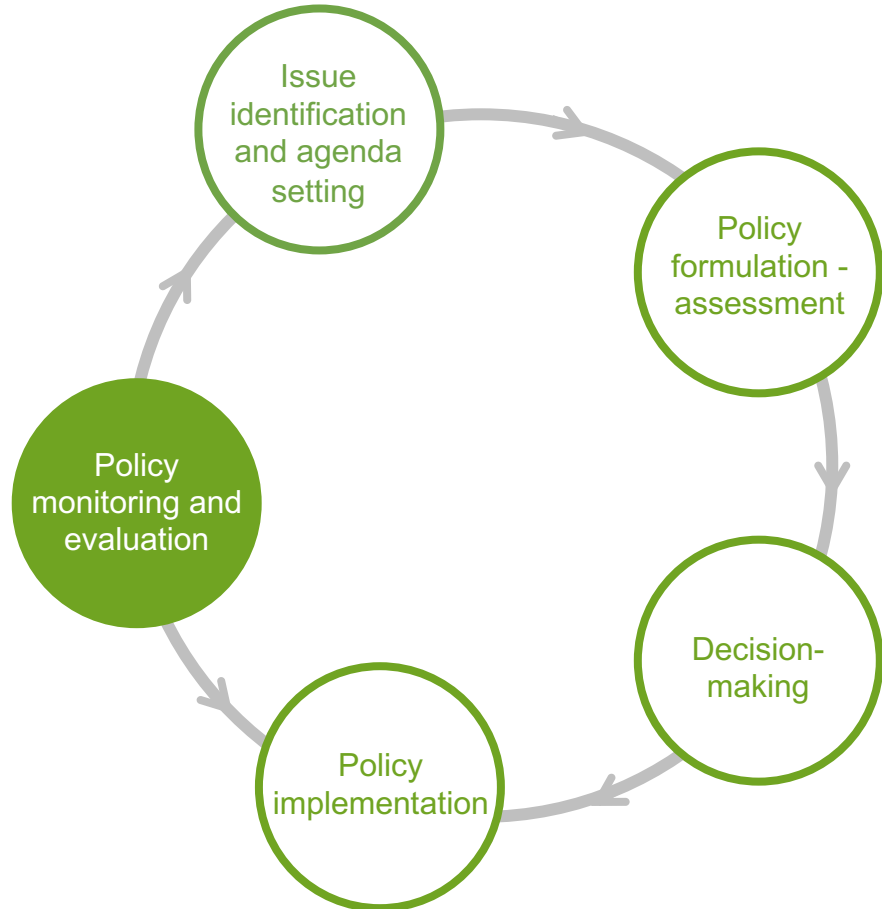


**What indicators  
would you use to  
assess the outcomes  
of the establishment  
of a natural park?**

## 5 Policy Monitoring and Evaluation



## INDICATORS FOR POLICY MONITORING & EVALUATION



- Support the assessment of the performance of the intervention implemented.
- Indicators for issue identification are compared to target indicators to evaluate whether the situation is improving.
- Actual policy impacts on the economy and overall well-being of the population are compared to the expectations defined in the policy assessment phase.





## INDICATORS FOR POLICY MONITORING & EVALUATION - STEPS

1

Measure policy impacts in relation to the environmental issue (indicators for issue identification).



2

Measure the investment leveraged (indicators for policy formulation).



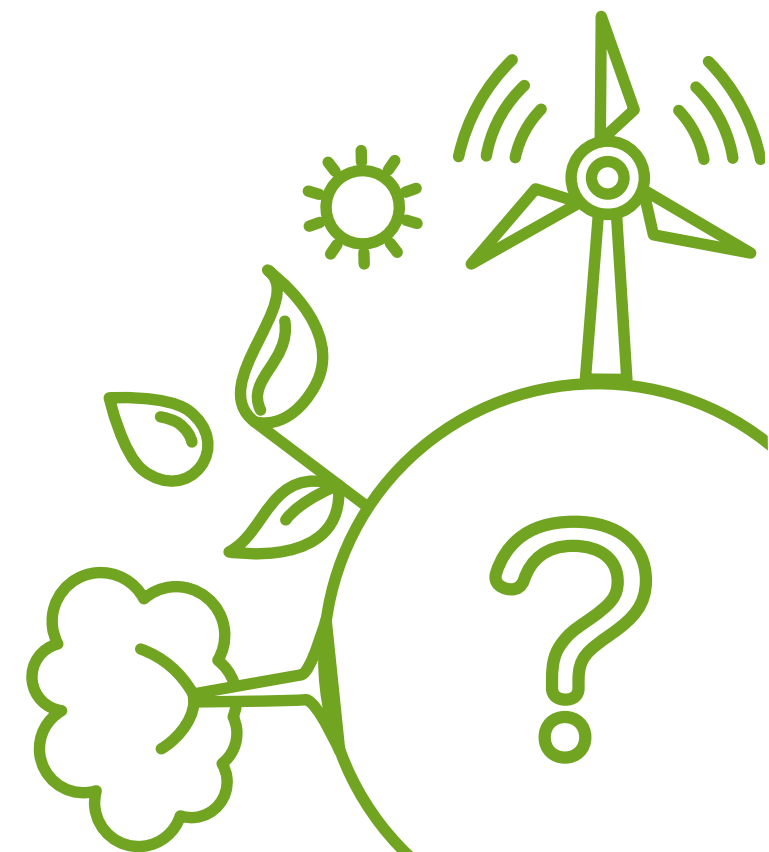
3

Measure impacts across sectors and on the overall well-being of the population (indicators for policy assessment).



## KEY QUESTIONS

- *Is the policy implemented contributing to solving the problem?*
- *Are the costs estimated in line with actual expenditure?*
- *Is implementation progressing as planned?*
- *Is there any cross-sectoral impact as a result of policy implementation?*
- *Is the policy contributing to inclusiveness and well-being?*



## QUIZ

Link the indicators on the left-hand side to the following steps of the decision-making cycle:

- 1 Issue Identification
- 2 Policy Formulation
- 3 Policy Assessment
- 4 Policy Monitoring & Evaluation

Job creation from recycling

Water pollution from waste

Tons of waste landfilled

Percentage of waste collected

Ban on single use plastics

Municipal solid waste tax

## 6 The GEP Measurement Framework



## GEP MEASUREMENT FRAMEWORK: OBJECTIVES

### At the international level:

1. Develop a framework that provides a useful tool for countries to measure their progress towards an IGE.
2. Measure progress in green economy areas, many related to the SDGs, and compare efforts across countries and over time to identify gaps and opportunities.

### At the national level:

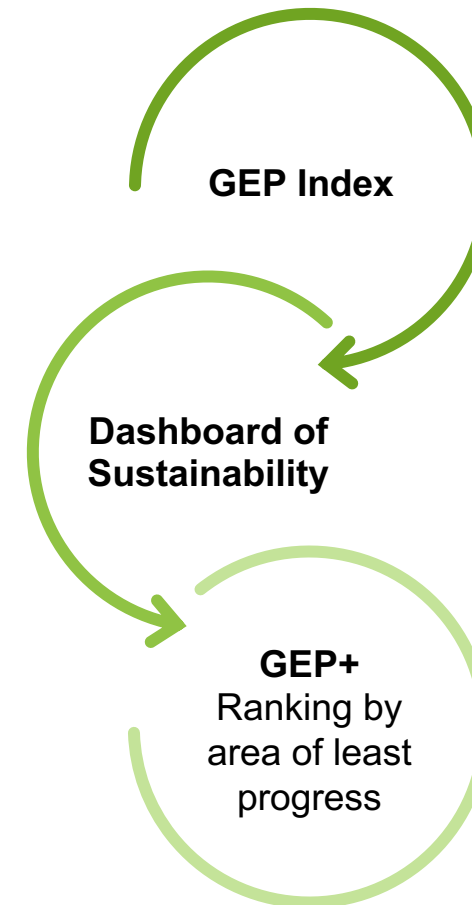
3. Measure progress in achieving national priorities.



## THE GEP MEASUREMENT FRAMEWORK

- *The GEP Index* tracks **progress** in green economy indicators, relative to the desired changes, that impact current well-being.
- *The Dashboard of progress on sustainability indicators* monitors the **sustainability** of well-being, that is, the well-being of future generations.
- *GEP+ ranking* of progress is carried out by comparing progress on indicators in the *dashboard* with progress measured by the *GEP index*.

### GEP Measurement Framework



Source: PAGE, 2017

## INDICATORS

- GEP index: 13 indicators
- Dashboard: six indicators

The Green Economy Progress Measurement Framework's parts.

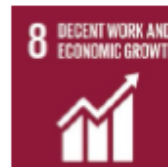
Source: PAGE, 2017



## MAPPING INDICATORS WITH SDGS

### **Green Trade**

Export of environmental goods (% of total export)



### **Environmental Patents**

Measure of green technology innovation  
(% of total patents)



### **Renewable Energy**

Share of renewable energy supply  
(of total energy supply)



### **Energy Use**

Energy use (kg of oil equivalent) per USD 1,000 GPD



Source: PAGE, 2017



## MAPPING INDICATORS WITH SDGS

### Palma Ratio

Ratio of the richest 10% of the population income over income of the poorest 40%



### Access to Basic Services

Access to improved water sources, electricity, sanitation (% of total population)



### Air Pollution

PM2.5 pollution mean annual exposure (micrograms per cubic meter)



### Material Footprint

Raw material consumption of used biotic and abiotic materials (tonnes/person)



Source: PAGE, 2017

## MAPPING INDICATORS WITH SDGS

<p><b>Protected Areas</b> Sum of terrestrial &amp; marine protected areas (% of total land area and territorial waters)</p>
<p><b>Gender Inequality Index</b> Inequality in genders across reproductive health, empowerment, &amp; the labour market</p>
<p><b>Pension Coverage</b> Share of population above statutory pensionable age receiving a pension</p>
<p><b>Mean Years of Schooling</b> Average number of years of education received by people ages 25 and older</p>
<p><b>Life Expectancy</b> Life expectancy by contribution and sex</p>



Source: PAGE, 2017

## GEP INDEX

Intended to measure the progress in achieving the transition towards an inclusive green economy (IGE) based on three main ideas:

1

**Identifying key dimensions** to be associated with an **IGE**, each approximated by one or several variables.

2

Focusing on **progress**, i.e. changes rather than levels.

3

Measuring progress relative to targets and thresholds. **Targets** refer to desired changes, whereas **thresholds** define some critical levels.

## RESULTS GEP INDEX BY INDICATOR

Variable	Obs	Mean	Std. Dev.	Min	Max
material footprint	104	-1.83	5.57	-52.53	1.43
air pollution	105	-0.13	0.89	-5.70	1.23
protected areas	101	0.15	0.35	-0.04	2.44
energy use	102	0.37	0.46	-1.43	2.03
green trade	93	0.10	0.30	-0.28	1.61
green technology innovation	54	0.13	0.98	-0.92	5.98
renewable energy source	101	0.04	0.36	-0.78	1.11
Palma ratio	96	0.06	0.68	-2.04	1.74
gender inequality index	98	0.39	0.30	-0.28	1.46
access to basic services	71	0.38	0.23	-0.05	1.00
mean years of schooling	103	0.39	0.25	-0.42	1.04
pension coverage	66	0.22	0.96	-4.55	2.19
life expectancy	103	0.39	0.20	-0.32	1.48

Source: PAGE, 2017

## RESULTS DASHBOARD BY INDICATORS

Indicator	Obs.	Mean	Std. Dev.	Min	Max
Freshwater withdrawal	79	-0.07	1.65	-10.93	1.28
Greenhouse gas emissions	104	-0.31	0.68	-3.74	0.84
Emissions of nitrogen	102	-0.35	1.11	-5.07	1.48
Land use	104	-0.31	1.03	-4.24	1.54
Ecological footprint	92	-0.34	0.82	-4.95	1.02
Inclusive Wealth Index	100	0.31	0.52	-1.11	1.84
Inclusive Wealth Index (Natural Capital)	100	-5.84	7.48	-26.41	5.21

Source: PAGE, 2017

## FINAL REMARKS

- The GEP Index shows that in 2014, 83 out of 105 countries (79 per cent) managed to achieve progress in their transition towards an Inclusive Green Economy, as compared to the year 2004.
- Progress on the green economy, as measured by the GEP Index, shows important differences in results across geographical regions and development groups.
- Results from the dashboard show that, on average, countries are making regress in the sustainability indicators.



**End of Module 2.**

**Thank you for your attention!**