



# MANAGING AND CONSERVING THE NATURAL RESOURCE BASE FOR SUSTAINED ECONOMIC AND SOCIAL DEVELOPMENT

*An input from the International Resource Panel*





## About the IRP

The UNEP-hosted International Resource Panel (IRP) was established in 2007 to provide independent, coherent and authoritative scientific assessments on the use of natural resources and its environmental impacts over the full life cycle and to contribute to a better understanding of how to decouple economic growth from environmental degradation. The Panel is constituted of eminent experts from all parts of the world, bringing their multidisciplinary expertise to address resource management issues. Benefitting also from the support of a large number of governments and other stakeholders, it provides a platform for exchange between policy-makers and scientists so that policies for sustainable development can be formulated taking into account the best available science. The assessments of the IRP to date demonstrate the numerous opportunities for governments and businesses to work together at the science-policy interface to create and implement policies to encourage sustainable resource management, including through better planning, more investment, technological innovation and strategic incentives

## About the Report

Given IRP's mandate and responsibility for raising the visibility and sense of urgency regarding natural resource issues among decision-makers and the public, this report advocates and promotes the rational management of resources throughout the Post-2015 SDG processes. In addition to integrating resource concerns in popular and widely acceptable goals on food, water, energy, urban development etc., this paper also advocates for a separate goal on sustainable resource management.

## Sustainable Resource Management – an imperative for human well-being

As nations strive to improve economic welfare, a large part of the costs of these efforts are being passed on to nature and future generations. About a quarter of the earth's land area is highly degraded (up from 15% in 1991)<sup>1</sup> and 5.2 million hectares of forests are lost every year<sup>2</sup>. Rivers and lakes are drying up, groundwater aquifers are depleting, oceans are becoming acidified, and more than 30% of global fisheries that are harvested are overfished<sup>3</sup>. 27% of the world's 845 species of reef-building corals have been listed as threatened and an additional 20% are considered near threatened<sup>4</sup>. Species and other forms of biodiversity are vanishing at rates not seen since the last mass extinction 65 million years ago when the dinosaurs disappeared<sup>5</sup>.

Greenhouse gas emissions increased by more than 30% between 1990 and 2010 and are leading to substantial changes in the environment<sup>6</sup>. The production of conventional fossil fuels has peaked and the environmental implications of the new, unconventional sources are likely to lead to severe limits on their extraction.

***Global economic and social development over the last two centuries has been largely achieved through intensive, inefficient and unsustainable use of the earth's finite resources.***

During the 20th century, extraction of construction minerals grew by a factor of 34, industrial ores and minerals by a factor of 27, fossil fuels by a factor of 12 and biomass by a factor of 3.6. The total material extraction increased by a factor of about 8 to support a 23-fold GDP growth<sup>7</sup>. Annual extraction of ores, minerals, hydrocarbons and biomass to keep us fed, clothed, housed, mobile, entertained and connected has grown from 7 billion tons in 1900 to 60 billion tons today and, on current trends of growth in population and economic activity, are set to reach 140 billion tons by 2050.

Recognising these hard realities, *The Future We Want*, an outcome document of Rio+20, calls for “*protecting and managing the natural resource base of economic and social development*”. Subsequently, the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda (HLP) reiterates that ***the poor directly depend on natural resources, for food, fuel, medicine, shelter and livelihoods, and are especially affected by resource depletion and environmental degradation***<sup>8</sup>.

Natural capital is essential for sustainable economic development and is the basis for a wealth generated in the poorest countries. A reduction in stocks of natural capital and flows of ecosystem services disproportionately harms the wellbeing of the poor and the resilience of their communities. In addition, global inequalities, in terms of both economic benefit and natural resource use, are a stark reality.

<sup>1</sup> UNCCD secretariat (2013), A Stronger UNCCD for a Land-Degradation Neutral World

<sup>2</sup> FAOSTAT, 2013

<sup>3</sup> FAO (2012), The State of the World Fisheries and Aquaculture

<sup>4</sup> 2008 IUCN Red List of Threatened Species™

<sup>5</sup> 65 million years ago, our planet faced the largest mass extinction of land animals in its history when approximately 700 dinosaur species were wiped off the face of the earth. In recent years, we have come to face a different, yet equally horrific calamity as species around the world have begun, and continue to decline at an alarming rate. This represents the sixth mass species extinction. (IUCN website)

<sup>6</sup> FT 2010, European Commission, Joint Research Centre (JRC)/PBL Netherlands Environmental Assessment Agency. Emission Database for Global Atmospheric Research (EDGAR), release version 4.2

<sup>7</sup> UNEP (2011) Decoupling natural resource use and environmental impacts from economic growth, A Report of the Working Group on Decoupling to the International Resource Panel.

<sup>8</sup> United Nations (2013), A New Global Partnership: Eradicate Poverty And Transform Economies Through Sustainable Development, The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda

The environmental impacts of affluence are well known and include the depletion of non-renewable resources, creation of waste and pollution and the destruction of ecosystem processes mentioned above. But poverty can also exert a negative impact on the environment. Out of the exigencies of survival, the poor have little choice but to eke out their basic needs and livelihoods from a fragile ecological resource base, and having lost the means to conserve it, they can sometimes damage its productivity and thus the very basis of their livelihoods. Poverty, combined with the lack of stable institutional frameworks, also appears as a potent driver of conflicts: the race for highly valuable natural resources such as minerals (e.g. columbite–tantalite aka “coltan”) or precious timber is a fundamental cause of the conflict in Africa’s Great Lakes region, the worst conflict in terms of casualties since World War II.

These challenges are mounting as the world population is projected to reach 8 billion by 2030, and over 9 billion by 2050<sup>9</sup>; 70% living in resource-intensive urban areas<sup>10</sup>. An additional 3 billion will join the current 2 billion in the middle class as consumers and major resource users<sup>11</sup>. 85% of the increase in population will be in the global south with 33% living in urban areas. 1.4 billion people lack access to modern energy<sup>12</sup> and some 2.5 billion lack basic sanitation services<sup>13</sup>. Inequality is also on the rise; today the 1.2 billion poorest people account for 1% of the world’s consumption while the billion richest consume 72% of the world’s resources. Despite the existence of widespread poverty and under consumption by poor, the utilisation of resources has already surpassed sustainable levels.

***The global challenge will therefore be to lift one billion out of absolute poverty and meet the needs of nine billion people in 2050 in terms of energy, land, water and material supply, while keeping climate change, biodiversity loss and health threats within acceptable limits.*** The twin issues of reducing overconsumption and wastage at one end, and providing secure access to food and resources on the other will have to be addressed simultaneously.

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<sup>9</sup> United Nations, Department of Economic and Social Welfare, Population Division (2013, World Population Prospects: The 2012 Revision, Key Findings and Advance Tables

<sup>10</sup> United Nations, Department of Economic and Social Affairs, Population Division, (2012), World Urbanization Prospects: The 2011 Revision

<sup>11</sup> Homi Kharas (2010), OECD Development Centre Working Paper 285, The emerging Middle Class in Developing Countries.

<sup>12</sup> International Energy Agency (2010), World Energy Outlook

<sup>13</sup> World Health Organization and UNICEF (2013), Progress of Sanitation and Drinking Water – 2013 Update

## Sustainable Resource Management – opportunities in the Post-2015 era

Through its assessments over the last six years, the International Resource Panel (IRP) has drawn attention to current practices and future opportunities for achieving sustainable resource management by '**decoupling natural resource use and environmental impacts from economic growth**'. For example, good experiences on technology prospects for decoupling include<sup>14</sup>:

- **Water efficiency:** In Australia, where GDP rose by 30% and water consumption was reduced in *absolute* terms by 40% during the same short period from 2001 to 2009.
- **Steel:** 80% reductions in greenhouse gas emissions can be achieved in the recycling of scrap iron by switching to state of the art electric arc furnace system, with improved process control, oxy-fuel burners, and post-combustion processes etc.
- **Cement:** It is possible to reduce energy and process related carbon dioxide methods by 30% globally<sup>15</sup>.
- **Paper and Pulp:** Fossil fuel use by the US pulp and paper industry declined by more than 50% between 1972 and 2002, largely through energy efficiency measures, power recovery through co-generation and increased use of biomass.

Many more opportunities for enhancing resource productivity lie not in a specific technology but in policies and processes that enable systemic improvements, cascades of use, and in synergies running through the whole production chain and life cycle of products. Material and energy efficiency in agriculture and forestry, manufacturing and final production and along the whole value chains can be improved significantly. Future material and energy supply will be based more on renewable sources such as recycling of waste. The opportunities to establish more closed-loop recycling systems increase with the on-going growth of infrastructures and the built environment in cities, which will become the mines of the future. Examples of systemic improvements are:

- Sustainable Food Systems for Food Security, Malawi
- Las Gaviostas, Colombia
- Inclusive Growth for Decoupling, Germany

The question, of course, occurs why relatively so few of these manifestly beneficial opportunities have been appropriated in the real world. Given the variety of resource challenges and of local situations, there is clearly no 'one size fits all' prescription, solution or single instrument that can be applied everywhere. Some common features can, however, be identified<sup>16</sup> for policies aiming at ambitious goals of decoupling resource use in a green economy, such as:

- **The whole systems approach** to avoid narrow sectoral or partial analysis which usually leads to sub-optimal outcomes.
- **Policies** that strike a better balance in the mix of economic, technological, regulatory instruments.
- **Long term thinking** to avoid political and economic decisions which are currently made on the basis of short time horizons, often determined by political or business considerations.
- **Life cycle analysis and management** to ensure environmental policies go beyond end of pipe solutions and avoid burden shifting by transferring one problem to another.

<sup>14</sup> UNEP, (2013), Decoupling in Practice (Decoupling 2) – draft (to be published)

<sup>15</sup> IPCC, Fourth Assessment Report, (2007), Climate Change 2007

<sup>16</sup> UNEP (2013), Decoupling in Practice (Decoupling 2) – draft (to be published)

- **Consumer awareness** to spread consciousness of the need to conserve non-renewable resources.
- **Inclusiveness** through establishment of formal and informal decision structures that can identify grassroots level needs and aspirations.
- **Universal access** to basic natural resources through appropriate pricing and delivery systems.
- **Innovation and education** to develop appropriate technological innovations and to diffuse them into the entire society and economic fabric.

This simplified list clearly shows that a wide range of measures are required to facilitate continued improvement in resources management. These include framework conditions under which innovations are encouraged; technology development and investment on resource-efficiency technologies; education and awareness on resources productivity; design at all levels (product, services, city, infrastructure, etc.) for sustainable resource management. The good news is that many such options are now available or under serious development.

Visionary political and business leadership is essential in both the developing and industrialised world, because concerns for resources go far beyond the confines of environment ministries. The use of resources is at the core of economic activity. Economic affairs and development, fiscal affairs, transport, trade, planning and infrastructures, science and technology, and education are central to resource policies or are at least influenced by it. This means that resource policies unavoidably require the attention of the top ranks of our political and business leadership to help policy co-ordination both in the public and private domain. It necessitates building cooperation, co-ordination and integration among different stakeholders and sectors. The full potential of sustainable resource management for sustained human well-being can be harnessed through focussed and conscious international cooperation on the issue.

### **Building on the Millennium Development Goals (MDGs) Experience – incorporating resource management concerns in SDGs**

The MDGs, adopted at the global summits held in New York in 2000 and Johannesburg in 2002 with a time horizon of 2015, have made tangible progress for different goals in different countries. It becomes clear that, continuing with the tradition of the MDGs, the primary emphasis is on human well-being, with little attention to the health of the environment.

However, actual progress towards sustainable development will ultimately depend on how responsibly the planet's natural resources are managed. It is not just the economy that draws much of its sustenance from the resource base: the quality of the environment, the well-being of humanity and the very continuance of life itself is integrally dependent on it. The Post-2015 processes offer an opportunity to create a sense of urgency regarding natural resource management issues.

An analysis of 5 reports (CIGI, SDSN, UNGC, Griggs, and HLP)<sup>17</sup> reveals that some goals on food, energy, and water have embedded environmental concerns, however these were found to be inadequate with respect to proposed targets/indicators. For example, there is little or no mention about materials as a resource and implications of unsustainable practices with respect to extraction and consumption of material resources. Goals on education, health, income and jobs do incorporate a social dimension but without any significant reference or implication on environment. The table below highlights the same:

Goal Cluster	CIGI	SDSN	UNGC	Griggs	HLP
Poverty/Livelihoods/Inclusive Growth/Jobs					
Food /Sustainable Agriculture					
Water and sanitation					
Energy					
Education					
Health (Social Security Services)					
Governance and rule of law					
Environmental/ Biodiversity Management					
Global partnership for development					
Peace and security					
Cities/ Urbanisation					
Resilience					
Ocean Acidification/ Fisheries					
SCP					

Key:

 Economic

 Social

 Environmental

Therefore, this Panel is in a unique position to suggest options for incorporating concerns and methods for decoupling economic growth from environmental degradation and resource consumption in the SDG frameworks.

<sup>17</sup> Centre for International Governance Innovation (CIGI) 'Post-2015 Development Agenda: Goals, Targets and Indicators'; Sustainable Development Solutions Network (SDSN) 'Post-2015 Report: An Action Agenda for Sustainable Development'; United Nations Global Compact (UNGC) 'Corporate Sustainability and the United Nations Post-2015 Development Agenda'; Griggs 'Sustainable Development Goals for People and Planet'; High Level Panel (HLP) 'A New Global Partnership: Eradicate and Transform Economies through Sustainable Development'.

One option for incorporation of these concerns in the SDG framework will be to establish a separate goal for sustainable resource management with associated targets and indicators. This could read as follows:

<b>Goals</b>	Efficient use of natural resources in an equitable, secure and environmentally benign manner for human well-being in current and future generations.
<b>Targets</b>	Double the yearly rate of resource productivity over the next XXXX years
<b>Indicators</b>	<ul style="list-style-type: none"> <li>• TMR/GDP (total material requirement/GDP)</li> <li>• Material Requirement/GDP and GHG/GDP (Per sector: food, shelter, energy and mobility, etc.)</li> <li>• HDI/GPI</li> <li>• Total ha of land used</li> <li>• M3 of Fossil water</li> <li>• Tonnes of SO<sub>x</sub>, NO<sub>x</sub>, PM generated</li> </ul>

While a separate goal of this kind will highlight the primacy sustainable resource management deserves in the SDG framework, the formulation of the target suggested above only outlines the trajectory to be adopted. The quantum and timeframe of the target is debateable and should be the outcome of a political process. The indicators illustrate the *kind* of measurements and assessments that will be required.

The second and even more important option is to incorporate sustainable resource management concerns in the relevant human well-being goals like food security, water, energy, and urban development etc. through appropriate targets and indicators. Keeping this in mind, an indicative list of goals, targets, and indicators has been prepared by the Panel for themes that are the priority for the Post-2015 SDG processes. This is provided in the accompanying document titled 'Mainstreaming Resource Management Concerns in Human Well-being Goals'.

These targets and indicators demonstrate the need to consider complex inter-linkages and synergies among different goals on food, water, and energy etc. For example, progress on social goals, such as access to drinking water and nutritious food, may have increased impact on natural resource use, or progress in terms of poverty reduction may lead to rising consumption of resources and materials and thus countervail relevant targets on food waste, cropland expansion, land degradation or public transport. Tapping into the resource management potentials offers wider opportunities for broader developmental goals in terms of:

- **Eradicating poverty** – by breaking the vicious circle of over-consumption, environmental degradation and poverty
- **Ensuring food security** – by adopting sustainable use of land based resources
- **Achieving universal access to safe and clean water & sanitation** – by enhancing efficient use
- **Securing access to universal energy** – by incorporating resource efficient renewable energies
- **Creating sustainable livelihoods and equitable growth** - by promoting innovations for sustainable resource use



Hence, it will be absolutely essential and critical to incorporate sustainable resource management concerns in human well-being goals along with including a separate goal to ensure that the resources issue finds its rightful place in the Post-2015 SDG frameworks.

Examples of Targets and Indicators mainstreaming resource concerns in human-wellbeing goals:

Goal	Targets	Indicators
Ensure sustainable agriculture, food and nutrition security, combat desertification and land degradation	Increase agricultural productivity by X% by 20XX	<ul style="list-style-type: none"> <li>Yield per water unit used</li> <li>Yield per carbon emission</li> <li>Yield per soil loss</li> </ul>
	Improve nutrient use efficiency by X% by 20XX	<ul style="list-style-type: none"> <li>Units of Nitrogen, potash and phosphorous per \$ of agricultural production</li> </ul>
Ensure integrated management of water resources to provide for all uses	Provide universal access to safe drinking water and good sanitation by XXXX year	<ul style="list-style-type: none"> <li>Proportion of water users (households, industry and agriculture) recycling and re-using water</li> <li>Increase in water efficiency in agriculture by X%, industry by y% and households by z%</li> </ul>
	Maintain environmental flow in freshwater bodies to sustain water related ecosystem services	<ul style="list-style-type: none"> <li>Regulate ground water withdrawals within annual recharge capacity</li> </ul>
Access to energy, sustainable energy	Reduce the climate forcing of energy supply by 50% by 2050.	<ul style="list-style-type: none"> <li>Total climate forcing caused by energy supply</li> <li>Carbon footprint per person</li> <li>Non-carbon energy share in energy and electricity</li> <li>GHG emissions from energy production and use (per capita and per unit of GDP)</li> </ul>
	Limit the use of resources (bio productive land, water, metals) associated with energy supply to sustainable levels.	<ul style="list-style-type: none"> <li>Resource footprint of the per person energy supply (m<sup>2</sup>/person, m<sup>3</sup>/person)</li> </ul>
Protect biological diversity and ecosystem services through restoration and sustainable management of forests	Halt deforestation through conservation of selected old-growth forests, sustainable management of production forests, and restoration of degraded forests	<ul style="list-style-type: none"> <li>Rate of deforestation</li> <li>Rate of reforestation and restoration of degraded forests</li> <li>Percentage of forests managed sustainably</li> </ul>
Sustainable Urban Development	Reduce carbon emissions from the construction and operation of buildings	<ul style="list-style-type: none"> <li>GHG emissions from construction sector</li> <li>Electricity consumption in buildings</li> <li>Heating related emissions</li> </ul>
	Ensure urban planning as it provides liveable cities with clean air and water and efficient use of land and resources	<ul style="list-style-type: none"> <li>Air quality – SO<sub>x</sub>, NO<sub>x</sub>, PM</li> <li>Water Quality – Biological, Physical, Chemical</li> <li>Urban Plans</li> </ul>

Goal	Target	Indicator
Health for All	Promote healthy diets and physical activity, discourage unhealthy behaviours, such as smoking and excessive alcohol intake, and track subjective wellbeing and social capital	<ul style="list-style-type: none"> <li>Obesity: Adult <i>Prevalence</i> Rate</li> </ul>
Access to education and information	Include sustainable development concepts curricula at all school levels	
Sustainable use of oceans, seas, rivers and lakes, sustainable fisheries, and addressing ocean acidification and eutrophication	Reduce share of overexploited ocean fish stocks by 20 %	<ul style="list-style-type: none"> <li>Proportion of fish stocks within safe biological limits</li> <li>Rate of ocean acidification</li> </ul>
	Eliminate policies that support unsustainable fisheries practices by 2020	
Resilience and disaster risk reduction	Build resilience and reduce deaths from natural disasters by x %	<ul style="list-style-type: none"> <li>% of a country's surface for which a multi-hazard assessment exists (including landslides/ rock fall, soil shrinkage, seismic activity, radon gas emissions, excess or deficit of trace elements in soil and water, volcanic activity, sea level variations)</li> <li>Direct economic losses as a percentage of GDP</li> </ul>
	Ensure National disaster risk reduction and resilience plans are adopted and referenced in national development plans	<ul style="list-style-type: none"> <li>Number of land-use plans integrating the exposure to the various categories of natural hazards</li> </ul>
Inclusive economic development, governance of finance and economic sectors, sustainable livelihoods, employment and decent work	Reduce GHG emissions by x% p.a., where x is related to GDP	<ul style="list-style-type: none"> <li>GHG intensity of GDP</li> <li>Indicators of environmental damage associated with resource extraction</li> </ul>
	Increase the number of good, green and decent jobs and livelihoods by X	<ul style="list-style-type: none"> <li>% of waste recovered through decent jobs</li> <li>GHG emissions per head</li> <li>GHG intensity of energy use</li> </ul>