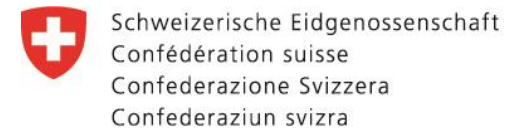


INDICATORS FOR GREEN ECONOMY POLICYMAKING

INTRODUCING THE GREEN ECONOMY PROGRESS (GEP) MEASUREMENT FRAMEWORK



The GGKP is a global community of organizations, research institutes, and experts committed to collaboratively **generating, managing and sharing** green growth knowledge and data to mobilize an inclusive green economy.



The 5th Green Growth Knowledge Platform Annual Conference

Sustainable Infrastructure

Leading researchers will explore key aspects of the infrastructure agenda, including the policy and regulatory framework, finance, climate change adaptation, low carbon pathways, energy, transportation, nature-based solutions and more.

27-28 November 2017
Washington DC, USA





Bruno Oberle

Head, Chair for Green Economy and Resource Governance,
École polytechnique fédérale de Lausanne (EPFL)



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Senior Economist, Green Belt and Road Initiative,
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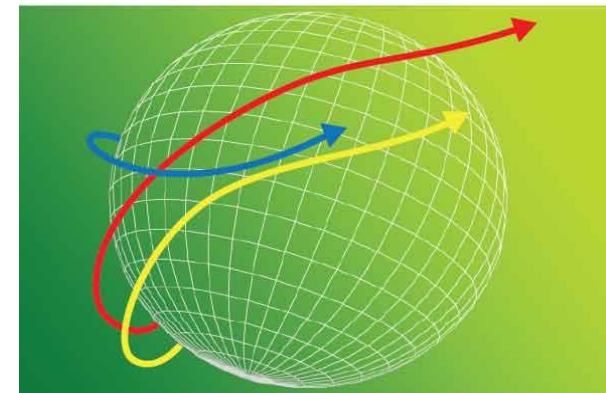
WHY GREEN ECONOMY INDICATORS?

- Effective GE policymaking requires indicators
 - Identify worrying trends
 - Identify suitable policies to address concerns
 - Assess and evaluate policy impacts
- Indicators also support GE policymaking
 - Capture the nexus among economic performance, environmental status and social dynamics
 - Act as a “report card” for decision making and monitoring

BACKGROUND

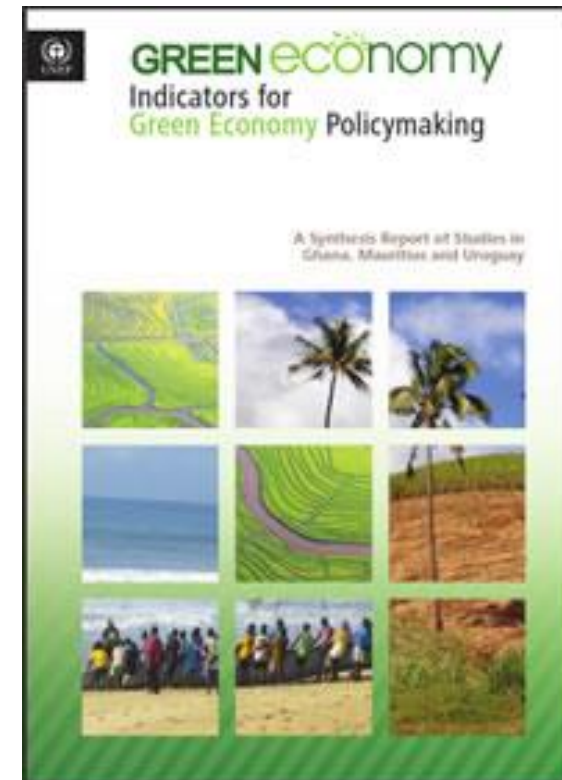
- UNEP, 2012. *Measuring Progress towards an Inclusive Green Economy*
- GGKP, 2013. *Moving towards a Common Approach on Green Growth Indicators*
- UNEP, 2014. *Using Indicators For Green Economy Policymaking*
 - Link between indicators framework and integrated policymaking process

- Integrated policymaking process:
 - Issue identification and agenda setting;
 - Policy formulation and assessment;
 - Decision-making;
 - Implementation; and
 - Monitoring and evaluation.



BACKGROUND

- UNEP, 2015. *Indicators for Green Economy Policymaking – A Synthesis Report of Studies in Ghana, Mauritius and Uruguay*
 - 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





Mokshanand Sunil Dowarkasing

Senior Portfolio Manager,
Greenpeace International

WHY GREEN ECONOMY FOR MAURITIUS ?

- Launch an ambitious project “ Maurice ile Durable”
- Indigenous action plan to move the sustainability agenda of the country
- Laying the foundation for the transformation of the country
- Developed the NCA and VRP index- pioneers
- The GE concept fits well in our plan


HOW ? THE GREEN ECONOMY ROADMAP

- Greening the existing sectors – 6 entry points- Agriculture, Tourism, Manufacturing, Waste, Transport and Water
- Create new pillar of the economy – (RE sector, Waste re-cycling etc..)- Green jobs creation
- Re-direct investment to be aligned to the SD concept i.e. bearing in mind the Social and Environmental impacts. (carrying capacity/ impacts on water & electricity and waste)

4 STEPS APPROACH- POLICY CANNOT STAND IN A VACUUM

1. Assessing the existing policies – Deep dive into policies that were put in place for the last 10 years – what worked and what didn't? - lessons learned.
2. Assessing the regulatory frame work – Whether the existing laws/regulations were adequate for the policy implementation
3. Assessing the delivery mechanism and the implementation process
4. Resources evaluation

WHY THE 4 STEPS APPROACH?

- Despite a lot of good policies endorsed by Ministries – no tangible change was visible.
 - Try to find out the root causes of the failed policies.
 - Map out the syndrome – “ Enacting new policies to correct the failed ones”
 - Try to find out if the objectives and outcomes of the policies in place/ degree of success .
 - Help to understand the flaws and the gaps
- 

GREEN ECONOMY ACTION PLAN

- Agriculture, energy, transport, manufacturing, tourism, waste and water sectors were identified during stakeholder consultations as having significant potential for greening the economy.
- Contribution to **GDP**
- **Employment** creation
- Global competitiveness and **environmental impact**.
- These sectors are **not only** inter-related, but also reflect the country's challenges as they relate to food and water security, dependence on imported energy with high energy costs, traffic congestion, impacts related to waste management and the vulnerability and fragility of the tourism sector.

HOW THE KEY SECTORIAL GREEN INDICATORS WERE CHOSEN?

- ***Policy relevance***: the indicator needs to address issues that are of (actual or potential) public concern relevant to policy-making. In fact, the ultimate test of any single indicator's relevance is whether it contributes to the policy process.
- ***Analytical soundness***: ensuring that the indicator is based on the best available science is a key feature to assure that the indicator can be trusted.
- ***Measurability***: the need to reflect reality on a timely and accurate basis and be measurable at a reasonable cost, balancing the long-term nature of some environmental, economic and social effects and the cyclicity of others. Definitions and data need to allow meaningful comparison both across time and countries.
- ***Usefulness in communication***: the ability to provide understandable, easily interpretable signals for the intended audience.

AGRICULTURAL SECTOR



THE AGRICULTURAL SECTOR AS AN EXAMPLE

1. Problem - Conversion of Agricultural land to other uses

i. Indicator of issue



Area of land under agriculture(ha)

Area of land under sugar cane(ha)

Area of land under food crops(ha)

Volume of agricultural
production(tons/year)

No of farmers in food crops

Average age of farmers in food
crops(yr)

Population

Average price of land for real
estate development(Rs/ha).

ii. Indicator of policy formulation

Food security targets for strategic commodities (%)
Incentives/Subsidies for agriculture(Rs/year)
Taxes for land conversion(Rs/ha)

iii. Indicator of policy evaluation

Volume of agricultural production(tons/year)
Food Security for strategic commodities(%)
Share of agriculture in GDP(%)
Area of land under sugar cane(ha)
Area of land under food crops(ha)
Area of forest land(ha)
Employment in the Agricultural sector(jobs/year)

THE AGRICULTURAL SECTOR AS AN EXAMPLE

2. Problem -Misuse of Agro-chemicals in agriculture

i. Indicator of issue



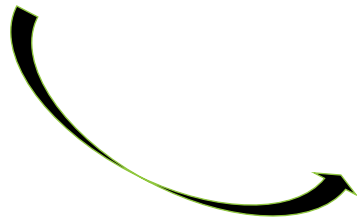
- Amount of fertilizer/pesticides used (tons/year)
- Consumption of fertilizers per ha of arable land(kg/ha)
- Agricultural yields (tons/ha)
- Amount of organic fertilizers used(tons/year)
- No of plants disease outbreaks per year
- Water use for irrigation of food crops(m³/year)
- Average nitrate and pesticide concentration in groundwater(mg/l)

ii. Indicator of policy formulation



- Investment in efficient Irrigation techniques (Rs/year)
- Target % of crop area under sustainable agriculture(%).
- Amount of tax exemptions on the import of efficient irrigation systems
-) Incentives for compost making(subsidies on price for compost) (Rs/year)
- Target for no of farmers trained in sustainable agriculture
- Expenditure on R&D in Agriculture(Rs/year)

iii. Indicator of policy evaluation



- No of farmers that subscribe to sustainable agriculture
- No of green certification schemes established
- Area under sustainable farming(ha)
- Volume of compost/organic fertilizers used used(tons/year)
- Volume of certified green agricultural products on the market(tons/year)
- Avoided costs for fertilizer/pesticides imports(Rs/year)
- Average concentration of nitrate and pesticide in groundwater(mg/l)
- Market price of sustainable agriculture products(Rs/ton)
- Total volume of business(revenues) for sustainable products(Rs/year)

WASTE SECTOR



THE WASTE SECTOR AS AN EXAMPLE

1. Problem -Increasing volume of waste to be collected and treated

i. Indicator of issue



- Total MSW collected and disposed(tons/year)
- Per Capita MSW Generation(tons/person/year)
- % of Food and Green Waste, Paper and Plastics
- Total MSW Landfilled (tons/year)
- Total MSW Composted (tons/year)
- Total MSW recycled(tons/year)
- Total MSW combusted(tons/year)
- Total Landfill area(ha)



ii. Indicator of policy formulation

- Target % reduction in MSW landfilled
- Target % of MSW composted
- Target % of MSW recycled and reused
- Investment in waste collection and disposal(Rs/year)
- Incentives for waste reduction and recycling(Rs/year)

iii. Indicator of policy evaluation

- % reduction in MSW landfilled
- % of MSW composted
- % of MSW recycled and reused
- Surface and Groundwater Quality near landfills/composting plants/combustion facilities
- Employment in waste sector
- Economic value of wastes exported(Rs/year)

THE WASTE SECTOR AS AN EXAMPLE

2. Problem -Inadequate Infrastructure for waste collection, recycling, treatment and disposal

i. Indicator of issue



- LFG production(m³/year)
- Landfill capacity(tons/year)
- Composting plants capacity(tons/year)
- Anaerobic Digestion capacity(tons/year)
- Combustion capacity(tons/year)
- Hazardous waste generated, collected and treated(tons/year)
- E-Waste Generated, collected and reused/recycled (tons/year)
-

THE TOURISM SECTOR AS AN EXAMPLE


i. Indicator of issue



- Total MSW collected and disposed(tons/year)
- Per Capita MSW Generation(tons/person/year)
- % of Food and Green Waste, Paper and Plastics
- Total MSW Landfilled (tons/year)
- Total MSW Composted (tons/year)
- Total MSW recycled(tons/year)
- Total MSW combusted(tons/year)
- Total Landfill area(ha)

.

ii. Indicator of policy formulation

- 
- Target % of households with compost bins
 - Target % of E-Waste reused/recycled
 - Target % of hazardous waste collected and treated
 - Public Expenditure in waste collection and disposal(Rs/year)
 - Public Expenditure in waste landfill construction and maintenance and operation(Rs/year)
 - Target Expenditure in Ecopoints(Rs/year)

iii. Indicator of policy evaluation



- Energy produced from waste (toe/yr)
- Amount of hazardous wastes collected and disposed(tons/yr)
- Amount of E wastes collected and recycled(tons/yr)
- Amount of Waste collected at EcoPoints to be recycled (tons/year)
- Private Investment in Recycling (Rs/year)
- Revenue from waste taxes (Rs/year)
- Average wage of waste collection and disposal workers (Rs/month)
- % of households



TOURISM SECTOR



THE TOURISM SECTOR

1. Problem- 1. Coastal Ecosystem degradation.

- Indicator of issue
- Indicator of policy formulation
- Indicator of policy evaluation

2. Poor Resource Efficiency

- Indicator of issue
- Indicator of policy formulation
- Indicator of policy evaluation

THANK YOU





Jose Pineda

Adjunct Professor, Sauder School of Business,
University of British Columbia

MAIN LESSONS FROM COUNTRY STUDIES

- Consultative process in policymaking is critical
 - Selection of sectors and identification of policies and areas of action were done in a series of workshops with relevant stakeholders, including representatives of key ministries
 - Time consuming and imposes some challenges, but ensure greater validity as well as the cooperation on data building in the future
- Packaging indicators covering broader aspects of GE generate important benefits
 - Show multiple overlapping benefits in terms of economic growth, poverty reduction and environmental outcomes
 - Facilitates analysis of potential causal loops and interrelations among different dimensions of GE

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;

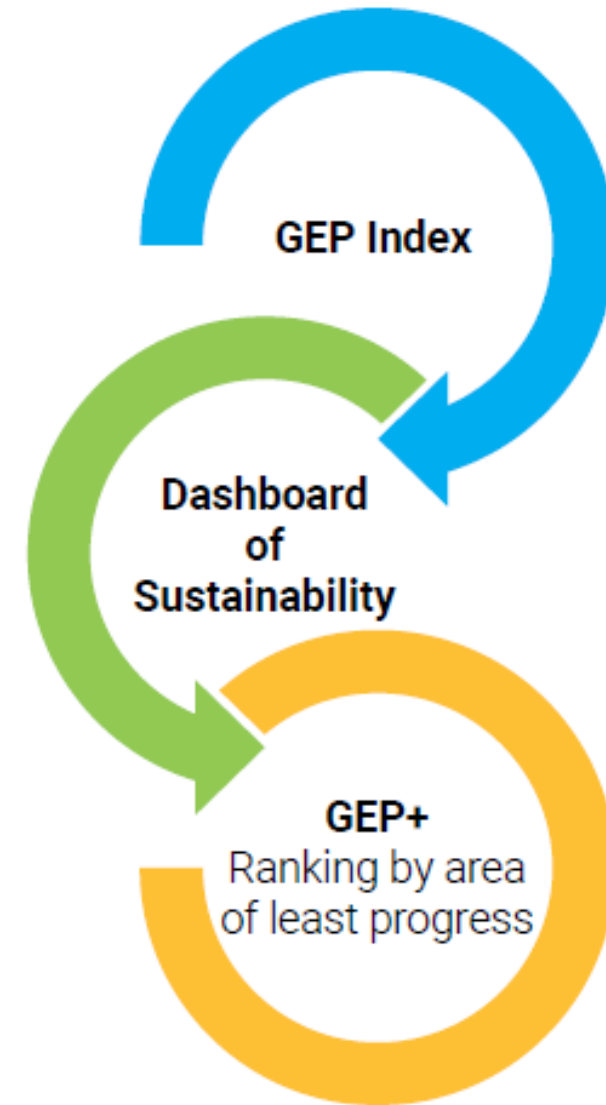
At the national level

3. Measure progress in achieving national priorities
 - Framework accommodates to countries' level of development
 - Can be complemented with country-specific indicators

THE CHALLENGES OF MEASUREMENT

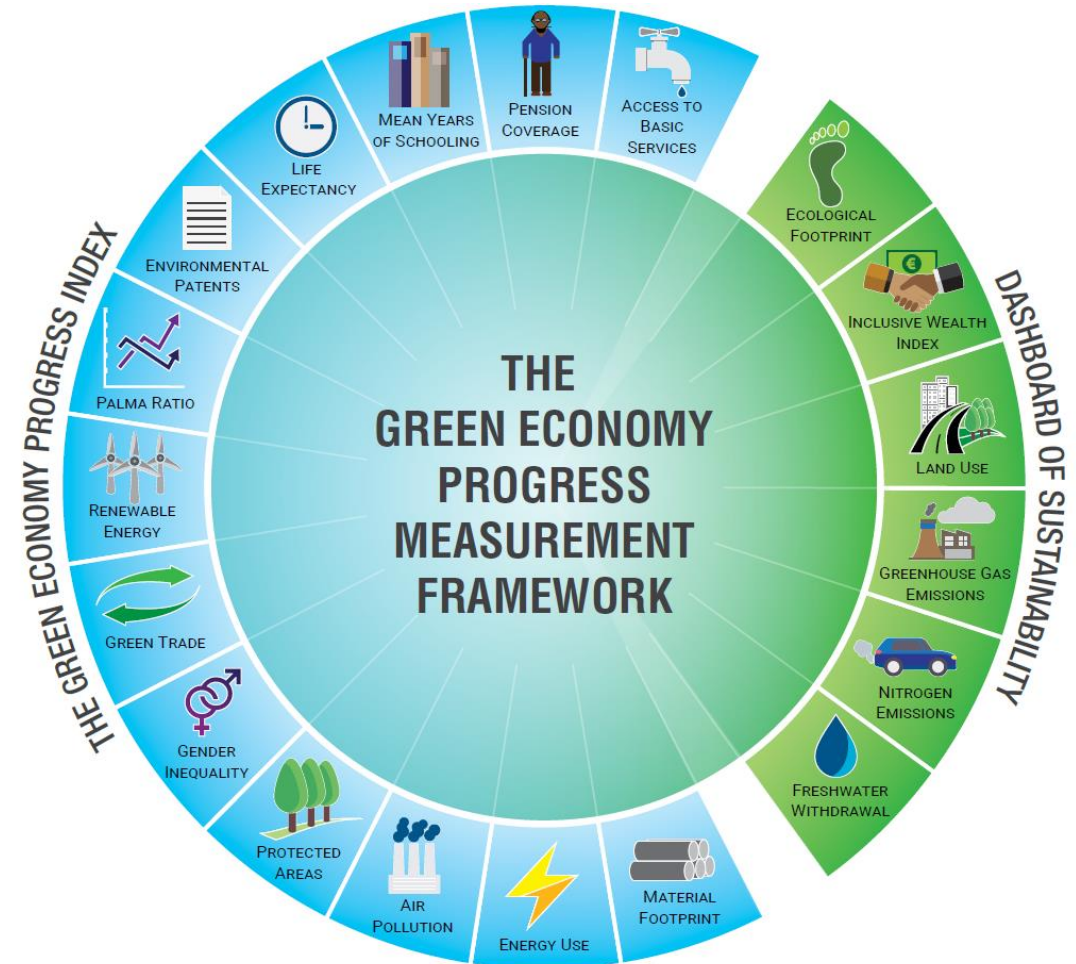
- A famous sentence, attributed to Albert Einstein, says: *“not everything that can be counted counts, and not everything that counts can be counted.”*
 - Remind us that measuring complex phenomena
- Not everything that counts and can be counted can be reasonably aggregated into a single number.
 - This implies that any measure of IGE will only provide a partial estimate of the performance to be evaluated.
 - Complementing that single number with a dashboard of indicators might be most useful.

- *GEP index*: track **progress** in green economy indicators, relative to the desired changes, impacting current well-being
 - Reflects weighted progress achieved by countries with respect to targets set within relevant thresholds across several indicators
 - The score of the GEP index gives a country an indication of its overall progress towards an IGE
- *Dashboard of progress on sustainability indicators*: monitors the **sustainability** of well-being (well-being of future generations).
 - Keeps track of some of the main forms of natural capital as well as other key stocks of capital which affect long term sustainability.
- *GEP+ ranking* of progress is done by comparing progress on indicators in the *dashboard* with progress measured by the *GEP index*.



INDICATORS

- GEP index: 13 indicators
- Dashboard: 6 indicators
- Selection criteria
 - Mapping with IGE narrative (multidimensionality)
 - Data coverage (country and time)
 - Transparency and comparability (Data accessibility)
 - Linkages with SDGs' headline indicators




MAPPING INDICATORS WITH SDGs

<p>Green Trade Export of environmental goods (% of total export)</p>	
<p>Environmental Patents Measure of green technology innovation (% of total patents)</p>	
<p>Renewable Energy Share of renewable energy supply (of total energy supply)</p>	
<p>Energy Use Energy use (kg of oil equivalent) per USD 1,000 GDP</p>	
<p>Palma Ratio Ratio of the richest 10% of the population income over income of the poorest 40%</p>	
<p>Access to Basic Services Access to improved water sources, electricity, sanitation (% of total population)</p>	
<p>Air Pollution PM2.5 pollution mean annual exposure (micrograms per cubic meter)</p>	
<p>Material Footprint Raw material consumption of used biotic and abiotic materials (tonnes/person)</p>	
<p>Protected Areas Sum of terrestrial & marine protected areas (% of total land area and territorial waters)</p>	
<p>Gender Inequality Index Inequality in gender across reproductive health, empowerment, & the labour market</p>	
<p>Pension Coverage Share of population above statutory pensionable age receiving a pension</p>	
<p>Mean Years of Schooling Average number of years of education received by people ages 25 and older</p>	
<p>Life Expectancy Life expectancy by contribution and sex</p>	

- The GEP Measurement Framework has strong linkages with many of the SDGs (it has direct 14 direct links to 10 of the 17 SDGs)



GEP INDEX

- Intended to measure the progress in achieving the transition towards an IGE based on three main ideas:
 1. Identifying key dimensions to be associated with an inclusive green economy, each approximated by one or several variables;
 2. Focusing on the 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.
- 

- Let y^* be the value of the indicator that we **target** to have in $t+1$

- $Progress = \begin{cases} \frac{dy}{dy^*} = \frac{y^1 - y^0}{y^* - y^0} & \text{for goods} \\ \frac{d(-y)}{d(-y^*)} = \frac{y^0 - y^1}{y^0 - y^*} & \text{for bads} \end{cases}$

- *Progress*: ratio of actual versus desired (or targeted) increment.
- Target y^* is set so as to include the **threshold (t)**.
- For a good: Progress will have a greater valuation if it happens or lead us to be above the threshold.

$$y^* = \max\{t, \lambda y^0\}, \lambda > 1$$

- For a good: Progress will have a greater valuation if it happens or lead us to be above the threshold.

$$y^* = \min\{t, \beta y^0\}, \beta < 1$$

METHODOLOGY: GEP INDEX

- Let $J = G \cup B$ be the set of indicators, consisting of goods, G , and bads, B (in the understanding that $G \cap B = \emptyset$). Let π_j denote the weight attached to indicator j into the aggregate composite index, with $\sum_{j \in J} \pi_j = 1$.
- Applying now the former model for the case of different weights for different indicators, we get:

$$\bullet \text{ } GEP = \sum_{j \in G} \pi_j \frac{dy_j}{dy_j^*} + \sum_{j \in B} \pi_j \frac{d(-y_j)}{d(-y_j^*)}, \quad \text{where } \hat{\pi}_j = \begin{cases} \frac{t_j}{y_j^0}, & \text{if } j \in G \\ \frac{y_j^0}{t_j}, & \text{if } j \in B \end{cases}$$

- Normalising the weights: $\pi_j = \frac{\hat{\pi}_j}{\sum_{j \in J} \hat{\pi}_j}$
- Green Economy Progress (GEP) index:

$$GEP = \frac{1}{\sum_{j \in G} \frac{t_j}{y_j^0} + \sum_{j \in B} \frac{y_j^0}{t_j}} \times \left[\sum_{j \in G} \frac{t_j}{y_j^0} \frac{dy_j}{dy_j^*} + \sum_{j \in B} \frac{y_j^0}{t_j} \frac{d(-y_j)}{d(-y_j^*)} \right]$$

OVERALL RANKING: AGGREGATING INFORMATION IN GEP INDEX AND DASHBOARD

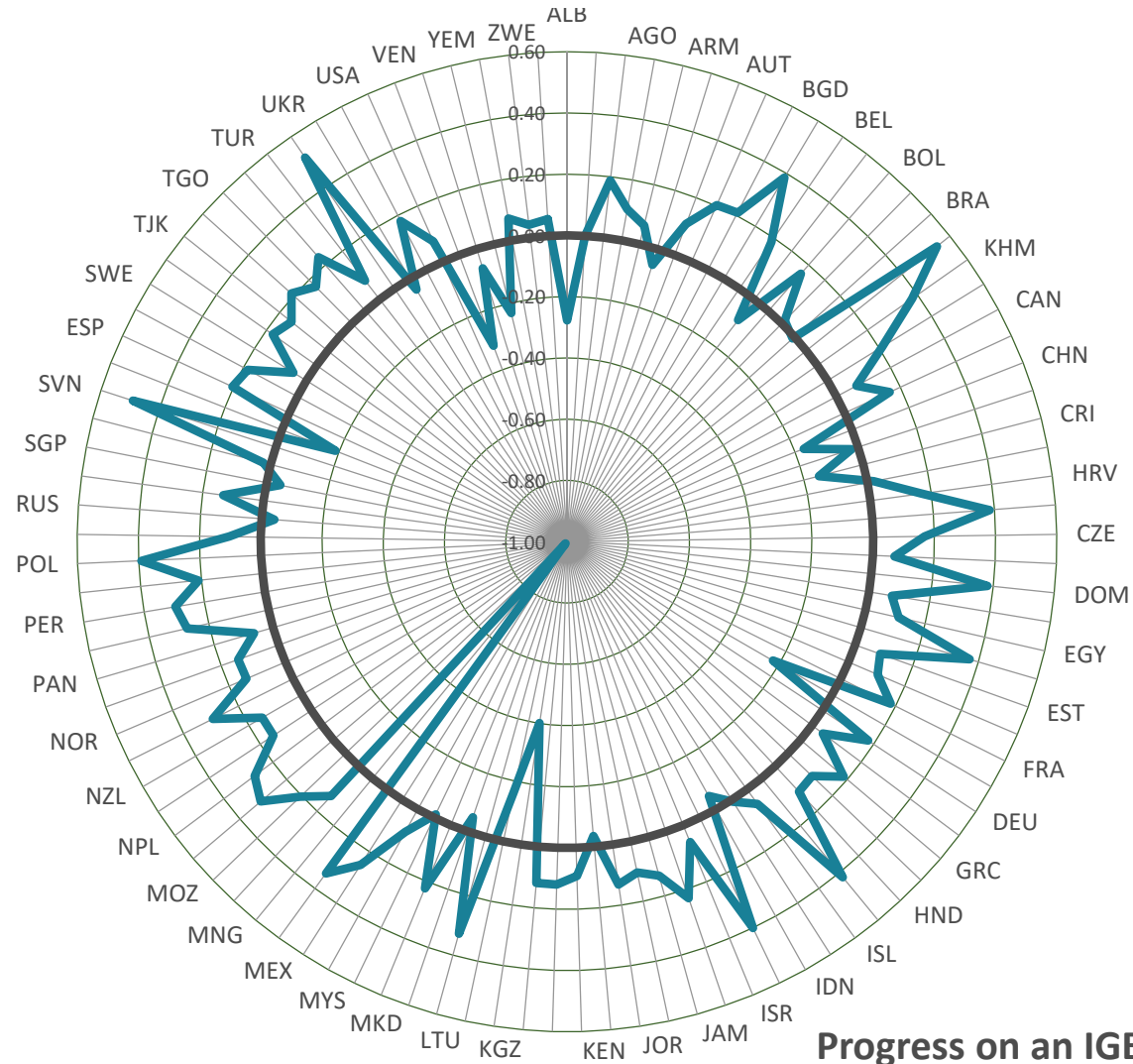
- Rank all index-dashboard profiles but do not combine their information into a synthetic index.
- When comparing progress based on the GEP index and the dashboard, countries are ranked according to their least-performing progress.
- Carries a double signal for countries:
 - Learn about their relative green economy progress with the GEP index and dashboard indicators.
 - Learn how their least-performing progress compares with the achievements of other countries.

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

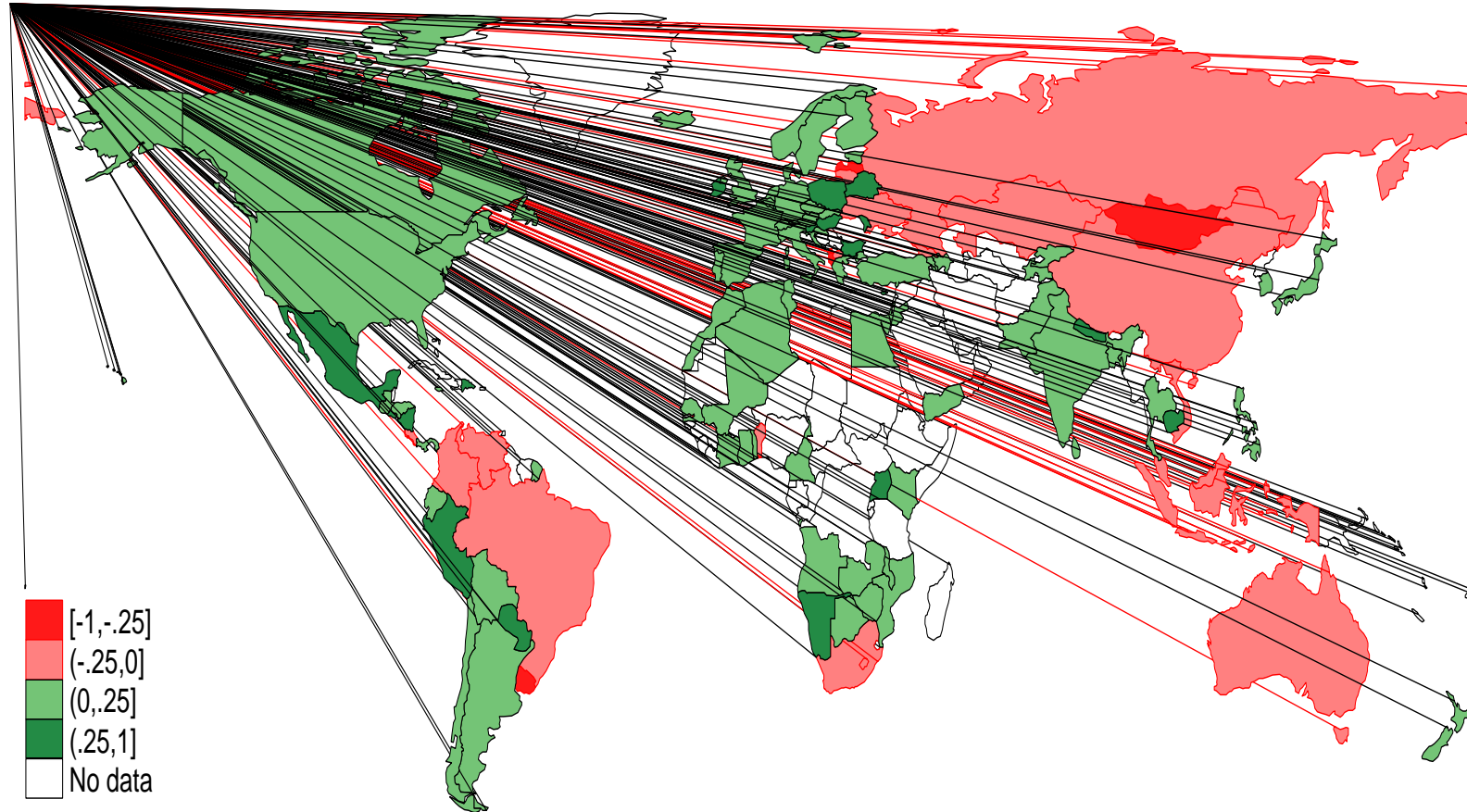
Progress on an IGE by country – full sample

RESULTS GEP INDEX : BY COUNTRY

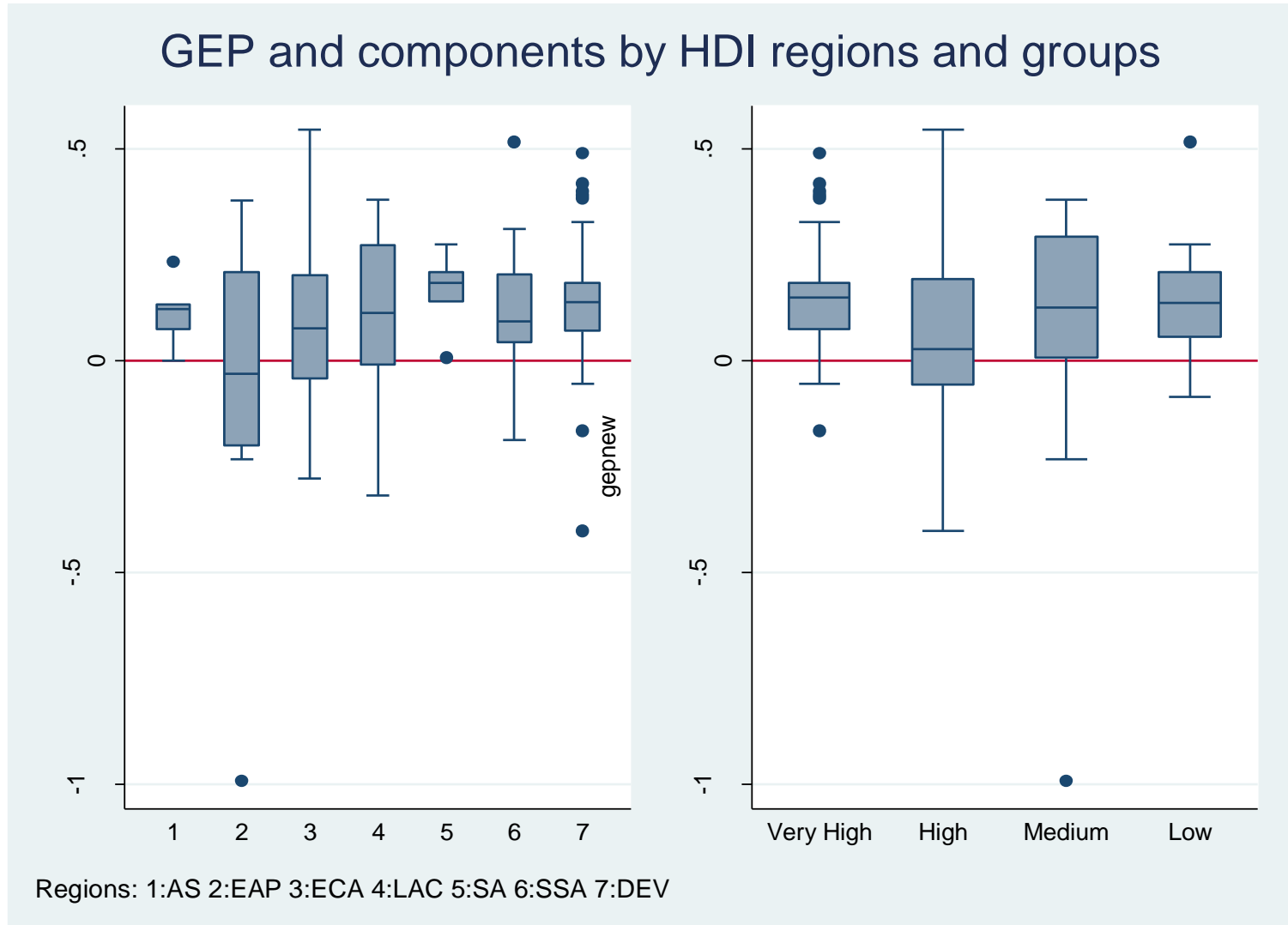


Progress on an IGE by country – full sample

RESULTS GEP INDEX : BY COUNTRY



RESULTS GEP INDEX: REGIONS AND HDI GROUPS



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

RESULTS GEP+ (TOP 4 COUNTRIES PER HDI GROUP)

Rank	Country	Progress Greenhouse gas emissions	Progress Nitrogen emissions	Progress Land use	GEP Index	Protective criterion	HDI group
1	Cyprus	0,5566	0,5971	0,1800	0,5862	0,1800	Very High
2	Portugal	0,9080	0,7315	0,1120	0,0999	0,0999	Very High
3	Spain	1,3180	1,7082	0,0873	0,2118	0,0873	Very High
4	Italy	0,9423	1,9024	0,0664	0,2598	0,0664	Very High
1	Jamaica	1,1022	0,4906	0,1682	0,1256	0,1256	High
2	Azerbaijan	-0,1942	0,0018	0,0010	0,2512	-0,1942	High
3	Jordan	-0,2369	2,1228	0,0080	0,1523	-0,2369	High
4	Venezuela, RB	-0,3027	0,3700	0,0227	-0,0497	-0,3027	High
1	Dominican Republic	-0,2539	-0,2341	0,0000	0,2801	-0,2539	Medium
2	South Africa	-0,3429	0,6564	-0,0059	-0,1977	-0,3429	Medium
3	Philippines	0,1430	0,3621	-0,3572	0,1978	-0,3572	Medium
4	Honduras	-0,3793	0,6753	-0,1613	0,1329	-0,3793	Medium
1	Zimbabwe	0,9104	0,2037	0,0000	0,0530	0,0000	Low
2	Senegal	0,2000	0,0080	-0,0052	0,1607	-0,0052	Low
3	Cameroon	0,8613	0,0657	-0,1058	0,2448	-0,1058	Low
4	Mali	-0,1776	1,7463	-0,0061	0,1931	-0,1776	Low

TAKE AWAY MESSAGES

- The GEP Index shows that 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
 - However, there are important challenges in areas such as increasing material footprint and overstepped planetary boundaries
- Progress on 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
- The overall ranking (applying the Protective Criterion) shows that only 17 out of 100 countries were able to make progress in the dashboard and in the GEP index.
- Methodology is flexible for country application (specific indicators, sub-national measurement)

GREEN ECONOMY PROGRESS MEASUREMENT FRAMEWORK

- The Green Economy Progress Measurement Framework – Methodology and Application are available on:
 - GGKP's website: <http://www.greengrowthknowledge.org/resource/green-economy-progress-measurement-framework>
 - PAGE's website: <http://un-page.org/learning-resources/technical-guidance/green-economy-progress-measurement-framework>



Andrea Bassi

Founder and CEO,
KnowEdge Srl

Panel Discussion

Q & A

Closing Remarks

Thank you for attending this webinar on
Introducing the Green Economy Progress (GEP) Measurement Framework

- This webinar was **recorded** and will be **uploaded** to the GGKP website: www.ggkp.org
- If you have any further questions about the webinar please email: contact@ggkp.org
- The GGKP asks you to complete a **survey** which will be sent out after this webinar.