Embedding the Environment in Sustainable Development Goals

UNEP Post-2015 Discussion Paper 1

Version 2   19 July 2013

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Précis

One of the principal outcomes of Rio+20 was the call to produce a set of universally applicable sustainable development goals (SDGs) that balance the environmental, social and economic dimensions of sustainable development. This Paper provides advice and guidance on how environmental sustainability can be incorporated in the SDGs.

An analysis of current environmental goals and targets shows that the successful ones are built on general support from society and a scientific consensus that the problem exists and is urgent. The ones making most progress tend to be embedded in effective governance regimes, and be easier to implement because solutions are readily available. A key to success also seems to be that goals are underpinned by specific and measurable targets.

After considering the above and other lessons from current goals, the following framework is proposed for embedding environment in the SDGs:

1. A **rationale and overarching vision for the SDGs**, which is a narrative describing the basis for including environmental sustainability in the SDGs;

2. An **integrated approach for embedding environment in goals and targets** which proposes basic characteristics and types of goals and targets to be selected;

3. A **set of six criteria** for assessing or proposing goals and targets, and guidance on how to use them. The criteria are: (i) Strong linkage of environment with socio-economic developmental goals; (ii) Decoupling of socio-economic development from escalating resource use and environmental degradation; (iii) Coverage of critical issues of environmental sustainability such as important irreversible changes in the global environment; (iv) Take into account current global environmental goals and targets, (v) Scientifically credible and verifiable; and (vi) Progress must be "trackable".

4. A **list of best practices for selecting indicators** that can effectively support targets.

The framework and other ideas presented in the Paper are meant to stimulate a dialogue on environmental sustainability and the SDGs.

Acknowledgements

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Executive Summary

World leaders at the 2012 United Nations Conference on Sustainable Development (Rio+20) reaffirmed their commitment to sustainable development which embraces economic progress, social development, and environmental protection for the benefit of all. One of the principal outcomes of Rio+20 was the call to develop a set of universally applicable sustainable development goals (SDGs) that carefully balance the environmental, social and economic dimensions of sustainable development. This Paper provides advice and guidance on how environmental sustainability can be incorporated in the SDGs. It is intended to stimulate a dialogue on environmental sustainability and the SDGs rather than be the last word on the subject.

Lessons Learned from Current Goals and Targets

While countries recommended that the SDGs take a forward-looking approach, they also suggested that the new goals be based on experiences from current international goals and targets. With that in mind, it has been observed that particularly *successful* goals are …

- built on general support from society and a scientific consensus regarding the urgency of the problem;
- embedded in effective institutional and political frameworks and governance regimes that ensure implementation and compliance;
- made easier to implement because of the availability of solutions;
- linked to specific and measurable targets.

On the negative side, a major *barrier to* their success has been *fragmentation* with respect to design (by neglecting the interconnectedness of goals, especially the linkages between their environmental, social and economic aspects) and the lack of coordination between design, implementation and monitoring.

Other lessons coming from experience with MDG 7 and other goals suggest that new goals and targets should cover a wider range of important environmental sustainability topics than currently covered, and that these topics should be closely linked with socio-economic developmental goals. In addition, it might be more effective in some cases to devise goals that target the core driving forces behind a problem rather than the problem itself.

A Framework for Embedding Environmental Sustainability in the SDGs

Building on lessons from existing goals, a framework is suggested for embedding environmental sustainability into SDGs. This framework includes the following:

The first part of the framework is the **rationale and overarching vision for the SDGs**, which is a narrative describing the basis for including environmental sustainability in SDGs.

The second part is an **integrated approach** for embedding the environment in goals and targets. This approach includes:

1. A *complementary set of goals and targets* – An important principle for selecting goals and targets is that they should reinforce and complement each other, firstly, by ensuring that they cover all of the main objectives of the environmental, social and economic dimensions of sustainable development; and secondly, by ensuring that they work together to maintain and restore the biological diversity and ecosystem services necessary to meet social and economic objectives.
2. *Integrated goals* – It is suggested to fill the top level of the SDGs with a limited number of integrated goals that are simple to understand, but not necessarily simple in nature. The goals would be "integrated" in the sense that they embody all three aspects of sustainable development – environmental, social and economic.
3. *A mix of targets* – Each of the integrated goals should be underpinned by a mix of targets – some integrated, and some "non-integrated" (in the sense that they concentrate on either environmental, social or economic objectives). The preference is for integrated targets because they can incorporate the interlinkages between environmental, social and economic dimensions of sustainable development, and have other strengths. However, targets must also be specific and measurable. If integrated targets cannot meet these criteria then "non-integrated" targets may be more appropriate. Hence, a mix of targets.

The third part of the framework is a set of **criteria** for embedding environmental sustainability in SDGs. The criteria can be used to assess goals and targets already proposed in the SDG discussion process, or to

formulate new goals and targets that can be put into the SDG discussion process.

The six criteria are:

Criterion 1. Strong linkage with developmental goals. Within the SDGs environmental issues should be strongly linked to socio-economic developmental issues. The SDGs should "incorporate in a balanced way all three dimensions of sustainable development and their interlinkages" (Rio+20 Outcome Document). Perhaps the most fruitful way to couple environment and socio-economic development within the SDGs is to formulate *integrated goals and targets*, as previously described.

Criterion 2. Decoupling of socio-economic development from escalating resource use and environmental degradation. Goals and targets should be formulated to promote the decoupling of socio-economic development from unsustainable depletion of resources and increasing environmental impact. They should encourage and support steadily improving resource efficiency through more efficient production and recycling, reducing waste, and modifying unsustainable consumption patterns.

Criterion 3. Coverage of critical issues of environmental sustainability such as important irreversible changes in the global environment. The final set of selected goals and targets should cover as many critical environmental sustainability issues (current and imminent) as possible. Priority should be given to objectives that help avoid critical "irreversible" changes of the global environment.

Criterion 4. Take into account current global environmental goals and targets. This can be done by: (a) using current goals and targets as a "ground floor" for new goals and targets; (b) incorporating a small number of important current goals and targets whose implementation can be accelerated if they are included in the SDGs.

Criterion 5. Scientifically credible and verifiable. Goals and targets should be based on best scientific understanding, and support should be available from the scientific community to monitor and implement them.

Criterion 6. Progress must be "trackable". All goals should be backed by specific and measurable targets and indicators.

The final part of the framework is advice on **best practices for selecting indicators** to support SDG goals and targets. This advice includes recommended characteristics of indicators, such as:

- The set of indicators for monitoring SDGs should be limited in number and coherent, i.e. consistent and complementary to each other within and in between goals.
- They should be understandable, clear and unambiguous in their interpretation.
- They should be specific and measurable.
- They should be clearly linked to the target and be robust in providing measures of progress towards targets.
- They should be relevant to policy making and should change in response to policy interventions.
- Where possible, they should be linked to recognized cost-effective tracking and monitoring systems to establish their credibility and comparability.
- They could include both absolute and relative changes in order to give a more complete picture of performance.

Strengths of the framework

In sum, the framework proposed for embedding environment in the SDGs brings the following benefits:

- Integrated goals, as opposed to single dimensional goals, achieve a higher level of integration of the three dimensions of sustainable development. They will help ensure that all dimensions of sustainable development are well represented in the set of SDGs.
- Integrated goals, with at least some integrated targets, will encourage governments and other institutions to move away from the silo approach to solving challenges of sustainable development.
- Giving the environment an equal footing to social and economic considerations within the framework shows that environmental sustainability is a foundation for socio-economic development. It encourages a type of development that minimizes unintended environmental consequences and strengthens adaptation and resilience to environmental and other changes.

It is hoped that this framework and other ideas presented in the Paper will promote a fruitful collaboration between the environmental community and the many other constituencies working to develop SDGs.

1. Introduction

Rio+20 was an important stocktaking of the world's progress towards achieving sustainable development. Certainly one of its key outcomes was the call to develop sustainable development goals (SDGs) with the aim to bring the world further along the path of sustainable development. Countries saw the SDGs as a chance to assess the global framework used to monitor progress in sustainable development. They also recognized that agreeing to a single set of SDGs would help ensure that society was moving in the same direction towards sustainability.

An important message was that this new set of goals should carefully consider and balance the three dimensions of sustainable development – environmental, social and economic. In the meantime, a fourth dimension, "peace and security" has been suggested by the UN Task Team on the post-2015 UN Development Agenda[1] and the Sustainable Development Solutions Network.

Countries declared that the SDGs should be transformational and address the multiple and intertwined challenges of ensuring environmental sustainability, eradicating extreme poverty, and achieving economic and social wellbeing. They also affirmed that these goals should be universally applicable to all countries while taking into account different national realities, capacities and levels of development. While taking a forward-looking approach to such goals, they recommended looking back at the Millennium Development Goals (MDGs) and other goals and targets to learn from experience.

Rio + 20 also set in motion the machinery to develop new goals and targets. The Open Working Group (OWG) on SDGs will submit a proposal for SDGs to the 68th session of the General Assembly, and the UN was called in to support it through an interagency technical support team. While the OWG is working on the overall vision of SDGs, this Paper focuses on the environmental dimensions of SDGs taking into consideration their socio-economic dimensions.

Related to these activities are various strands of work concerned with the UN development agenda beyond 2015. For example, the UN Secretary-General's High-Level Panel of Eminent Persons on the Post-2015 Development Agenda has submitted a report on the subject, while further ideas on the post-2015 agenda are being collected by the UN Development Group at national, regional and global thematic consultations.

Some of these processes have already produced proposals for SDGs, as summarized in Box 1. Although there are many different processes, they all need input from a wide range of institutions concerned with sustainable development. This Paper is intended to provide such input.

One of the greatest challenges in developing SDGs will be to incorporate all the dimensions of sustainable development in a balanced way – environmental, social, and economic. Each of these dimensions requires careful thinking and analysis about the role they will play in SDGs and how they will be interlinked. This Paper is concerned in particular with the role of environmental sustainability.

Although it focuses on one aspect of the bigger picture, an important message here is that environment and socio-economic development are so intricately linked that development cannot be sustainable without considering its environmental dimensions. In a similar vein, it is now accepted that poverty eradication and a lasting prosperity cannot be achieved if ecosystem services and natural capital are degraded or lost.[2] Countries underlined this at Rio+20 by noting that socio-economic development and environmental sustainability come together in the inclusive "Green Economy", naming it "one of the important tools available for achieving sustainable development". Ushering in this Green Economy, and conserving and using ecosystem services and natural capital in a sustainable manner, are the kinds of transformative changes that could and should be catalyzed by sustainable development goals.

With these important ideas in mind, the main objective of this Paper is to provide advice and guidance on how

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[1] The UN System Task Team on Post-2015. 2012. Realizing the future we want for all. Report to the Secretary-General by the UN System Task Team on the Post-2015 UN Development Agenda. New York. http://www.un.org/millenniumgoals/pdf/Post_2015_UNTTreport.pdf

[2] Millennium Ecosystem Assessment. 2005. Ecosystems and human well-being: Synthesis. Island Press, Washington, DC. http://www.unep.org/maweb/documents/document.356.aspx.pdf

environmental sustainability can be incorporated in the SDGs. The Paper aims to stimulate a dialogue on environmental sustainability and the SDGs rather than be the last word on the subject.

The Paper begins with a brief review of lessons learned from current global environmental goals and targets relevant to the SDGs. It then discusses a framework for embedding environment in the SDGs that includes a statement of an overarching vision, an approach to structuring goals and targets, a set of criteria for assessing or deriving goals and targets, and a list of best practices for indicators. It is hoped that this framework and other ideas presented in the Paper will promote a fruitful collaboration between the environmental community and the many other constituencies working to develop the SDGs.

Box 1: Some current proposals for SDGs

A number of publications have been released recently containing proposals for specific SDGs. A summary is given here:

- The United Nations Department of Economic and Social Affairs (DESA) in a briefing paper[3] summarized ideas on SDGs based on proposals from two UN Member States and the world's Civil Society Organizations (CSOs). Colombia and Guatemala proposed 8 goals, while the CSOs proposed 17 goals. The goals are related to combating poverty, sustainable consumption and production, sustainable livelihoods, youth and education, climate sustainability, clean energy, biodiversity and forests, water, healthy seas and oceans, sustainable agriculture, environmental justice for the poor and marginalized, access to information, basic health and new indicators of progress.

- The Centre for International Governance Innovation in collaboration with the Korea Development Institute proposed the "Bellagio Goals"[4], which include inclusive growth, food and water, education and skills, health, gender and equality, environmental sustainability, security, resilient communities, infrastructure, civil and political rights and global governance.

- In a German Development Institute briefing paper[5] it was suggested that the post-2015 international agenda could be structured into two parts comprising of human development objectives (final goals) and provision of global public goods (instrumental goals). It was proposed that the "final goals" could include reduction of income poverty, food security, education, health and family planning, infrastructure (energy, housing, water and sanitation), environment (clean air and water, protection of resources), resilience (human and social security), and good governance, while the "instrumental goals" could include limiting climate change, joint global management of environmental resources, containing infectious diseases, improving the stability of financial markets, curbing international terrorism and disarmament of anti-personnel mines and weapons of mass destruction. However, in another briefing paper from the same institute[6], seven goals, including food security for all, water security for all, health for all, sustainable energy for all, opportunities for all, peace and justice for all and earth system security, were proposed.

- Griggs and colleagues[7] proposed a set of six SDGs that were developed by combining the MDGs with conditions that were claimed to be necessary to assure the stability of the Earth's systems. The proposed goals include thriving lives and livelihoods, sustainable food security, sustainable water security, universal clean energy, healthy and productive ecosystems and governance for sustainable societies.

- The High Level Panel on the Post-2015 Development Agenda in its report[8] to the UN Secretary General proposed twelve illustrative goals including ending poverty, empowering girls and women and achieving gender equality, providing quality education and lifelong learning, ensuring healthy lives, ensuring food security and good nutrition, achieving universal access to water and sanitation, securing sustainable energy, creating jobs, sustainable livelihoods and equitable growth, managing natural resource assets sustainably, ensuring good governance and effective institutions, ensuring stable and peaceful societies and creating a global enabling environment and catalysing long-term finance.

- The Sustainable Development Solutions Network in its report[9] to the UN Secretary General proposed ten SDGs including ending extreme poverty including hunger, achieving development within planetary boundaries, ensuring effective learning for all children and youth for life and livelihood, achieving gender equality, social inclusion and human rights for all, achieving health and wellbeing at all ages, improving agricultural systems and raising rural prosperity, empowering inclusive, productive and resilient cities, curbing human-induced climate change and ensuring sustainable energy, securing ecosystem services and biodiversity and ensuring good management of water and other natural resources, and transforming governance for sustainable development.

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[3] UNDESA. 2012. Current ideas on SDGs and indicators. http://www.uncsd2012.org/index.php?page=view&type=400&nr=218&menu=45

[4] Bates-Eamer et al. 2012. Post-2015 development agenda: goals, targets and indicators. http://www.cigionline.org/sites/default/files/MDG_Post_2015v3.pdf

[5] Loewe, M. 2012. Post 2015: How to reconcile the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs)?, Bonn: DIE (Briefing Paper 18/2012)

[6] Boltz et al. 2013. Loewe, M. (2012): Post 2015: Reconsidering Sustainable Development Goals: Is the environment merely a dimension?, Bonn: DIE (Briefing Paper 4/2013)

[7] Griggs et al. 2013. Sustainable development goals for people and planet. Nature, 495, 305-307

[8] HLP 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. http://www.post2015hlp.org/wp-content/uploads/2013/05/UN-Report.pdf

[9] SDSN. 2013. An action agenda for sustainable development. Report for the UN Secretary-General. http://unsdsn.org/files/2013/06/post-2015-report-recommendations.pdf

PART A

Experience with Global Environmental Goals

Part A. Experience with Global Environmental Goals

2. Lessons Learned from a Review of Environmental Goals and Targets

What lessons are to be learned from current environmental goals and targets?

Over the last decades the international community has adopted an impressive number of environmentally-related international agreements. According to one count[10] there are more than 500 such treaties. (As an aside, 195 are concerned with water, 180 with chemicals and wastes, 155 with biodiversity, 60 with the atmosphere including climate change, and 45 with land use.)

As part of an initiative to identify a core set of environmental goals,[11] UNEP examined progress in achieving 90 important goals from these treaties and found that only 4 of them showed significant progress[12]. From this standpoint, there is much unfinished business on the international environmental agenda.

So what have we learned from this and other reviews of goals and targets? The following factors, in particular, seemed to have played a key role in successfully meeting goals:

- *Consensus and support from the scientific community* provides confidence to policymakers that a problem is significant and requires action[13].

- Related to the previous point, *the general support of society* for these goals is also a key ingredient for making progress. This requires clearly communicating the significance of the goals, including how they affect peoples' lives.

- The *availability of solutions* for addressing an environmental problem sometimes (but not always) raises the political will of signatories, and enables the raising of funds for implementing a treaty.[14] Furthermore, success in achieving a goal depends on the ease with which a targeted problem can be broken down into pieces, each of which is amenable to solution.[15]

- The *principle of common but differentiated responsibilities*[16] embedded in many agreements encourages agreement on common overarching goals while allowing individual countries to comply at a different pace using different targets and timelines for implementation. Responsibilities of countries are typically related to historical and current contributions to environmental problems, and to current/future capacities to address them.

- A key factor is *embedding goals in effective governance regimes* that ensure their implementation, accountability and compliance. Ultimately, the effectiveness of implementing environmental goals depends on how well they are integrated into institutional and governance frameworks at all levels (international, regional, national and sub-national). Effective governance includes adequate follow-up and compliance systems with independent monitoring and evaluation, and effective financing and economic incentives. Related to this, the MDGs and other

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[10] Jabbour et al., 2012. Internationally agreed environmental goals: a critical evaluation of progress. Environmental Development, 3, 5-24.

[11] UNEP. 2012. Measuring progress: environmental goals & gaps. United Nations Environment Programme. Nairobi. http://www.unep.org/geo/pdfs/geo5/Measuring_progress.pdf

[12] The four goals showing significant progress are the goals on protection of the ozone layer, the phasing out of lead in gasoline, the MDG on halving the proportion of people without sustainable access to safe drinking water by 2015, and improving research in order to prevent, eliminate and reduce pollution of the marine environment. On the other hand, 40 showed some progress; 24 showed little to no progress; 7 showed further deterioration; 14 had insufficient data; and for one, it was too soon to assess its status. More details in the two references above.

[13] The 1987 Montreal Protocol provides an example in which states took precautionary measures to control ozone-depleting substances at the time the agreement was signed. Only later, over the course of a decade and in light of further scientific findings was the reduction schedule tightened. (See Kiss & Shelton. 2004. International Environmental Law, 3rd ed., Transnational Publishers, Inc. Ardsley, NY, p. 576)

[14] An example is the case of the Montreal Protocol, in which it is thought that the availability of economical substitutes for ozone-depleting substances was a factor in leading to an agreement on controlling these substances. See for example, Peloso, C. 2010. Crafting an international climate change protocol: applying the lessons learned from the success of the Montreal Protocol and the ozone depletion problem. Florida University Journal of Land Use and Environmental Law, 25, 305-329 and UNEP 2012. Global Environment Outlook – 5. United Nations Environment Programme (http://www.unep.org/GEo/geo5.asp).

[15] For example, in the case of the ozone treaty, negotiators could break down the sources of ozone-depleting substances into specific product-producing sectors that could be effectively targeted for mitigation. So the lesson here is to develop goals that are less complex in their definition and solution.

[16] This principle assigns different obligations to developing and developed countries for tackling environmental problems based on their historical responsibility for these problems and their current capacity to address these problems.

goals have shown the need for a broad-based, inclusive monitoring mechanism, and for succinct, regular reporting on progress and challenges.[17]

- *Linkage of goals with specific and measurable targets*. One of the strongest conclusions from the analysis of global goals was that those showing the greatest progress had the most specific and measurable targets. This was also a major conclusion of the Secretary-General's High Level Panel on Sustainability.[18]

  Why? It was suggested that measurable targets encourage countries and the international community to collect and coordinate data about the environmental goal, providing a basis for tracking progress and determining compliance. These data also help determine needed solutions to achieve goals.

  Conversely, goals without specific targets beg the question as to whether they are successful or not. Examples are the goals aiming to protect or restore freshwater quality which are not backed up by sufficient baseline field data.[19]

  But the lessons here are not so clear. If progress is slow because of the lack of data, does it mean that only targets backed up by data should be selected? Or does it mean that measurement programmes for collecting necessary data can follow the selection of measurable targets?

  What about developing countries with limited resources for data collection? Should targets be selected only if data to support them are cheap to collect, or if they receive external support for data collection and management?

  Here are a few tentative answers to these questions:

i. Goals should be backed up by targets that are measurable. This should be a minimum criterion. If targets are not measurable, it is doubtful that they should be considered. Note, however, that "measurable" can be broadly interpreted. For example, many targets having to do with the "quality" of something, quality of education for example, can now be measured. Also, some targets can be backed by measurable proxy indicators or indices of performance. (See Section 10, Tracking Progress on Goals and Targets).

ii. If a goal has the option of having two equally good targets, then the target backed up by the greatest amount of data and cheapest costs for data collection should be given extra weight.[20] On the other hand, while relative availability and costs of data should be given consideration in the selection of targets, they should not be the only criteria.

iii. If no data are available to back up a target, then an analysis should be carried out on the costs and effort needed to develop the necessary data, and this information should be factored into the decision about whether to select a particular target or not.

On the negative side, a factor working *against* the achievement of goals is *neglecting their interconnectedness*. In general, global environmental goals have been developed in a fragmented manner in part because some environmental issues tend to be ready for international action sooner than others. Why? Perhaps because some issues appear more urgent than others, or because a critical level of scientific knowledge about a problem is reached, or because solutions to the problem become available.

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[17] See Weiss, E.B. 1998. Understanding compliance with international environmental agreements: the Baker's dozen myths, which lists the different factors that account for successful implementation and compliance with environmental agreements. Effective governance has played an important role in the success of the Montreal Protocol, including its innovative compliance mechanisms and governance of the Multilateral Fund, and the interlinkage of funding and trading incentives with the compliance mechanism.

[18] United Nations. 2012. Resilient people, resilient planet: a future worth choosing. Report of the United Nations Secretary-General's High-Level Panel on Global Sustainability. United Nations, New York, NY. http://www.un.org/gsp/sites/default/files/attachments/GSP_Report_web_final.pdf

[19] UNEP 2011. Progress towards meeting internationally agreed goals. Findings from GEO-5 draft 2 as at 26 September 2011. http://www.unep.org/pdf/RIO20/progress-internationally-agreed-goals.pdf and UNEP 2011. Keeping track of our changing environment. From Rio to Rio+10 (1992-2012). http://www.unep.org/geo/pdfs/Keeping_Track.pdf

[20] For example, if a health goal has a choice of two possible air pollution targets -- a target for reducing emissions of particulate matter, or a target for limiting atmospheric levels of particulate matter – and both are considered equally satisfactory for tracking progress, then the one with the more data available and lowest costs of measurement or estimation should be given special weight.

Whatever the reason, this fragmented approach can lead to achieving one goal at the expense of another.[21] Part of the problem is the lack of a coordinated response from governments because different departments are responsible for different problems. This fragmented way of dealing with problems can also put a large burden on governments in terms of reporting and fulfilling their obligations to several different treaties, and may imply a wastage of resources.

It is essential, therefore, that SDG developers take into account the interlinkages among new goals.[22]

3. Experience with MDG-7 – The Millennium Development Goal on Environmental Sustainability

What can we learn from experience with MDG-7?

Environmental objectives in the Millennium Development Goals are concentrated in MDG-7 – "Ensure Environmental Sustainability" with its four subsidiary targets. The 2012 UN MDGs report[23] together with other evaluations[24] have come to the following conclusions about these targets:

Target 7a: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources. A look at the five indicators defined for this target shows full compliance with only the one having to do with reducing the consumption of ozone depleting substances. Other indicators show much slower progress. Total forest loss continues, although it has slowed from an annual loss of 8.3 million hectares in the 1990s to 5.2 million hectares in 2010[25]. Meanwhile, global emissions of CO_2 did drop between 2008 and 2009[26], but they are now rising again.

With respect to the proportion of fish stocks within safe biological limits, the overexploitation of marine fisheries reached a new peak in 2008. According to the FAO, approximately 30% of marine fish stocks were overexploited in 2009.[27] For the indicator on the proportion of total water resources used, the 2011 UN MDGs report[28] indicates slow or no progress.

Target 7b: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss. A review of the two indicators for this target (proportion of terrestrial and marine areas protected and proportion of species threatened with extinction) indicates slow progress or decline.

Target 7c: Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. The 2012 UN MDG report indicates that the world has met the global target on access to safe drinking water but is making slow progress towards the sanitation target. The significance of meeting the drinking water target should not be underestimated because it means that millions of people have gained access to safer water supplies. But more needs to be done. The 2012 UN MDG report indicates that despite global success, regions including Oceania and sub-saharan Africa are not on track to meet the drinking water target. Over 40% of the global population without improved drinking water supplies are in sub-saharan Africa.

Target 7d: Achieve, by 2020, a significant improvement in the lives of at least 100 million slum dwellers. The 2012 UN MDG report indicates that this target has been met well in advance of the deadline. Nevertheless, the absolute number of slum dwellers continues to grow.

To sum up, on the positive side, the goal-setting approach of the MDGs has provided a focal point

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[21] For example, it has been argued that a side effect of achieving the goals of combatting ozone depletion through the Montreal Protocol has been an increasing threat to the success of the Framework Convention on Climate Change. It turns out that one of the main substitutes for ozone-depleting substances are hydrofluorocarbons (HFCs) which happen to be potent greenhouse gases. While the concentration of HFCs is still low in the atmosphere, it is building up rapidly because countries are switching to HFCs to comply with the Montreal Protocol (See UNEP 2011. HFCs: A Critical Link in Protecting Climate and the Ozone Layer. United Nations Environment Programme. Nairobi. http://www.unep.org/dewa/Portals/67/pdf/HFC_report.pdf). Hence a solution to ozone depletion point under one treaty has turned out to undermine the achievement of climate targets under another treaty.

[22] For this purpose it would be useful to have a theoretical construct for looking at the SDGs.

[23] UN 2012. The Millennium Development Goal report 2012. United Nations, New York. http://www.un.org/millenniumgoals/pdf/MDG%20Report%202012.pdf

[24] For example, FAO 2012. The state of the world's fisheries and aquaculture 2012. http://www.fao.org/docrep/016/i2727e/i2727e.pdf and IUCN Red List: http://www.iucnredlist.org/

[25] UN 2012. The Millennium Development Goal report 2012. United Nations, New York. http://www.un.org/millenniumgoals/pdf/MDG%20Report%202012.pdf

[26] This is mainly due to the global economic crisis of 2008 and 2009 rather than mitigation efforts by countries.

[27] FAO 2012. The state of the world's fisheries and aquaculture 2012. http://www.fao.org/docrep/016/i2727e/i2727e.pdf.

[28] UN 2011 – The Millennium Development Goal report 2011. United Nations, New York. http://www.un.org/millenniumgoals//pdf/(2011_E)%20MDG%20Report%202011_Book%20LR.pdf

for advocacy, improved the effective targeting and channelling of funds, and improved the monitoring of development projects[29]. The simplicity and transparency of the goals have made them easy-to-communicate and to rally around.[30] All in all, MDGs and other international goals have served as beacons for raising the material wellbeing of millions of people.

On the negative side, as noted above, insufficient progress has been made on many environmental themes, including biodiversity loss and degradation of ecosystems. Moreover, MDG-7 has too limited a coverage of environmental sustainability issues, and omits many important topics concerned with arid and semi-arid, oceanic, mountain, grassland, and arctic ecosystems, among others. It does not deal with the growing problems of air pollution and water pollution throughout much of the developing world, the accumulation of chemical wastes, or the on-going unsustainable consumption of natural resources.

Also neglected have been important synergies and interlinkages between MDG-7 and other MDGs. For example, despite the crucial link between environmental sustainability and poverty, health and job creation,[31] the environmental themes in MDG-7 are not linked to the poverty and hunger reduction targets in MDG 1.

Furthermore, MDG-7 focuses exclusively on changes in the state of the environment rather than on the driving forces behind these changes. Some believe that addressing these driving forces could lead to greater wins for sustainable development. In support of this, it is worth noting that an MDG-7 indicator showing substantial progress is "reducing the consumption of ozone depleting substances" which indeed addresses

the driving force of the problem, rather than the problem itself ("depletion of the ozone layer").[32]

Also, some of the targets of MDG-7 are difficult to measure and some of its indicators are not well defined. It is difficult, for example, to measure to what degree countries have incorporated the principles of sustainable development into their national policies and programmes (Target 7a). Another example is the case of "significant improvement in the lives of slum dwellers" (Target 7d) in which the indicator was defined in proportional units rather than absolute numbers. This provides an incomplete indication of progress as the proportion of slum dwellers goes down, but their absolute numbers go up.[33] Another example is the case of reduced biodiversity loss (Target 7b) in which the proportion of terrestrial and marine areas under protection is increasing, yet biodiversity continues to decrease.[34]

Lastly, weaknesses in the *formulation* of MDG-7, have in turn, led to problems in their *implementation.* The vagueness of some targets has made it difficult for governments to find the right actions for pursuing the targets. Successful implementation also requires adequate measurement and data systems.[35]

So what are the lessons to be learned? Firstly, progress in achieving MDG-7 has been uneven and there is still a lot of ground to cover before all of its targets can be achieved by 2015.[36] Hence, new goals and targets may need to pick up some of the unfinished business of MDG-7. Secondly, new goals and targets should cover a wider range of important environmental sustainability topics, including emerging issues. Furthermore, these topics need to be closely linked with developmental goals. Thirdly, it might be more effective to devise goals that address the driving forces of a problem

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[29] The UN System Task Team on Post-2015. 2012. Realizing the future we want for all. Report to the Secretary-General by the UN System Task Team on the Post-2015 UN Development Agenda. New York. http://www.un.org/millenniumgoals/pdf/Post_2015_UNTTreport.pdf

[30] See above reference.

[31] For example, see IBRD/World Bank 2008. Global monitoring report. MDGs and the environment. The International Bank for Reconstruction and Development / The World Bank. http://www.imf.org/external/pubs/ft/gmr/2008/eng/gmr.pdf

[32] But focusing on driving forces rather than final objectives may also have some disadvantages. Firstly, stakeholders would have to agree on which driving forces are important in achieving the final objectives. Secondly, expressing goals and targets as driving forces (reduce air pollution sources in cities by 50%) may not be as inspiring as expressing them as final objectives (reduce the level of air pollution in cities by 50%).

[33] UN 2012. The Millennium Development Goal Report 2012. United Nations, New York. http://www.un.org/millenniumgoals/pdf/MDG%20Report%202012.pdf

[34] See above reference

[35] SCBD (Secretariat of the Convention on Biological Diversity) 2013. Biodiversity and sustainable development – the relevance of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets for the post-2015 development agenda and the Sustainable Development Goals. The Seventh Trondheim Conference on Biodiversity. Trondheim, Norway, 27–31 May 2013 . INF2

[36] See also, Bates-Eamer et al. 2012. Post-2015 development agenda: goals, targets and indicators. http://www.cigionline.org/sites/default/files/MDG Post_2015v3.pdf

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rather than the problem itself. Finally, special effort should be invested in defining targets and indicators that are measurable.

Another overarching lesson is that it is crucial to avoid fragmentation in setting and implementing goals and this can best be done by taking a holistic approach to designing, implementing, and monitoring SDGs. This holistic approach has to be supported by governance structures dedicated to sustainable development, and by well organized means of tracking progress and accountability at the national and global levels.

4. Effects of MDGs on the Environment

What can we learn from the effects of the MDGs on the environment?

While only MDG-7 had a clear focus on the environment, the other MDGs nevertheless had indirect impacts on the environment, both positive and negative.

On the positive side, it is thought that the MDG 2 goal for universal primary education has encouraged greater awareness of the need for environmental protection.[37]

On the other hand, progress towards achieving MDGs can have a negative impact on the environment when not properly implemented. As an example, the current way of reducing poverty and hunger (MDG 1) is linked in many cases to greater output from modern agriculture accompanied by its requirements for water, synthetic chemical fertilizers, herbicides and intensive use of machinery (although smallholder producers also make a significant contribution to worldwide food production but without heavy machinery and usually

with a much lower environmental impact). Agriculture accounts for 70% of freshwater withdrawals and contributes greatly to freshwater pollution. Environmental side effects of crop cultivation include pesticide contamination of neighbouring ecosystems, nitrate pollution of groundwater, eutrophication of surface waters and coastal zones, soil compaction, and emissions of the important greenhouse gas, nitrous oxide, as well as emissions of air pollutants nitrogen dioxide and ammonia.[38] Expansion of cropland and rangeland to provide more food has also contributed to deforestation and higher greenhouse gas emissions.[39] But an important point is that many of these impacts can be substantially reduced by practicing tried and tested models of sustainable agriculture as well as by boosting the efficiency of the food system.[40]

Another example comes from the Millennium Ecosystem Assessment (MA). The MA's scenarios show that the beneficial expansion of public water supply for households and industry may result in a large increase in wastewater loadings to freshwater ecosystems in many developing regions over the course of the first half of the 21st century[41]. This, in turn, could lead to major water pollution problems including threats to the freshwater fishery and food security in some developing countries.[42] On the other hand, if wastewater is treated or water use efficiency is increased, the expansion of water supply may not lead to major water pollution problems. Put another way, it is possible for society to benefit from an expansion of public water supply without decreasing its wellbeing through inadvertent water pollution.

What are the lessons to be learned here?

Firstly, new goals and targets should aim to minimize the environmental impacts of developmental activities.

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[37] Although, no analysis of the effect of increased primary education on the environment currently exists, it is believed that the MDG goal on education can raise awareness of the need for environmental protection. This positive effect would however depend on the quality of primary education. See: UNESCO 2010. The central role of education in Millenium Development Goals. http://www.unesco.org/fileadmin/MULTIMEDIA/HQ/ED/ED_new/images/education_for_all_international_coordination_new/PDF/MDGs_Final.pdf.

[38] UNEP. 2012. Land Chapter – Global Environment Outlook. http://www.unep.org/geo/pdfs/geo5/GEO5_report_C3.pdf

[39] See for example, DeFries et al. 2010. Deforestation driven by urban population growth and agricultural trade in the twenty-first century. Nature Geoscience, 3, 178-181; Boucher et al. 2011. The root of the problem. What's driving tropicl deforestation today? Union of Concerned Scientist. http://www.ucsusa.org/assets/documents/global_warming/UCS_RootoftheProblem_DriversofDeforestation_FullReport.pdf.; and Hosonuma et al. 2012. An assessment of deforestation and forest degradation drivers in developing countries. Environmental Research Letters, 7, 12pp.

[40] UNEP 2012. Avoiding future famines. Strengthening the ecological foundation of food security through sustainable food systems. http://www.unep.org/publications/ebooks/avoidingfamines/portals/19/UNEP_Food_Security_Report.pdf

[41] MA. 2005. Millennium Ecosystem Assessment. 2005 – Global Assessment Reports. http://www.unep.org/maweb/en/Global.aspx

[42] UNEP 2012. Avoiding future famines. Strengthening the ecological foundation of food security through sustainable food systems. http://www.unep.org/publications/ebooks/avoidingfamines/portals/19/UNEP_Food_Security_Report.pdf

Secondly, the environmental impacts of the MDGs can be minimized by *how the goals are implemented*. For example, the environmental side effects of agriculture can be reduced through sustainable agriculture, while the inadvertent water pollution caused by expanding water supply systems can be minimized by treating wastewater or boosting water efficiency.

The third point is that good environmental practices contribute to achieving developmental goals. Examples from the emerging and inclusive "Green Economy" provide many illustrations of how environmental sustainability and socio-economic development can work hand-in-hand. For example, biological diversity underpins ecosystem functioning and the provision of ecosystem services essential for human well-being. It provides for food security, human health, the provision of clean air and water; it contributes to local livelihoods, and economic development, and is essential for the achievement of the MDGs and SDGs, including poverty alleviation.[43]

5. Relevance of Current Global Environmental Goals in relation to SDGs

What role should current goals play in SDGs?

We have seen that there is much to be learned from current goals. How, then, can we use this experience?

First, the lessons learned can be consolidated and formulated as a set of criteria to help guide the definition of sustainable development goals and targets and embed environmental sustainability in the SDGs. These criteria are presented in Section 9.

Second, existing goals and targets can be taken as a "ground floor" for the SDGs, that is, they can be used as a reference point to make sure that new objectives are stronger. Certainly the international community

cannot afford to backtrack on its ambitions to protect biodiversity, mitigate climate change, restore freshwater ecosystems, and otherwise promote environmental sustainability . In fact, governments in Rio+20 confirmed that the SDGs should "build upon commitments already made". [44]

Third, the SDGs should take on some of the unfinished business of current goals and targets by incorporating in some form a limited number that are particularly important and whose implementation can be accelerated if they are included in the SDGs. It was mentioned in Section 2 that mitigating climate change, reducing indoor air pollution, slowing the loss of biodiversity and ecosystem services, and lessening the risk of species extinction are examples of goals making slow progress. Besides stimulating their implementation, the inclusion of existing goals and targets in SDGs might lend weight to their adoption by the UN General Assembly. In addition, there are precedents for including the same or similar goals in two different treaties, as in the case of MDG-7 which has a qualitative objective for "reducing the consumption of ozone depleting substances" similar to the quantitative objective for reducing these substances in the Montreal Protocol.

While some current goals and targets should be included in the new SDGs this does not mean that SDGs should *only* cover current goals and targets. In fact they should also consider the many emerging issues not covered by current agreements.

Another important point is that it will be neither feasible nor necessary to try and incorporate all current goals and targets in SDGs. For example, many focus on regional or sub-regional issues and may therefore not be appropriate for the global and "universal" focus of the SDGs.

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[43] See for the example, SCBD (Secretariat of the Convention on Biological Diversity) 2012. The International Strategic Plan for Biodiversity 2011-2020, including the Aichi Biodiversity Targets. Secretariat for the Convention on Biological Biodiversity. https://www.cbd.int/sp/

[44] Paragraph 246, Rio+20 Outcome Document. UN 2012. The Future We Want. http://www.uncsd2012.org/thefuturewewant.html

PART B

A Framework for Embedding Environment in SDGs

Part B. A Framework for Embedding Environment in SDGs

6. Introducing a Framework for Embedding Environment in the SDGs

What framework can be used for embedding environment in the SDGs?

We have seen up to this point that current international environmental goals have made some, but limited, progress in achieving their targets. This was an important factor in the decision at Rio+20 to call for goals for *sustainable development* rather than just *development*. These SDGs have the dual purpose of increasing human wellbeing through development while protecting and strengthening the ecosystem services that underpin this wellbeing.

Recalling the aim of this Paper, we now ask, how can the environment be embedded in the SDGs? A four-point framework can be used for this task:

- A **rationale and overarching vision for the SDGs**, which is a narrative describing the basis for including environmental sustainability in SDGs (Section 7);
- An **integrated approach to embedding environment in goals and targets** which proposes basic characteristics and types of goals and targets to be selected (Section 8);

- A **set of criteria** for assessing or proposing goals and targets, and guidance on how to use them (Section 9);
- A **list of best practices for selecting indicators** that can effectively support targets. (Section 10)

The framework is depicted in Figure 1 and described in the following sections.

7. Rationale and Overarching Vision

What is the rationale and overarching vision for embedding the environment in the SDGs?

Countries at the Rio+20 Conference set an overarching vision for the SDGs, stating that they should "address and incorporate in a balanced way all three dimensions of sustainable development and their interlinkages." Furthermore, the SDGs "should be coherent with… the United Nations Development Agenda beyond 2015" and be "action-oriented, concise and easy to communicate, limited in number, aspirational, global in nature and universally applicable to all countries while taking into account different national realities…". They should also be "consistent with international law [and] build upon commitments already made".
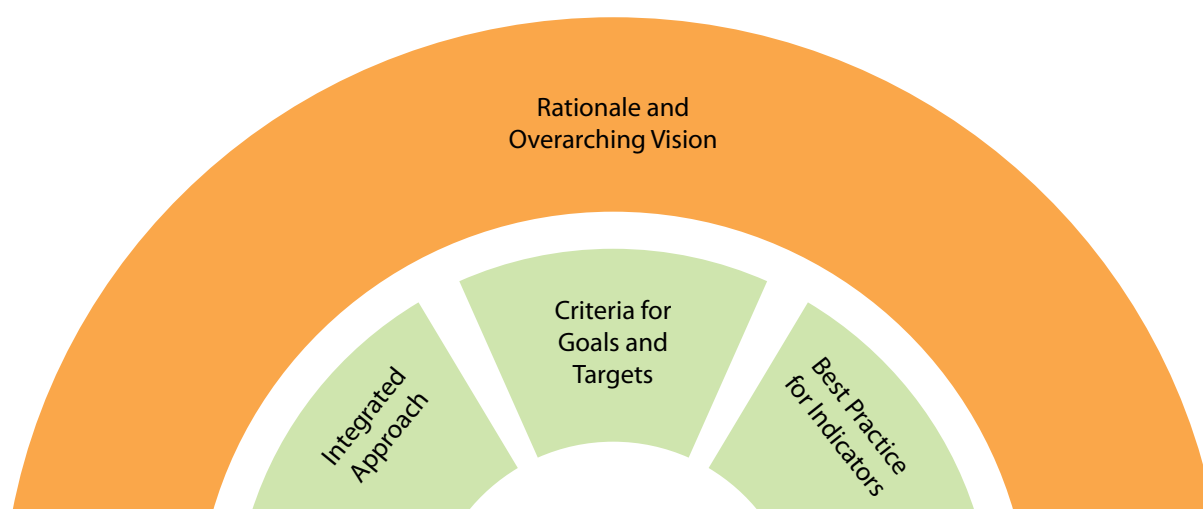

Figure 1: A framework for embedding the environment in SDGs

In line with the purpose of this Paper, it is appropriate to ask at this juncture, what is the rationale for embedding environment in the SDGs?

- *Environment is a prerequisite for socio-economic development.* We know, for example, that the viability of agriculture depends on the condition of its ecological foundation, including healthy off-farm and on-farm biodiversity. Fish harvests are similarly underpinned by an ecological basis including healthy coral reefs and delta ecosystems which provide vital habitat for fish and their associated food web. Nature also provides basic inputs to the economy such as water, building materials, energy and fuels, textiles, productive soils, navigation routes for our trade, and offers livelihoods in forestry, fisheries, and agriculture.
- *Human health and wellbeing depends on good environmental quality.* Conversely, the absence of good environmental quality in the form of contaminated water or polluted air endangers our health and wellbeing.
- *Environment has intrinsic values.* Over and above the preceding justifications, the integrity of the environment is important in itself because nature has educational, cultural, recreational, aesthetic, religious, spiritual and other intrinsic values.

Taken together, these benefits are part of the vast collection of natural resources and vital "ecosystem services", underpinned by biodiversity, that sustain the existence of humanity.

It is clear that environmental changes and policies deeply influence development. But the relationship between development and the environment has not been favourable up to now since the payment for a higher standard of living has been the steady depletion of natural resources and increasing environmental impact. A key challenge to the SDGs, then, is how to "decouple" socio-economic development from this overuse of resources and growing environmental degradation (See Criterion 2 in Section 9).

With the above points in mind, it is apparent that a fundamental and transformative change in our thinking will be needed to increase the wellbeing[45]

of all people, including future generations, while maintaining the integrity of ecosystems and the earth system. It follows that the SDGs must be profound and not incremental, but at the same time specific enough to trigger and sustain the necessary shift in thinking. Good governance will play a particularly important role in realizing these goals.

8. An Integrated Approach to Embedding Environment in SDGs

What is an appropriate approach to embedding environment in SDGs? What kind of goals and targets and other elements are part of this approach?

In this section we examine a systematic approach to embedding environment in goals and targets. The approach covers the basic characteristics and types of the goals and targets to be selected. The approach was selected after an expert group (see Acknowledgements) evaluated three alternative approaches (See Annex).

The approach consists of integrated goals, underpinned by mixed targets, which in turn are supported by clear, measurable indicators (Figure 2). The goals and targets work together as a coherent set to fulfil the objectives of sustainable development. In addition, a set of criteria (described in Section 9) helps to ensure that the environment is embedded in the goals and targets. The elements of the approach are described in the following paragraphs.

8.1. A Complementary Set of Goals and Targets

An important principle for selecting goals and targets is that they should add up to a set of objectives (goals and targets) that reinforce and complement each other.

In the first place, they should as a whole cover the minimum objectives of the environmental, social and economic aspects of sustainable development. The criteria in Section 9 ("Criteria for Embedding Environmental Sustainability in SDGs") can be used to test if environmental sustainability is adequately incorporated in goals and targets.

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[45] According to the Millennium Ecosystem Assessment, human well-being has several key components including the basic material needs for a good life, freedom of choice, health, good social relations, and personal security. For more details, see MA. 2005. Ecosystems and Human Well-Being. Synthesis. Millennium Ecosystem Assessment. http://www.millenniumassessment.org/documents/document.356.aspx.pdf
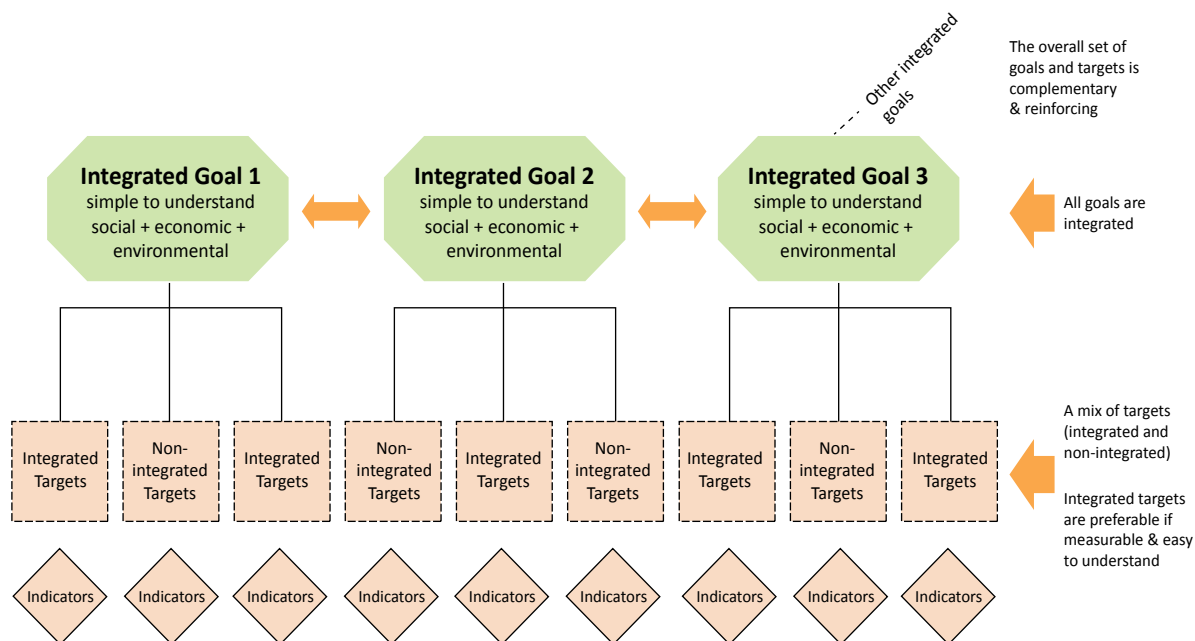
Figure 2. Illustration of an integrated approach to SDGs

Secondly, they must work together as a set, in that they must support each other and not create a false sense of competition.

But this complementarity is not likely to happen automatically. One of the strongest lessons drawn from current goals is that extra effort must be made to make this happen. Otherwise actions to achieve one goal might undermine the achievement of another goal. As an example, it was pointed out in Part A of this Paper that the lack of harmony between the socio-economic and environmental objectives of the MDGs has lowered their effectiveness. It is essential, therefore, to maximize the complementarity of the goals and targets if the SDGs are to have their desired impact.

To assess the level of complementarity, SDG developers can test a particular set of goals and targets against the yardsticks presented in Section 9 (under "Using the Framework and Criteria, Option 1, Step 1b).

8.2. Integrated Goals

An integrated approach to SDGs has, at the top level, a limited number of *integrated goals* that are simple to understand and communicate, but not necessarily simple in nature. They are likely to be aspirational and qualitative, so that they are translatable, flexible, and

have an easier chance of gaining broad acceptance. The goals would be "integrated" in the sense that they embody all three aspects of sustainable development – environmental, social and economic (e.g. "*Ensure sustainable food and nutrition security worldwide*").

A useful characteristic of goals was mentioned earlier and is repeated here, namely that goals should focus more on driving forces leading to positive outcomes ("expand sustainable agriculture" or "increase the efficiency of the food system") rather than the positive outcomes themselves ("secure food supply" or "lower occurrence of malnutrition"). The reasoning is that focusing on driving forces rather than outcomes leads to a more direct pathway to solving a problem or achieving a goal.

Examples of integrated goals are presented in Box 2. Section 11 lists some of the advantages of developing *integrated* rather than single dimensional goals.

8.3. A Mix of Targets

The previous section emphasizes that in setting goals it is important to consider the interlinkages among the various dimensions of sustainable development, and therefore the need for *integrated* goals. The question is, does this also apply to the targets that underpin the goals? Should targets also be integrated?

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Box 2. Examples of goals and targets using an "integrated" approach. Presented for illustration only.

Example Integrated Goal 1. *Ensure worldwide food and nutrition security through (i) adequate nutrition for all, (ii) equitable access for all to food supplies, and (iii) expansion of environmentally sustainable fisheries and agriculture .*

Example Targets

Integrated Target 1.1
Increase access to food and reduce the environmental consequences of food production by reducing food loss and waste by XX% by 2025.

Integrated Target 1.2
Expand the coverage of early warning systems for food shortfalls from XX to YY countries by 2025 in order to provide a more reliable food supply system and as an aid to climate change adaptation.

Non-Integrated Target 1.3
Increase access to sufficient, safe, affordable, and nutritious food, thereby reducing the absolute number of children suffering from malnutrition from XX to YY% by 2025.[46]

Non-integrated Target 1.4
Phase out subsidies and incentives by 2025 that are harmful to the continuous ability of ecosystems to produce food and fish.

Non-integrated Target 1.5
Expand the coverage of sustainable agriculture and fisheries by:
- increasing the area of land under sustainable agriculture from XX% to YY% by 2025[47];
- ensuring that XX% of fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, by 2025; [48]
- reducing by XX% the environmental pollution caused by agricultural fertilizers by 2025.[49]

Example Integrated Goal 2. *Achieve sustainable energy for all through delivery of energy that is (i) affordable and accessible to all, (ii) creates green jobs, (iii) minimizes health risks, and (iv) minimizes environmental degradation and resource depletion.*

Example Targets

Integrated Target 2.1
Increase the percentage of primary energy produced by sustainable energy sources from XX% to YY% by 2025.

Integrated Target 2.2
Reduce per capita worldwide energy consumption by XX% by 2025 through improvements in the energy efficiency of the building, industrial, agricultural, and transportation sectors worldwide.

Non-integrated Target 2.3
Increase the percentage of households with access to renewable electricity from XX% to YY% by 2025.

Non-integrated Target 2.4
Reduce the average worldwide water used per KwH from XX to YY by 2025.

Non-integrated Target 2.5
Phase out XX% of inefficient subsidies that result in wasteful energy consumption by 2025[50].

Non-integrated Target 2.6
Reduce the health impacts of energy use by decreasing by XX millions the number of people exposed to harmful levels of indoor air pollution. Achieve this through the use of clean fuels and good technical practices for household heating and cooking.

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[46] Based on HLP's Illustrative Target 5a. See HLP 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. http://www.post2015hlp.org/wp-content/uploads/2013/05/UN-Report.pdf

[47] Based on Aichi Target 7. See https://www.cbd.int/sp/targets/

[48] Based on Aichi Target 6. See https://www.cbd.int/sp/targets/

[49] Based on Aichi Target 8. See https://www.cbd.int/sp/targets/

[50] Based on HLP's Illustrative Targets 7d. See HLP 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. http://www.post2015hlp.org/wp-content/uploads/2013/05/UN-Report.pdf

One answer is that as many of the targets as possible should be integrated, for the same reasons as above. Another answer is that it may not be possible to come up with a complete set of integrated targets because they should also be *specific* and *measurable*. Indeed, these two criteria have apparently played a key role in the success of current targets (see Part A, Experience with Global Environmental Goals) because they encourage countries to compile the necessary data for tracking their progress. This in turn, has helped countries raise support internally and externally for meeting their targets.

But being *specific* and *measurable* and being *integrated* are not necessarily compatible because integrated targets can be difficult to interpret and measure. In some cases they may be suitable as qualitative and aspirational goals, but perhaps not as targets.

The conclusion, therefore, is that each of the integrated goals should be underpinned by a *mix* of targets – some integrated, and some "non-integrated" (in that they concentrate on either environmental, social or economic objectives) (Figure 1). Examples are given in Box 2.

To sum up, integrated targets are preferable because they acknowledge the interlinkages between environmental, social and economic dimensions of sustainable development, and have other strengths given in Section 11 for integrated goals. But to avoid their weaknesses, integrated targets should only be used if they are:

- specific enough to be easily understood.
- measurable under current or feasible measurement programmes.

9. Criteria for Embedding Environmental Sustainability in SDGs

What criteria can be used for embedding environmental sustainability in SDGs?

Up to this point, this Paper has described the type of goals and targets that would make up an "integrated approach" for structuring SDGs. How then can we ensure that these goals and targets embed environmental sustainability? How can we draw on

experience with current environmental objectives to help with this task? Based upon the lessons discussed in Sections 2 ("Experience with Global Environmental Goals"), the following criteria are given as a guide for embedding environment in SDGs. As would be explained in Section 9.3, the criteria can be used for either assessing or deriving goals and targets.

While these criteria were developed with environmental sustainability in mind, they also apply in some cases to the social and economic dimensions of sustainable development.

9.1. Overview of Suggested Criteria

The six criteria are:

I. ***Strong linkage with developmental goals.*** Within the SDGs environmental issues should be strongly linked to socio-economic developmental issues. The SDGs should "incorporate in a balanced way all three dimensions of sustainable development and their inter-linkages" (Rio+20 Outcome Document). Perhaps the most fruitful way to couple environment and socio-economic development within the SDGs is to formulate integrated goals and targets, as previously described.

II. ***Decoupling of socio-economic development from escalating resource use and environmental degradation.*** Goals and targets should be formulated to promote the decoupling of socio-economic development from unsustainable depletion of resources and increasing environmental impact.

III. ***Coverage of critical issues of environmental sustainability such as important irreversible changes in the global environment.*** The final set of selected goals and targets should cover as many critical environmental sustainability issues (current and imminent) as possible. Priority should be given to objectives that help avoid critical "irreversible" changes of the global environment.

IV. ***Take into account current and global environmental goals and targets.*** This can be done by: (a) using current goals and targets as a "ground floor" for new goals and targets; (b) incorporating a small number of important current goals and targets whose implementation can be accelerated if they are included in the SDGs.

V. *Scientifically credible and verifiable.* Goals and targets should be based on best scientific understanding and support should be available from the scientific community to monitor and implement them.

VI. *Progress must be "trackable".* All goals should be backed up by specific and measurable targets and indicators.

9.2. Explanation of Criteria

Criterion 1. Strong linkage with developmental goals.

The Rio+20 Outcome Document suggests that developmental issues should be a strong guiding force for new SDGs and that biodiversity and ecosystem services are important to sustainable development. It follows that environmental sustainability within the SDGs should have a direct link to socio-economic issues leading to greater wellbeing such as poverty eradication. In the same vein, individual environmental goals/targets under the SDG umbrella must be coupled and consistent with each other. As mentioned earlier, this is one of the strongest lessons coming from experience with existing environmental goals and targets.

An effective way to integrate environment and socio-economic development is to bring them together in the form of *integrated goals and targets* as explained in Section 8 ("An Integrated Approach to Embedding Environment in SDGs").

Criterion 2. Decoupling of socio-economic development from escalating resource use and environmental degradation.

In Section 7 ("Rationale and Overarching Vision") it was noted that a key to achieving environmental sustainability is to decouple the traditional relationship between socio-economic development and depletion of resources and increasing environmental impact.[51]

An important way to decouple this relationship is to increase resource efficiency along the entire production chain. Indeed, there is strong evidence that the potential is still huge for improving the efficiency of using energy, water, and production materials, including metals and other commodities.[52] For example less than one-third of some 60 metals studied have an end-of-life recycling rate above 50 per cent, and 34 metals have a recycling rate below one per cent, including many valuable rare earths[53].

But decoupling cannot be achieved by just improving technical efficiency since there are upper limits to these improvements and they can occasionally even stimulate higher consumption. To be effective these improvements need to be accompanied by shifts to more sustainable consumption and production patterns. In the energy sector, for example, a combination of increasing energy efficiency, together with lower levels of energy use, and a replacement of fossil fuels with renewable energy sources will finally put society on a sustainable energy path.

Criterion 3. Coverage of critical issues of environmental sustainability such as irreversible changes in the global environment.

As noted in Section 2 ("Experience with Global Environmental Goals"), the current MDGs only cover a limited part of the environmental sustainability spectrum. On one hand, since environment is a key aspect of sustainable development, the SDGs should cover as much of this spectrum as possible.

On the other hand, the SDGs should also be "limited in number"[54] and it is certainly not possible to include each and every environmental sustainability issue. Hence, an urgent task is to identify a priority

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[51] During the 20th century the annual extraction of construction minerals grew by a factor of 34, ores and minerals by a factor of 27, fossil fuels by a factor of 12, biomass by a factor of 3.6, and total material extraction by a factor of about eight, while GDP rose 23-fold. See UNEP 2012. Responsible resource management for a sustainable world: findings from the International Resource Panel. UNEP. http://www.unep.org/resourcepanel/Portals/24102/SYNOPSIS%20Final%20compressed.pdf. This increase in resource use was accompanied by depletion of the stratospheric ozone layer, ocean acidification, irreversible exhaustion of some groundwater sources, and of course many other environmental impacts.

[52] UNEP. 2013. Metal recycling: opportunities, limits, infrastructure. A Report of the Working Group on the Global Metal Flows to the International Resource Panel. http://www.unep.org/resourcepanel/Portals/24102/PDFs/Metal_Recycling_Full_Report.pdf

[53] UNEP. 2011. Recycling rates of metals – a status report. A report of the Working Group on the Global Metal Flows to the International Resource Panel. http://www.unep.org/resourcepanel/Portals/24102/PDFs/Metals_Recycling_Rates_110412-1.pdf.

[54] Rio+20 Outcome Document. UN 2012. The Future We Want. http://www.uncsd2012.org/thefuturewewant.html

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list of issues.[55] Precedence here should be given to environmental problems currently critical or increasing in intensity such as growing air and water pollution in developing countries, which is leading to risks to public health and food security.[56]

Another priority class of issues are *irreversible environmental problems*. Some environmental problems are only reversible over the time scale of decades, centuries, or even longer. These are sometimes labelled "irreversible" since they seem irreversible over generations or lifetimes. In the case of the extinction of species, they are truly irreversible. These changes are sometimes associated with an environmental system moving from their current state to one having no precedent in human experience, as in the case of shifting vegetation zones brought on by long term temperature and precipitation changes.

Some authors[57] have recommended that irreversible problems be given special attention in the SDGs because they imply impacts that cannot be ameliorated and may be difficult to adapt to.

Furthermore, on the large scale, some of these changes imply a dangerous tampering with the earth system, or "tipping points". One example is the case of global warming which can lead to a chain of events such as the melting of Arctic permafrost, which releases methane gas, which further stimulates global warming and further melting, and so on.[58]

The idea of irreversible problems is also connected to the notions of "planetary boundaries" and "safe operating space"[59] because socio-economic development cannot proceed indefinitely if it causes irreversible environmental changes on a large scale. It is easy to imagine how this development will be self-limiting if it causes major shifts in rainfall patterns,

collapses of fisheries, contamination of soils, and other kinds of irreversible changes noted below.

There are many different categories of irreversible problems that should be considered for the SDGs. One category involves changes associated with climate change or other consequences of the build-up of greenhouse gases in the atmosphere such as large scale changes in rainfall patterns, more frequent extreme weather events or acidification of the oceans. Also included here are the irreversible outcomes of climate impacts including the melting of the Arctic ice cap and conversions of forested areas to grassland.

Another category has to do with irreversible changes, such as the diminishment of coral reefs, which are (or will be) caused by a combination of climate change and other pressures of society such as water pollution and/or development in coastal areas.

Yet another category of irreversible processes are mostly due to non-climate pressures from society such as the collapse of fisheries (overfishing), biodiversity loss including the accelerated extinction of species (over-harvesting and/or destruction of habitat), and the build-up of persistent organic pollutants in soils and water (pesticide application and atmospheric emissions of chemicals).

Some targets could aim at mitigating these problems (e.g. habitat protection in order to lower risk of species extinctions), while others could focus on early warning of their occurrence (e.g. monitoring programmes to detect methane releases from permafrost melting). Moreover, the precautionary approach provides a strong argument for acting on these problems, even if uncertainty is high. This was the case with ozone depletion in the upper atmosphere, in which countries decided to act despite initial scientific uncertainties.

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[55] To develop this priority list, it would be helpful to first draw up a compact inventory of environmental sustainability issues. This inventory can then be further compressed into a small priority list based on criteria such as urgency, persistence, impact on the earth system, and size of population and area affected or likely to be affected.

[56] See for example, Bruce et al. 2000. Indoor air pollution in developing countries: a major environmental and public health challenge. Bulletin of the World Health Organization, 78, 1078-1092. http://www.who.int/bulletin/archives/78(9)1078.pdf; McGranahan and Murray, 2003. Air pollution and health in rapidly developing countries. Earthscan Publications Ltd, 227pp, Corcoran et al. 2010. Sick Water? The central role of wastewater management in sustainable development. A rapid response. UNEP-UN-Habitat. http://www.unep.org/pdf/SickWater_screen.pdf. UNEP 2011. Integrated assessment of black carbon and tropospheric ozone: summary for decision makers. UNEP. http://www.unep.org/dewa/Portals/67/pdf/Black_Carbon.pdf

[57] For example, Griggs et al. 2013. Sustainable development goals for people and planet. Nature, 495, 305-307

[58] Ruppel, C. D. 2011. Methane hydrates and contemporary climate change. Nature Education Knowledge 3, 29. http://www.nature.com/scitable/knowledge/library/methane-hydrates-and-contemporary-climate-change-24314790 and UNEP 2012. Policy implication of warming permafrost. UNEP. http://www.unep.org/pdf/permafrost.pdf.

[59] See for example, Rockstrom et al. 2009. A safe operating space for humanity. Nature, 461, 472-475 and Raworth, K. 2013. A safe and just space for humanity. Oxfam Discussion Paper. http://www.oxfam.ca/sites/default/files/A%20Safe%20and%20Just%20Space%20for%20Humanity%20Discussion%20Paper-130212-en_0.pdf

Criterion 4. **Take into account current global environmental goals and targets***.*

As explained in Section 2 ("Lessons Learned from a Review of Environmental Goals and Targets"), there are hundreds of international environmental treaties and agreements and they contain a wide range of goals and targets which occupy the attention of the international community. Forging ahead with new SDGs while ignoring the existing web of goals and targets may create a situation in which countries are confronted with overlapping, and even contradictory goals. This would increase the burden on countries already struggling to track and comply with numerous environmental treaties. Hence, current goals and targets should be accounted for in some way in SDGs. Moreover, by being part of SDGs, current environmental goals would be coupled to important objectives of socio-economic development. In this way they could win additional support for their implementation from parts of government not usually concerned with environmental goals. Being embedded within the SDGs could also help to maintain attention on current environmental goals beyond their present time horizons.

But it will be neither feasible nor necessary to incorporate all current environmental objectives. For example, some focus on regional or sub-regional issues and perhaps are not very relevant to the global and "universal" scope of the SDGs.

Some ideas were presented in Section 5 on how to take into account current goals:

First, existing goals and targets can be used as a "ground floor" for the SDGs; this would mean that proposals for SDGs would be compared to existing goals and targets to make sure that new objectives are, at the minimum, equal to current objectives. As noted earlier, the international community cannot afford to backtrack on its ambitions to protect biodiversity, mitigate climate change, restore freshwater and marine ecosystems, and otherwise promote environmental sustainability.

Second, a limited number of current goals and targets could be incorporated in some fashion in SDGs, in particular, the ones whose implementation could be accelerated if they are included in the SDGs.

An important body of targets that falls within this context is the set of 20 Aichi Biodiversity Targets adopted in 2010 as part of the Strategic Plan for Biodiversity under the Convention on Biological Diversity. These targets, particularly the first four, are closely linked to socio-economic development issues. Efforts are underway to connect these targets to the SDGs, and this work should be taken into account to avoid duplication and ensure policy coherence.[60] Other Multilateral Environmental Agreements also have targets related to development issues, and these should also be factored into the SDG process.

Criterion 5. **Scientifically credible and verifiable***.*

All goals and targets should be scientifically credible and verifiable. They should be backed up with enough scientific capacity to support data collection, monitoring of progress and other tasks necessary for the implementation of the goal or target. This means that it is important to engage the scientific community in developing the SDGs. Scientists can also provide advice on possible targets for monitoring emerging issues not yet validated by science, and on "sustainability science" targets for bolstering the science needed to meet the sustainability challenge.

It is worth noting that scientific credibility is not as straightforward as it may seem. On one hand, developers of SDGs can use traditional benchmarks to judge credibility. For example, it is commonly assumed that findings about an issue are credible if they are published in several peer-reviewed technical journals. On the other hand, it is also accepted that traditional knowledge, citizen-science, and "qualitative" knowledge have a role to play in sustainable development issues.[61] Since the issue of how society reckons credibility is not likely to be resolved very soon, developers of SDGs should work closely with scientists

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[60] For some examples on how to integrate the Aichi Targets in the SDGs package, see: "Biodiversity in the post-2015 development agenda and Sustainable Development Goals (SDGs): Ecosystem goods and services for human wellbeing" - Background paper for the Trondheim Conference 27-31 May 2013. CBD Secretariat. http://www.cbd.int/sbstta/doc/trondheim-full-paper-2-sdgs-en.pdf.

[61] For example, the Millennium Ecosystem Assessment used multiple knowledge systems including the disciplines of conventional science, practitioner (or assessment user) knowledge, and local/traditional knowledge. See Ericksen and Woodley. 2005. Using multiple knowledge systems: benefits and challenges. Millennium Ecosystem Assessment. http://www.unep.org/maweb/documents/document.343.aspx.pdf

and other knowledgeable people to assess the credibility of issues on a case-by-case basis.

The issue of scientific credibility of proposed SDGs as well as the monitoring of their progress once adopted could be taken up by existing science-policy platforms such as the IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services) or the IPCC (Intergovernmental Panel on Climate Change).

Criterion 6. Progress must be "trackable".

This is a strong recommendation coming from many reports and a clear lesson from existing goals. Success in achieving goals seems to depend on whether society can show progress, and this requires specific and measurable targets and indicators and adequate monitoring of these indicators. As mentioned earlier, this does not imply that data for indicators must already be available. It is possible that some goals may require new measurable targets and indicators, and new efforts to acquire data. Section 10 ("Indicators for Tracking Progress on Goals and Target") addresses various issues associated with indicators.

9.3. Using the Framework and Criteria

How can the framework be used in the SDG development process? Two step-by-step options are presented here. Option 1 uses the criteria to assess existing goals and targets, and Option 2 for deriving new goals and targets.

Option 1. Assessing proposed goals and targets

One option is to use the framework to assess goals and targets already proposed in the SDG discussion process. Many different constituencies have already proposed objectives (See Box 1) and these could be evaluated to determine how well they embody environmental sustainability.

Step 1a. Overarching vision and rationale.
We first ask, *Do the proposed goals and targets fit within the rationale and overarching vision (Section 7) for the SDGs?*

Step 1b. The complementarity of the goals and targets
Next, we examine if the entire set of goals follows the integrated approach laid out in Section 8 ("An

Integrated Approach to Embedding Environment in SDGs"). We begin by asking, *Are the goals and targets complementary?* To address this question we can use the following yardsticks:

1. Are the most important objectives of the environmental, social and economic aspects of sustainable development covered by the set?

2. Are there significant gaps in coverage?

3. Will the goals and targets work as a set to maintain and restore the ecosystem services necessary to meet social and economic objectives?

4. Related to the preceding, are the social and economic objectives embedded in the goals and targets compatible with environmental sustainability?

5. Are goals or targets in one sector (e.g. food and nutrition) complementary to those in other sectors (e.g. health)?

Step 1c. Integrated goals and mixed targets
We then ask, *Are the goals and at least some of the targets integrated?* Information about integrated goals and targets from Section 8 would be used to address this question.

Step 1d. Criteria for embedding environmental sustainability
Next, we ask, *According to the criteria in Section 9.2, do the goals and targets embed environmental sustain-ability in an adequate way?*

Examining the goals and targets against these criteria would give some indication of the degree to which they incorporate ideas about environmental sustainability and its linkage to socio-economic development.

Step 1e. Supporting Indicators
Finally, we address the question, *Are the indicators proposed for these goals and targets consistent with guidelines for best practice presented in Section 10 ("Tracking Progress on Goals and Targets")?*

Option 2. Formulating new goals and targets

The framework can also be used to formulate new goals and targets for the SDG discussion process. In this case, the following steps would be followed:

Step 2a. Integrated goals

We first ask, *what are integrated goals that comply with Criteria 1 through 6?*

A possible approach is to come up with an initial list of goals by using Criteria 1 through 4. In other words, identifying goals: (i) that have a strong linkage to socio-development, (ii) that promote the decoupling of socio-economic development from escalating resource use and environmental degradation, (iii) that cover critical issues of environmental sustainability including irreversible changes in the global environment, (iv) that do not show a retreat from current goals and targets, and finally, (v) that account for a small number of important current goals and targets whose implementation could be accelerated if they are included in the SDGs. From the beginning it should be kept in mind that the goals should be integrated and simple-to-understand, as described in Section 8 ("An Integrated Approach to Embedding Environment in SDGs"), and should fit into the rationale and overarching vision for the SDGs (Section 7).

After an initial group of integrated goals is drawn up, this group can be tested against Criterion 5 – scientifically credible and verifiable. Criterion 6 first becomes important when we consider targets.

Step 2b. A mix of targets

As a next step we ask, *what is the appropriate mix of integrated and non-integrated targets that underpin the preliminary list of goals?*

We use Criteria 1 through 6 to formulate these targets. Similar to our approach for setting goals, we come up with a preliminary list of targets using Criteria 1 through 4, and then test this list against Criteria 5 through 6. Now Criterion 6 ("All goals should be backed up by specific and measurable targets and indicators") comes into play.

In selecting targets we keep in mind the suggestions for types of targets from Section 8 ("An Integrated Approach to Embedding Environment in SDGs"} and select a set of integrated and non-integrated targets appropriate for each of the goals. We recall that integrated targets are preferable because they acknowledge the interlinkages between

environmental, social and economic dimensions of sustainable development, and for other reasons. But to avoid their weaknesses, integrated targets should only be selected if they are:

- specific enough to be easily understoo d
- measurable under current or feasible measurement programmes

Otherwise single-dimensional goals (specific to the environmental, social or economic concerns of sustainable development) should be used.

Step 2c. A complementary set

After a preliminary set of goals and targets have been compiled, the set as a whole is examined to determine if it adds up to a set of objectives that reinforce and complement each other. To address this, the same set of questions as in Step 1b above can be used.

Step 2d. Supporting Indicators

Appropriate indicators for the goals and targets can then be selected with the help of the guidelines for best practice in Section 10 ("Tracking Progress on Goals and Targets").

There are, of course, other options for using the framework. For example, the six criteria from this Paper can be combined with their equivalents from the social and economic aspects of sustainable development, and the combined criteria can be used to formulate goals and targets that reflect all three dimensions of sustainable development.

10. Indicators for Tracking Progress on Goals and Targets

Countries made it clear at Rio+20 that "progress towards the achievement of the SDGs needs to be assessed and accompanied by targets and indicators…" In this section, we review best practices and other considerations in selecting these indicators.

Generally speaking, indicators are measures that can be used to illustrate and communicate complex phenomena relevant to the environment in a simple way, including trends over time. In the case of the SDGs they will facilitate tracking of whether targets and goals are being met and will indicate if corrective actions are required (e.g. redefining targets).

Here we review some of the basics of selecting indicators to track progress in achieving targets. Although the focus is on environmental indicators, many conclusions also pertain to social and economic indicators. That being said, some environmental indicators do differ from social and economic indicators, for example, by having greater spatial coverage or requiring special measuring techniques.

10.1. Recommended Characteristics of Indicators in the SDGs

Although a complete discussion of desirable characteristics of indicators is outside the scope of this Paper, here is a short list of recommendations:

- The set of indicators for monitoring SDGs should be limited in number and be coherent, i.e. consistent and complementary to each other within and between goals and targets. This is elaborated in the last point below.
- Indicators, just like targets, should be specific and measureable. As has been noted earlier, this is a clear lesson coming from existing environmental objectives.[62]
- They should be understandable, clear and unambiguous in their interpretation.
- Indicators should be clearly linked to targets and be robust in providing measures of progress towards achieving targets.
- They should be relevant to policy making and should change in response to policy interventions.
- Indicators selected for the purpose of the SDGs should avoid duplication by being consistent with indicators used by other agreements.
- Where possible, they should be linked to recognized cost-effective tracking and monitoring systems to establish their credibility and comparability, and to allow for meaningful analyses by countries.
- The mix of indicators for each target might include both absolute and relative changes. In addition, collected data should be disaggregated by income group, gender, location etc., in order to give a more complete picture of performance and support socially inclusive and equitable development.

- A baseline year for the indicator should be set in order to make progress between targets comparable.
- The interlinkages between indicators of bio-physical state as well as relationships with socio-economic drivers and impacts should be included. These relationships among indicators, and the links between goals, targets and indicators could be mapped out explicitly to provide a coherent and comparable framework for measuring progress of different goals and targets. Such a mapping exercise would also allow a better integration of the environment in the SDGs. As an example, as mentioned earlier, there is a clear link between targets and indicators for reducing hunger and poverty on one side and protecting biodiversity and ecosystem services on the other.

10.2. Methodologies for Selecting Indicators

A transparent methodology should be used to select indicators, rather than choosing them in an *ad hoc* manner. The advantage of using a particular methodology is that it will make it possible to explain how the indicators were selected, and this may increase their acceptance.

An example methodology is the "DPSIR approach" (Drivers−Pressure−State−Impacts−Response)[63]. This

provides a simple visual model for organizing large numbers of components that make up an environmental system, from the socio-economic driving forces of the system to the societal response to undesirable environmental change. In the context of the SDGs, a DPSIR diagram could be used to depict the various factors involved in a goal or target together with their interrelationships. Such a diagram would help developers of SDGs visualize the most appropriate indicators for tracking progress in reaching a target.

10.3. Types of Sustainability Indicators

Here is a brief review of different types of indicators related to sustainability issues and relevant to underpinning targets.

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[62] Monitoring concrete goals with statistically robust indicators was considered an important strength of the MDG framework from both a policy as well as statistical perspective. It has fostered the strengthening of statistical systems and the compilation and use of quality data to improve policy design and monitoring by national governments and international organizations.

[63] The DPSIR approach was used in the development of the UNEP Global Environment Outlook-5. UNEP 2012. Global Environment Outlook − 5. United Nations Environment Programme. GEO-5 Website: http://www.unep.org/geo/geo5.asp.

Outcome and process indicators

The typical metric used for measuring progress is an "impact/outcome" indicator, for example the "coverage of protected areas". In some cases, however, it is also useful to employ "process" indicators that track the rate of implementation of a target, for example the "number of countries that have adopted a national plan for reaching a target for coverage of protected areas".

Qualitative indicators

Most indicators underlying current international goals and targets are quantitative, which has the advantage of making them measureable. But they still may not cover all the areas needed for tracking a target. From the MDGs we have learned that not only quantitative indicators, but also "qualitative" indicators of perception, satisfaction and attitude can also be useful. These can also be measurable using metrics from the social sciences.[64]

Composite indicators

In some cases it is convenient and feasible to consolidate several indicators into a meaningful single index or "composite indicator[65]". These are combinations of different parameters with different numerical scales, weighted to provide a single value. Such composite indicators could be useful for communicating the state of SDG progress to a wide and varied audience because they describe a complex system in a simple way. However, to be accepted, information about the indicator must be transparent – it must be clear which parameters make up the composite index, and how they are weighted (the related issue of strength and weaknesses of composite goals and targets is taken up in the Annex).

Examples of composite indicators related to sustainability issues are: the Osberg and Sharpe's Index of Economic Well-Being; the Environmental Sustainability Index; the Sustainable Measure of Economic Welfare; the Index of Sustainable Economic Welfare; the Genuine Progress Indicator; the Adjusted Net Savings; and the Inclusive Wealth Index. A comprehensive evaluation of the strengths and weaknesses of these composite indicators is needed.

Topical indicators

Indicators can also be sorted according to the sustainability-related topics they cover. For example, a target for sustainable consumption and production could be underpinned by various indicators of material productivity and material consumption. In the context of the SDGs, such indicators could focus on those resources of critical importance to poverty eradication and human welfare – e.g. energy, water, land and soil fertility and biodiversity.

Another example is a target for the biosphere which could include indicators of Net Primary Productivity (NPP) - the net amount of solar energy converted to plant organic matter through photosynthesis. The NPP has been called a "common currency" for climate change, ecological, and economic assessments. The rate at which humans appropriate NPP is a powerful aggregate measure of human impact on the biosphere.

10.4. Data and Reporting Issues

Also of importance to setting targets and indicators are issues of data availability, quality and comparability.

At the beginning of this section it was advised that goals should be backed by *specific* and *measurable* targets and indicators. But the point was also made that it was desirable, but not necessary for indicator data to be currently available. In other words, the setting of goals and targets should not be data-driven or limited to those that are already backed up by databases for tracking progress. This is reasonable because only a few key environmental indicators are regularly monitored and reported at the global level.[66] However, provision should then be made for acquiring the necessary data after the goals and targets are adopted.

Two other points are worth noting here. First, for the sake of credibility and accountability, it is desirable to have a well established baseline of the indicator so

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[64] See for example, Parris and Kates, 2003. Characterising and measuring sustainable development. Annual Review of Environment and Resources, 28, 559-586; UN 2008. Measuring sustainable development. Report of the Joint UNECE/OECD/Eurostat Working Group on Statistics for Sustainable Development. United Nations. http://www.oecd.org/greengrowth/41414440.pdf., and Smits and Hoekstra 2011. Measuring sustainable development and societal progress: overview and conceptual approach. Statistics Netherlands. http://www.cbs.nl/NR/rdonlyres/C32647F1-1EBB-4CDF-861C-F80A8BD99CF3/0/measuringsustainabledevelopment.pdf.

[65] Composite indicators" should not be confused with the "composite goals" referred to in the Annex. "Composite goals" are those that use abstract concepts such as "rights" or "resilience" to capture the various dimensions of sustainable development.

[66] See Chapter 4 of UNEP Year Book 2013. Key Environmental Indicators: tracking progress towards environmental sustainability. UNEP 2013. Emerging issues in our global environment. UNEP. http://www.unep.org/pdf/uyb_2013.pdf.

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that progress in achieving goals and targets can be measured. Second, because SDGs should incorporate economic, social and environmental aspects of sustainable development, it follows that a very broad range of data will be needed for their monitoring and implementation. A UN-wide effort, also involving outside partners, could help to make these data available.

Despite the large number of existing initiatives to collect environmental information at all levels, important gaps still remain, and the capabilities of countries to acquire and process data continues to vary greatly. It is to be expected that new demands for data connected to the SDGs will put further pressure on countries to expand their data collection capabilities. But increasing the capacity of countries to collect, compile and analyse data, and to do so in an integrated fashion for different environmental issues will yield great gains. Countries would be able to track SDG progress and better compare their progress with other countries. This could consequently encourage them to meet targets.

A related challenge is that countries use different methods, definitions and data sources which makes the comparability of data a problem. With this in mind, it would be useful if the SDG process would include support for the harmonization of data.

In addition to the preceding issues about data, there is also the question about who should be involved in data collection. First of all, it is clear that indicator data should be collected and reported by legitimate institutions such as statistical offices. Since many of the environmental indicators may be geospatial in nature, the involvement of global and national observing systems is also important. In addition, universities, research institutions, and citizen scientists have a role to play by helping to develop and test new methodologies to acquire and analyse data.

In closing, we briefly raise two issues related to the reporting of progress in achieving targets.

The first issue relates to the international and national "architecture" of how data are processed and delivered, including robust independent systems for measurement, reporting, and verification (MRV). The

advice here is to spend adequate time to carefully plan this architecture once the SDGs have been identified. This is because a good design can save considerable resources. One of many options to be considered is to link the SDG architecture in some way to current reporting institutions within the Multilateral Environmental Agreements.

The second issue relates to maintaining the legitimacy and credibility of progress reports. A simple idea is to make the data behind the indicators widely accessible. Another is to disseminate descriptions of the techniques used to obtain and process the data.

To sum up, following the advice in this section will increase the usefulness of indicators in achieving sustainable development goals.

11. Strengths and Weaknesses of the Framework

To recapitulate, this Paper proposes an "integrated" approach for structuring SDGs in the form of a complementary set of integrated goals, underpinned by a mix of some integrated and non-integrated targets, in turn supported by clear, measurable indicators (Section 8). This approach, plus the "rationale and overarching vision for the SDGs" (Section 7) and a set of criteria for ensuring that environmental sustainability is included in SDGs (Section 9), make up the framework presented in this Paper.

Some weaknesses of the framework and what to do about them are:

- Pursuing integrated goals and targets requires a shift in thinking in government, business and other institutions. It requires exceptional visionary leaders, in particular at the national and sub-national levels, who are able to synthesize the environmental, social and economic concerns of sustainable development

  But leaders can and do learn. And a new gene-ration of leaders is being trained in modern interdisciplinary and transdisciplinary thinking and may be better equipped than their predecessors to deal with the sustainability challenge.
- An integrated approach to goals and targets will probably require a high level of intersectoral

coordination at the national and local level in order to reach simultaneous environmental, economic and social objectives.

On the other hand, the challenge of meeting integrated targets may have the positive effect of encouraging governments to take into account the interlinkages between the three dimensions of sustainable development.

- Integrated goals and targets may be more difficult to understand than those that limit themselves to either the environmental, social or economic aspects of sustainable development.

But this can be allayed by keeping the goals simple and qualitative.

- Integrated targets may require new aggregated metrics and new monitoring programmes to track. Nevertheless, it is likely that even targets focusing only on environmental, social or economic aspects of sustainable development will require an expansion of current measuring and monitoring efforts. Furthermore, experience has shown that means of measurement are developed once the political commitment is clear.

Strengths of the framework include:

- Developing integrated goals, as opposed to single dimensional goals, achieves a higher level of integration of the three dimensions of sustainable development. It acknowledges the fact that these dimensions are intricately linked. Integrated goals will also help ensure that all dimensions of sustainable development are well represented in the set of SDGs, as called for at Rio+20.

- Above, it was taken as a weakness that governments and other institutions will have to shift their thinking and improve their internal coordination in order to deal with integrated goals and targets. But this is actually a strength since integrated goals will encourage governments and other institutions to move away from the silo approach, and will prompt a more coordinated policy response to the three dimensions of sustainable development.

- Giving the environment equal footing to social and economic considerations within integrated goals conveys the message that environmental sustainability and investing in environmental goods and services provides a foundation for socio-economic development. Conversely, it recognizes that poor environmental quality leads to loss of biodiversity and ecosystem services and subsequent risks to socio-economic development. It encourages a type of development that minimizes unintended environmental consequences and strengthens adaptation and resilience to environmental and other changes.

Annex. Deciding on an Integrated Approach

Before deciding on the "integrated approach" described in Section 8, three other approaches were evaluated. These were formulated in a very distinctive way to accentuate their differences so as to make it easier to assess their strengths and weaknesses.

Approach 1. Developmental goals with nested environmental targets

Under this approach (Figure 1) the SDGs consist, at the highest level, of a set of *socio-economic developmental goals* (such as ensuring sustainable livelihoods, decent jobs and equitable growth; or, ensuring quality education and lifelong learning). Each developmental goal is underpinned by specific *environmental, social, and/or economic targets.*

This approach assumes that SDGs will be driven by the aims of socio-economic development and a push to increase human wellbeing, but that environmental targets should be nested within these goals to ensure that development is achieved under environmentally sustainable conditions.

For example a goal on sustainable livelihoods, decent jobs and equitable growth could be underpinned by targets for increasing the number of green jobs (environmental, economic), decreasing youth unemployment (social) and providing universal access to financial services and infrastructure (economic). Similarly, a goal on quality education and lifelong learning could be underpinned by targets for incorporating environmental education into all levels of educational curriculums worldwide (environmental), increasing the number of children and youths with access to primary and secondary education (social), and increasing the total number of graduates in high tech fields (economic).

Strengths of the approach:

- If each socio-developmental goal is assigned at least one environmental target, then this approach will convey the message that environmental sustainability supports developmental goals.

- Nesting environmental targets within all developmental goals may also help minimize the unintended environmental consequences and depletion of natural resources that usually accompany development.

Weaknesses of the approach:

- It omits the environmental dimension of sustainable development from the goals themselves and this could encourage a continuation of the fragmented approach towards meeting the sustainability challenge. It does not adequately consider that ecosystem services and a healthy biodiversity are prerequisites for sustainable development.

- Not all environmental issues can be easily nested within social and economic developmental goals. For example, it will not be easy to assign climate targets or biodiversity targets to a single development goal because these issues cut across many different developmental topics.

- The fact that environmental sustainability targets are embedded within developmental goals, rather than given equal weight to these goals, may give the false impression that environment has a lower priority.

Approach 2. Environmental goals on par with social and economic goals

Approach 2 (Figure 1) consists of a mixed set of environmental, economic, and social goals. Some goals would emphasize social objectives (e.g. governance), some economic (e.g. poverty reduction), and some environmental (e.g. biodiversity conservation). Unlike Approach 1, in which the goals are all socio-economic, here the goals would consist of a set of segregated environmental, social, and economic goals, all on a par with each other.

Each environmental goal would only be underpinned with environmental targets, economic goals with economic targets, and social goals with social targets.

Approach 1. Developmental goals with nested environmental targets
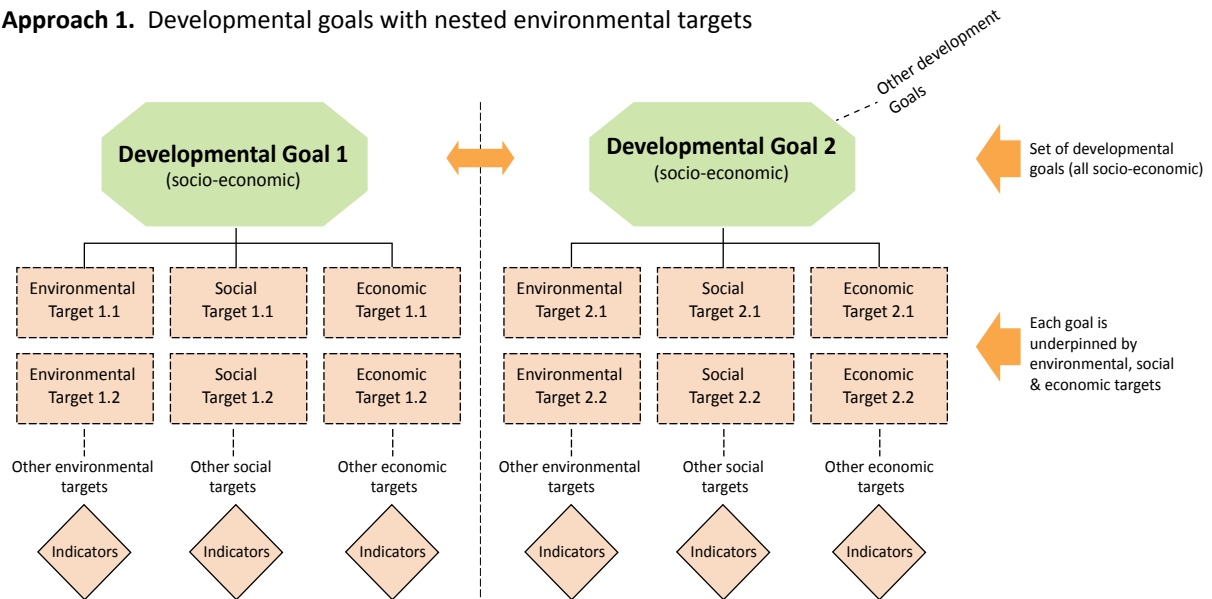
Approach 2. Environmental goals on same par as social and economic goals
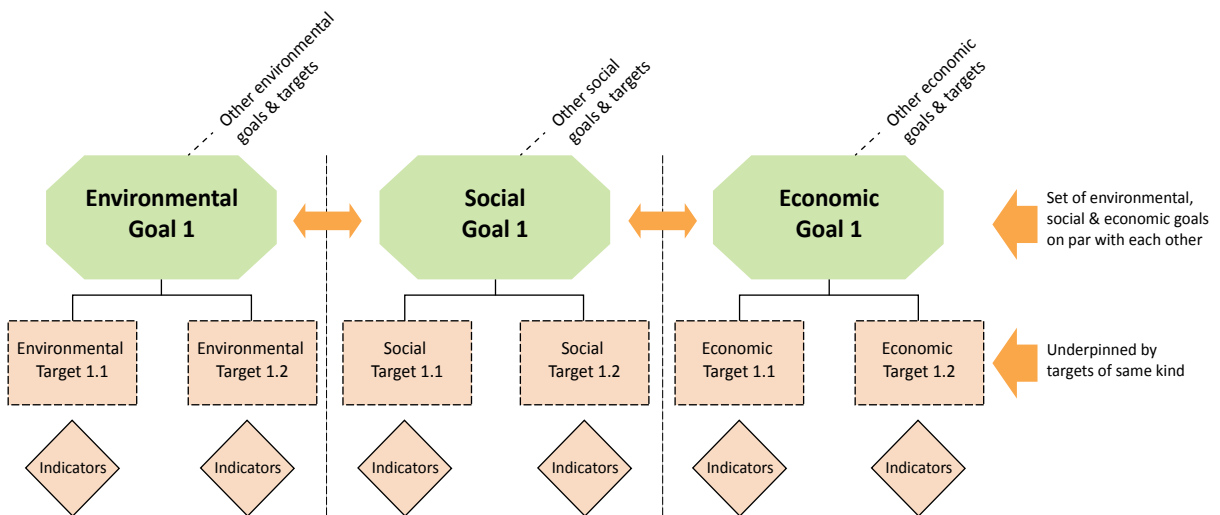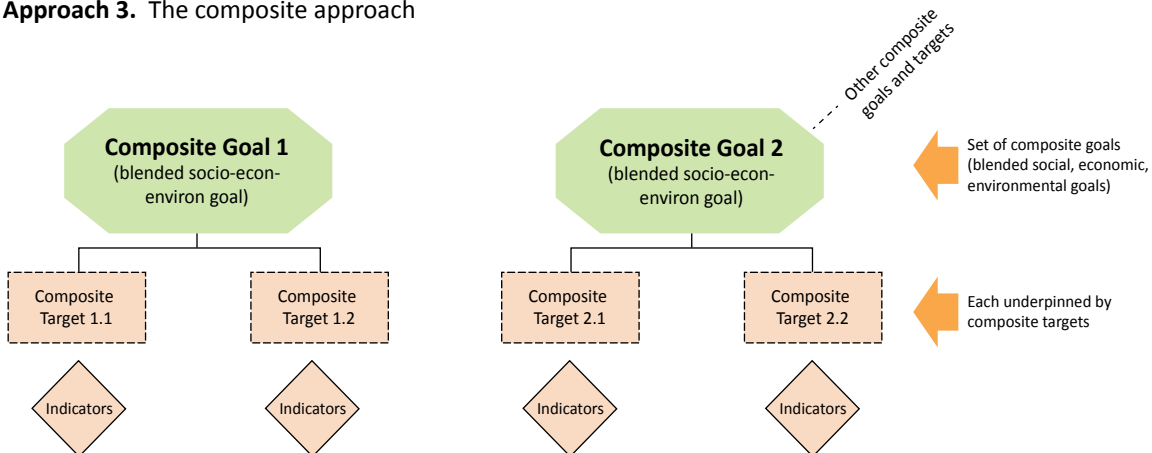
Approach 3. The composite approach

Figure A-1. Three approaches to embedding environment in SDGs

Strengths of the approach:

- It conveys the message that environmental sustainability is as important as social and economic sustainability.

- It increases the chances that major environmental issues are covered since they are given more prominence here in the form of goals, as compared to Approach 1 where they are subsidiary targets.

- Since environmental goals are segregated from economic and social goals, less institutional coordination may be needed to achieve them, as compared to Approaches 1 and 3 (to follow).

Weaknesses of the approach:

- The last "strength" listed above can also be viewed as an important weakness – separating environmental goals from economic and social goals perpetuates the uncoordinated "silo" way of dealing with development challenges, and this usually wastes resources because of duplicative efforts.

- Related to the previous point, experience from the MDGs (see Section 3) shows that segregating environment from social and economic considerations ignores crucial connections between these different aspects of sustainable development. For example, the MDG goal for poverty alleviation is not linked to the MDG goal for environment sustainability, even though poverty reduction can only be achieved by maintaining or restoring ecosystem services.

- It does not encourage transformative thinking about how to combine the three dimensions of sustainable development.

Approach 3. The composite approach

Under Approach 3 (Figure 1), the environmental, social and economic dimensions of sustainable development are blended into "composite" goals that use abstract concepts such as "rights" or "resilience" to capture the various dimensions of sustainable development.

In this approach composite goals would be underpinned by composite targets. No goals or targets focusing exclusively on environmental, social

or economic aspects would be allowed. In a sense, this approach goes beyond the notion of pillars or dimensions of sustainability.

An example composite goal would be "to increase human resilience to negative changes or shocks". An example composite target underpinning this goal would be to achieve a minimum value for the "human development index" in all countries by a particular date.

Strengths of the approach

- As compared to Approaches 1 and 2, this is likely to better integrate the three dimensions of sustainability because all three are incorporated in every goal and target.

- Given their abstract nature, the goals in this approach may be viewed as more aspirational and universally applicable than the goals in Approaches 1 and 2.

- This approach is consistent with the belief that transformative action is needed to meet the sustainability challenge.

Weaknesses of the approach

- Since composite goals are based on abstract concepts they are also more likely to be difficult to understand and interpret.

- Since they are more abstract, they may require a bigger shift in thinking on the part of governments and other institutions than Approaches 1 and 2, and may therefore be more difficult to implement.

- It will probably be a big challenge to come up with a complete set of targets that are not only composite, but also *specific* and *measurable.* Throughout this paper it is argued that being *specific* and *measurable* is crucial to the success of targets.

Combining the approaches

Experts[67] at a Roundtable Discussion examined the three approaches and suggested combining them into the "Integrated Approach" found in Section 8 of this paper.

From Approach 3, the idea is taken to have each goal incorporate the environmental, social and economic dimensions of sustainable development. But the Integrated Approach also stipulates that the goals must be simple to understand and communicate. Hence, the three dimensions of sustainable development are incorporated in a different way. While they are "blended" in the composite goals of Approach 3, they are "combined" in a recognizable way in the goals of the Integrated Approach. Approach 3 produces goals based on abstract concepts such as "resilience" and "rights" which do not explicitly spell out the separate dimensions of sustainable development. By contrast, the Integrated Approach starts with themes such as "energy security", and explicitly describes the three dimensions of this theme. For example, an integrated goal would be "energy security which provides affordable access to clean energy for all (economic, social), creates green jobs (environmental, economic), lowers the health risks of the energy system (environmental, social), and minimizes environmental degradation and resource depletion (environmental)."

Borrowing from Approaches 1 and 3, the goals in the Integrated Approach are underpinned by a mix of "integrated" targets (in that they incorporate all aspects of sustainable development) and "non-integrated" targets (in the sense that they pertain to either environmental, social or economic aspects). The advantage of a mix is that it allows either integrated or non-integrated targets to be chosen, as long as they are *specific and measurable.*

The strengths of the Integrated Approach are reviewed in more detail in Section 11.

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