



## REVIEW OF TARGETS FOR THE SUSTAINABLE DEVELOPMENT GOALS: THE SCIENCE PERSPECTIVE





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# EXECUTIVE SUMMARY

This report is an independent scientific review of the 17 Sustainable Development Goals (SDGs) and 169 targets, as submitted to the UN General Assembly by the UN Open Working Group (OWG). It is a unique tool designed primarily for negotiators, technical support teams and other actors engaged in defining a universal, integrated and transformational set of global goals and targets for sustainable development and the political declaration on the post-2015 development Agenda. In particular it is a resource for technical review of the targets carried out in preparation for their adoption and translation at the national level. With more than 40 contributing authors from 21 countries, the report brings together a wide range of scientific expertise across the natural and social sciences in an accessible and concise manner.

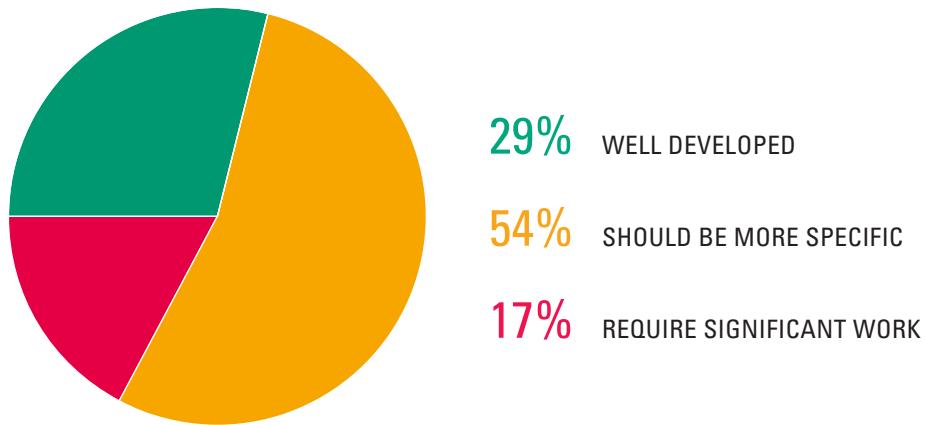
The report offers rigorous analysis of the proposed goals and targets, collectively and individually, assessing whether they are backed up by scientific evidence, whether they address the economic, social and environmental dimensions of sustainable development in an integrated way, and whether they are sufficiently specific to be effectively implemented and monitored. It clearly identifies how well defined each target is through a “traffic light” colour scheme (green, amber, red), signaling where more technical work may be needed. Concrete recommendations are put forward for consideration in refining the goals and targets or in planning for their implementation.

## THE SDG FRAMEWORK

- The proposed Sustainable Development Goals offer major improvements on the Millennium Development Goals (MDGs). The SDG framework addresses key systemic barriers to sustainable development such as inequality, unsustainable consumption patterns, weak institutional capacity, and environmental degradation that the MDGs neglected.
- The SDG framework would benefit from an overall narrative articulating how the goals will lead to broader outcomes for people and the planet. An overarching goal could be formulated, for instance in the political declaration framing the Post-2015 Development Agenda, binding together the 17 goals, thus providing a clearer means-to-end continuum.
- The current SDG framework does not identify the wide range of social groups that will need to be mobilized to deliver on the goals as agents of change alongside governments.
- Key trade-offs and complementarities among goals and targets should be specified in a follow-up document.

## THE SDGs TARGETS

Out of 169 targets, 49 (29%) are considered well developed, 91 targets (54%) could be strengthened by being more specific, and 29 (17%) require significant work. The analysis of the targets provided in this document could support a technical review of the targets around criteria such as:



### *Consistency with existing international agreements and processes*

The success of the SDGs is partly dependent on aligning targets and goals with existing international agreements and political processes. These include the Post-2015 Framework for Disaster Risk Reduction (to be agreed in Sendai, March 2015), the UNFCCC negotiations with the new climate agreement expected in December 2015, and the process on Financing for Development. All of these depend on each other for success. In addition, the report suggests harmonization of targets with the Aichi Biodiversity targets, and International Labour Organization social protection floors.

### *Implementability*

Some targets lack the focus to enable effective implementation. Recommendations are made where possible for specifying potential fields of application.

Many of the targets may also contribute to several goals, and some goals and targets may conflict. Action to meet one target could have unintended consequences on others if they are pursued separately. Research suggests that most goal areas are interlinked, that many targets might contribute to several goals, and that there are important trade-offs among several goals and targets. By tackling targets in an integrated way, the desired results can be achieved for many targets.

For example, progress on ending poverty (SDG 1) cannot be achieved without progress on the food security target under SDG 2, macroeconomic policies related to targets on full and productive employment and decent work under SDG 8, the reduction of inequality under SDG 10, and without enhancing resilience to climate change under SDG 13. Success in these will lead to better health and wellbeing, thus contributing to the achievement of SDG 3.

There are also important trade-offs between targets: For example, an increase in agricultural land-use to help end hunger can result in biodiversity loss, as well as in overuse and/or pollution of water resources and downstream (and likely negative) effects on marine resources, which in turn could exacerbate food security concerns.

## **Measurability**

A number of targets are not quantified, and wherever possible the report proposes minimum levels of ambition that could be specified. For example, figures are suggested for targets to reduce water pollution, increase recycling and safe reuse of waste water, or to prevent new and reduce existing marine pollution.

This report does not focus on indicators for measuring progress, but does identify some apparent gaps where key indicators may need to be developed and make recommendations to support an ambitious framework for monitoring and review of implementation. Measurability will depend on the availability of data and capacity to measure the targets. The capacity to collect reliable data at the national level consistently across member states is considered, as well as the availability of data and commonly agreed definitions to enable comparison. Also, the veracity of some existing indicators needs to be confirmed before relying on them for performance assessment, and the importance of baselines that are country-appropriate is raised.

## **THE ROLE OF SCIENCE**

Science plays an important role for sustainable development from informing the formulation of evidence-based targets and indicators, to assessing progress, testing solutions, and identifying emerging risks and opportunities. In recent decades, Earth-system research has provided critical inputs into our understanding of the interlinkages and interdependencies between natural and social systems which can support integrated policy-planning, monitoring and review at different scales.

The SDG framework poses a number of conceptual as well as implementation challenges that will require enhancing the close collaboration between the policy and scientific communities and other stakeholders. Global research initiatives such as Future Earth aim to mobilize scientists to collaborate tackle these issues in partnership with policy-makers and stakeholders, and more broadly to provide the knowledge needed to support transformations towards sustainable development.

# **OVERALL FRAMEWORK FOR THE SUSTAINABLE DEVELOPMENT GOALS**

Måns Nilsson, Robert Costanza

## **INTRODUCTION**

From a science perspective, the proposed Sustainable Development Goals (SDGs) offer major improvements on the Millennium Development Goals (MDGs). Not only do they address some of the systemic barriers to sustainable development but they also offer better coverage of, and balance between, the three dimensions of sustainable development – social, economic and environmental – and the institutional/governance aspects. The overall balance is illustrated by four of the goals discussing global environmental issues (climate, water, ecosystems, oceans). Environmental sustainability was an add-on in the MDGs (no. 7); in the Open Working Group (OWG) proposal for SDGs it is a core identity along with equity and poverty. Para. 3 states that “*Poverty eradication, changing unsustainable and promoting sustainable patterns of consumption and production and protecting and managing the natural resource base of economic and social development are the overarching objectives of and essential requirements for sustainable development*”.

The MDGs dealt only with developing countries and only to a limited degree captured all three dimensions of sustainability. In contrast, the SDGs deal with all countries and all dimensions, although the relevance of each goal will vary from country to country. But despite both repetition and many weakly formulated targets in the OWG proposal – which

must certainly be resolved – the SDG process has been a huge step forward through the effort to create universal goals that articulate the need and opportunity for the global community to come together to create a sustainable future in an interconnected world.

*Does the SDG framework reflect (the science related to) its major concepts?*

This section is a review of the degree to which a scientific understanding of sustainable development underpins the SDG framework as a whole, and identifies those elements that are considered to be missing from the framework.<sup>1</sup> Put simply, does the SDG framework reflect the science related to its underpinning concepts?

*Does the framework reflect a transformative development pathway?*

The SDG framework should encourage some degree of transformation across all three dimensions of sustainability. To be transformative, the SDGs should capture, in the targets and goals, both the systemic and structural barriers to, and the drivers of change. In this respect, the framework does consider certain barriers/drivers – such as inequality, inappropriate consumption and institutional structure and capacity.

However, a ‘narrative of change’ is missing, both in terms of how the pursuit of specific goals would lead to broader outcomes of social change and in terms of how this change actually takes place (Costanza 2014; Ostrom 2014). There is no clear means-ends continuum (Costanza et al. 2014a) or ‘theory of change’ (Weiss 1995) underpinning the framework. The ‘ultimate end’ of the SDGs in combination is not clear, nor is how the proposed goals and targets would contribute to achieving that ultimate end. Deploying a more scientific approach to the refinement of the framework would enable a more systematic means-ends separation between ultimate goals (intrinsic goods in their own right), for example human wellbeing, and enabling means or conditions. Development research has provided multiple perspectives on how attaining human wellbeing in the long term, as an ultimate aim, is dependent on an enabling development context, where global public goods, resources and capital (both manmade and natural) are safeguarded, and where economies can prosper (Nilsson et al. 2013; UN 2014).

More technical work, such as through scenario analysis, is needed to demonstrate the ways in which goal implementation can induce social change and the degree to which the unfolding pathways make sense for a country’s socio-economic development.

*Is the framework universal while respecting local contexts?*

Universality can be understood differently at different scales of action and for different thematic issues. The OWG had a representative membership which was a precondition for the formulation of a universal framework. It brought together the collected – and largely collective – interests of a broad range of countries involved in the OWG. The OWG’s outcome document also reflects universality from a human development perspective, such as the call for elimination of poverty in all its forms everywhere, and in that there is a collective (shared) commitment to establishing the conditions for this to happen (Sen 1996; Koehler et al. 2012; Bernstein et al. 2014).

The SDG framework also reflects the shared interest and responsibilities for addressing global challenges by governments at the nation-state level. However, governments are only one type of actor in a multi-actor landscape that characterizes global governance today. Owing to the government-driven process in the OWG, the proposed framework does not sufficiently reflect and address many of those groups within society that will

<sup>1</sup> This review has benefited from input and inspiration from a wide range of colleagues active in the SDG process around the world, such as within Future Earth, the UNU-IAS Post2015 project ([www.post2015.jp](http://www.post2015.jp)) and the Independent Research Forum (IRF2015) ([www.irf2015.org](http://www.irf2015.org)).

be required to deliver on the goals (beyond aid agencies and national governments). For example, it largely fails to reflect private sector perspectives and incentives to participate in the delivery of the goals.

#### *Does the framework reflect inter-linkages and integration?*

Many of the goals contain elements of the three dimensions of sustainability so the framework by definition contains elements of integration, but the level of integration is far lower than justified from a science perspective and far lower than discussed in the OWG preparation process. In terms of poverty, although there is a multi-dimensional understanding of poverty reduction and development, there is no clear articulation of what the development agenda actually involves, and how the key elements interact in the development process. For example, there is no clear articulation of what Sen (1999) called key 'freedoms', including economic opportunities (e.g. to participate in trade and production), political liberty, social empowerment, dignity and basic conditions such as good health and education. Dasgupta (2001) called those 'constituents' (health, happiness, freedom) and 'determinants' (access to food, nutrition, water, shelter, knowledge) of development, whereas the human rights literature frames many of these dimensions as rights or entitlements. The values of the Millennium Declaration (UN 2000) – freedom, equality, solidarity, tolerance, respect for nature and shared responsibility – could be another basis on which to build.

The goals are presented using a 'silo approach', that is, they are addressed as separate elements, mostly in isolation from each other. However, it is clear from systems science that goal areas overlap, that many targets might contribute to several goals, and that some goals may conflict. The goals are also addressed without reference to possible links with other goals. Since the SDG framework does not reflect interlinkages and cannot ensure that development takes place within sustainable levels of resource use at either the global or regional scale, it is possible that the framework as a whole might not be internally consistent – and as a result not be sustainable.

### **RECOMMENDATIONS FROM A SCIENCE PERSPECTIVE**

**The following elaborations to the SDG framework are recommended for consideration during the completion of the SDG framework in 2015.**

*Formulate an overarching goal.* The 'ultimate end' of the SDGs – in effect an overarching goal – and how the 17 goals and targets would contribute to achieving this end, needs to be more compelling. An overarching goal, such as: "*a prosperous, high quality of life that is equitably shared and sustainable*" could also be used to help group the 17 goals and make the full list more understandable to a broader range of people (Costanza et al. 2014a). The overarching goal should also be reflected in new metrics for measuring progress toward it, and this could stimulate progress toward moving beyond using GDP (Gross Domestic Product) as a proxy for the overarching goal (Costanza et al. 2014b). GDP was never designed for the purpose of measuring development, much less sustainable development. As Kuznets (1934) pointed out when first proposing GDP as a metric of national income: "*The welfare of a nation can scarcely be inferred from a measurement of national income*". The SDG framework should promote a new approach to measuring economic progress toward sustainable development (Kubiszewski et al. 2013). As Kuznets (1934) pointed out "*Goals for more growth should specify more growth of what and for what.*" As Costanza et al. (2014b) put it: "*The successor to GDP should be a new set of metrics that integrates current knowledge of how ecology, economics, psychology and sociology collectively contribute to establishing and measuring sustainable wellbeing. The new metrics must garner broad support from stakeholders in the coming conclaves.*" The SDG process should facilitate and support the broad consensus building required to move beyond both GDP and the established alternative Human Development Index (HDI) to more appropriate measures of progress toward sustainable development.

*Develop interlinking targets that are common to different goals.*

Incorporating more bottom-up target setting and modularity could significantly enhance the level of integration within the goal framework (Weitz et al. 2014). The current ‘silo approach’, reflecting political and institutional realities within international and national systems, is probably unavoidable but should be complemented by an interlinking approach. This would require establishing a new process across sectoral domains at both national and UN levels, and could result in a framework where targets and indicators of each goal are represented within or linked to other goals – for example, an efficiency target for various inputs, such as water or energy, can be linked with the goal on food security, or an energy access target can be linked with the goal on industrial development. Similarly, each goal could include an overall carbon intensity target so that implementing the goal did not undermine targets in the climate or other environmentally-related goals. This would enable trade-offs to be mitigated and synergies emphasized. An assessment of the relevance of each target for different goals, reveals that most targets are inherently cross-sectoral. The interaction between agriculture and water can be used to illustrate this point. Some targets are *interdependent* – one target must be realized in order for another to be viable. For example, the agricultural target for increasing access to irrigation requires a steady supply of freshwater. Other targets *impose constraints*. For example, the target for efficient agricultural water use sets a condition for how access to irrigation can be provided. Some targets *reinforce* each other. For example, increasing water efficiency in agriculture can ensure that more of the irrigation water actually reaches plants, thereby helping achieve the target for increased agricultural productivity. Critical *trade-offs* may also occur – for instance, when food and energy production compete for the same land resource, and the expansion of one impedes the other (Weitz et al. 2014). Ultimately, there is a need to incorporate a wider systems perspective that can articulate how the goals and targets would interact over time, in both positive and negative ways, and how they would contribute to the overarching goal.

*Formulate a compelling narrative of development.*

To be effective in communicating the SDGs it is necessary to have a compelling narrative to describe how the world could look when the SDGs are fully achieved. This narrative needs to consider more explicitly the ends-means continuum of sustainable development. Articulating this narrative would enhance the capacity to deal with trade-offs and synergies among the 17 goals since it must describe a world where the trade-offs and synergies have been resolved. It can also enhance public discussion of the type of future we actually want (e.g. Costanza and Kubiszewski 2014).

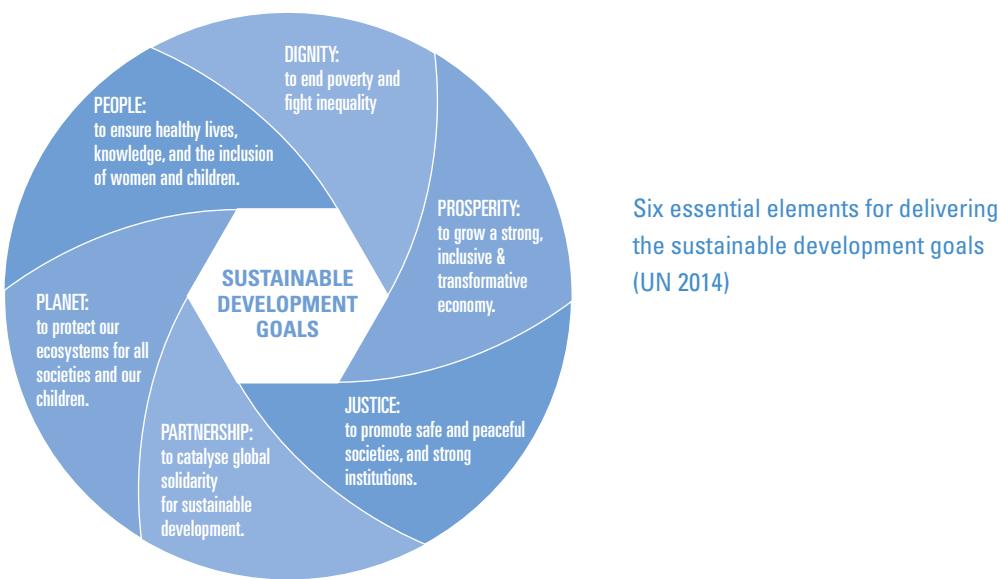
*Aggregate and package the goals and their interactions.*

SDGs should, according to the Rio+20 agreement, be “*limited in number, concise, and easily communicable*”. For this purpose, clustering the goals under ‘meta themes’ should be considered. To date, there are several possibilities: for example, the “*efficient allocation, fair distribution and sustainable scale*” approach (Costanza et al. 2014a) and the “*leave no one behind, ensure equity for all, build economies that work for people and planet, and mobilise collective action on a shared global agenda*” approach (IRF 2014). The Synthesis Report of the UN Secretary-General launched in December 2014 (UN 2014) proposed six ‘essential elements’ for delivering on the SDGs (see Figure 1). The UN Secretary-General has stated that these elements are not intended to cluster the goals. However, that some clustering of the goals seems not only feasible but essential in order to communicate the framework to a wider lay audience.

At the same time, there is a trade-off between communicability to the public and steering capacity within bureaucracies. From an implementation perspective, it is important to keep the resolution high and maintain the 17 goals because specific actors will be interested and incentivized to act upon specific targets and goals.

### *Specify targets.*

The science of program evaluation states that in order to drive change quantified targets and time frames are required to determine whether sufficient progress is being made. This means a major analytical and political effort is needed to enhance the SDG framework. Many of the environmental sustainability targets are considerably more vague (e.g. “ensure sustainable food production systems”) than most of the social targets. Specification regarding sustainable scale could be tied to the work on Earth’s system constraints (e.g. Rockström et al. 2009). Specification should also take into account the multi-actor implementation issue – i.e. what societal actors are expected to contribute to the achievement of the target – and through what incentive. Finally, specification must deal with issues of scale – both the time scale over which targets will be realized (i.e. short/long term) and the spatial scale at which they will be implemented and monitored (i.e. local/national/global).



### REFERENCES

- Bernstein S., J. Gupta, S. Andresen, P.M. Haas, N. Kanie, M. Kok, M.A. Levy and C. Stevens, 2014. Coherent Governance, the UN and the SDGs. POST2015/UNU-IAS Policy Brief #4, Tokyo. United Nations University Institute for the Advanced Study of Sustainability.
- Costanza R., 2014. A theory of socio-ecological system change. *Journal of BioEconomics*, 16:39-44.
- Costanza R. and I. Kubiszewski (eds), 2014. Creating a Sustainable and Desirable Future: Insights from 45 Global Thought Leaders. World Scientific, Singapore. ([www.worldscientific.com/worldscibooks/10.1142/8922](http://www.worldscientific.com/worldscibooks/10.1142/8922)).
- Costanza, R., J. McGlade, H. Lovins, and I. Kubiszewski. 2014. An Overarching Goal for the UN Sustainable Development Goals. *Solutions* 5(4):13-16. <http://thesolutionsjournal.com/node/237220>

- Costanza R., I. Kubiszewski, E. Giovannini, H. Lovins, J. McGlade, K.E. Pickett, K.V. Ragnarsdóttir, D. Roberts, R. De Vogli and R. Wilkinson, 2014b. Time to leave GDP behind. *Nature*, 505:283-285.
- Dasgupta P., 2001. Human Wellbeing and the Natural Environment. Oxford University Press.
- IRF, 2014. Assessing the Open Working Group on SDGs Outcome Document: Initial Recommendations on Way Forward. Independent Research Forum, informal note. ([www.irf2015.org](http://www.irf2015.org)).
- Koehler G., D. Gasper, R. Jolly and M. Simane, 2012. Human Security and the Next Generation of Comprehensive Human Development Goals. Institute of Development Studies (Sussex) and Institute of Social Studies (The Hague).
- Kubiszewski I., R. Costanza, C. Franco, P. Lawn, J. Talberth, T. Jackson and C. Aylmer, 2013. Beyond GDP: Measuring and achieving global genuine progress. *Ecological Economics*, 93:57-68.
- Kuznets S., 1934. National Income, 1929–1932. 73rd US Congress, 2d session, Senate document no. 124, page 7. (<http://library.bea.gov/u?/SOD,888>).
- Nilsson, M, Lucas, P., Yoshida, T. 2013. Towards an integrated framework for SDGs: ultimate and enabling goals for the case of energy. *Sustainability* 5, 4124-4151; doi:10.3390/su5104124
- Ostrom E., 2014. Do institutions for collective action evolve? *Journal of Bioeconomics*, 16:3-30.
- Rockström J., W. Steffen, K. Noone, Å. Persson, F.S. Chapin III, E.F. Lambin, T.M. Lenton, M. Scheffer, C. Folke, J. Schellnhuber, B. Nykvist, C.A. de Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P.K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R.W. Corell, V.J. Fabry, J. Hansen, D. Liverman, K. Richardson, P. Crutzen and J. Foley, 2009. A safe operating space for humanity. *Nature* 461:472-475.
- Sen A., 1999. Development as Freedom. Oxford University Press.
- UN, 2000. UN 55/2. Millennium Declaration. United Nations. ([www.un.org/millennium/declaration/ares552e.htm](http://www.un.org/millennium/declaration/ares552e.htm)).
- UN, 2014. The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet. Synthesis Report of the Secretary-General on the Post-2015 Agenda.
- Weiss C., 1995. Nothing as practical as good theory: Exploring theory-based evaluation for comprehensive community initiatives for children and families. In: J.P. Connell, SA.C. Kubisch, L.B. Schorr and C.H. Weiss (eds.), *New Approaches to Evaluating Community Initiatives*, Vol. 1, Concepts, methods and Contexts. Aspen Institute, Washington D.C.
- Weitz N., M. Nilsson and M. Davis, 2014. A nexus approach to the post-2015 agenda: Formulating integrated water, energy and food SDGs. *SAIS Review of International Affairs*, 34:37-50.





## GOAL

1

# END POVERTY IN ALL ITS FORMS EVERYWHERE

Bob Deacon and Asuncion Lera St.Clair

## PREAMBLE

There is a vast literature showing that ending poverty in all its forms everywhere implies attention to both completely eliminating extreme poverty while attending to other key socio-economic, cultural, political and environmental dimensions of poverty, including in advanced economies, and monitoring progress in social protection and inequality.

Scientific literature concerning the successful elimination of extreme poverty points towards the need to both provide universal and comprehensive access to basic resources and social protection and to addressing inequalities among social groups across and within countries. Achieving this goal requires both the provision of basic income and social protection to eliminate extreme poverty, and effective and equitable processes of wealth creation and distribution, employment and insurance in the present and the future. The key to a successful post 2015 agenda is awareness and prevention of negative tradeoffs between achieving sustainability and eliminating poverty. Scientific literature on the relations between climate, sustainability and poverty suggests that the targets of SDG1 need to be at the center of all other targets, in order to avoid either an inequitable transformation to a low carbon future or the use of the poor as a trump card for preventing needed change towards a sustainable future. The targets are doable according to accumulated knowledge in the past decades about what works and not in eliminating poverty but particular attention to national and international processes of wealth creation, redistribution and regulatory regimes are missing in the wording of the targets. There is a substantive amount of social science literature showing that persistent, durable poverty is often due to both global as well as national and local power relations that enable dispossession, unequal treatment and disrespect to people's rights and human dignity. In this regard, the UN Secretary General's Post 2015 Synthesis Report principles as presented in *The road to dignity by 2030: ending poverty, transforming all lives and protecting the planet*, are supported by scientific research.

## REFINING TARGETS

Most of the targets are a reasonable basis for improvement but need in some cases a tighter specification and modified wording for better measurability. At the same time the targets need to be geared to the adoption and implementation of actual concrete social policies that comparative social analysis has already shown are more likely to ensure that poverty reduction targets are reached. Among such policies is the ILO's social protection floors. Universal approaches to social protection are also more likely to eradicate poverty than targeted policies. At the same time, in order to meet the challenges of sustainability while protecting the vulnerable from climate change and assuring wealth is used to protect the poor, the targets of SDG1 need to be at the center of all other targets. Target 1.3 should ideally be the main target for goal 1.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
1.1	Eradicating extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day, by 2030 would certainly contribute to eradicating poverty in all its forms everywhere.	The income measure of extreme poverty will need to be revalued upwards. (Dimensions of extreme poverty other than income that need to be addressed are built into the targets 1.3, 1.4 and many other SDGs.).
1.2	Reducing at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions by 2030 would contribute to eradicating poverty in all its forms everywhere.	A systematic comparative analysis of national poverty lines and definitions would need to be made to ensure international comparability and consistency.
1.3	The target of implementing nationally appropriate social protection systems and measures for all, including floors is the most important policy specific target. It needs to be achieved before 2030.	Operationalise by either following the ILO Recommendation 202 on Social Protection Floors involving both horizontal and vertical dimensions or by introducing basic income schemes. The vertical dimension of the SPF involving better social protection coverage for all and not just the poor ensures middle class buy-in to reform and the required taxation policy to pay for floors.
1.4	This target which requires all to have equal rights to economic resources, access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology, and financial services including microfinance is far too complicated and multi-faceted to be useful and measurable.	Replace by a simple target of <i>equal access of all by 2030 to social, health, education services</i> . Such a target would usefully complement the target 1.3 of access to social protection. (Consideration could be given to additional specific targets for access to land, natural resources, etc. if not covered by the other 16 goals)
1.5	The target that calls for reduction of the poor to exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters is sound but also covered by Goals 13 and 15	This target is essential in its own right, but meeting it is totally dependent on similar targets under multiple other SDGs as well. The key recommendation is to assure that there are no trade-offs between fighting climate change and reducing poverty, but rather synergies as elaborated in IPCC AR5.
1.a	The target that aims to ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation to provide adequate and predictable means for developing countries, in particular LDCs, to implement programmes and policies to end poverty in all its dimensions is fine but needs to be reinforced by the inclusion of a global fund for social protection as called for by the Human Rights Special Rapporteur on Extreme Poverty. (Schutte O and Sepulveda M 2013. UNHCR Briefing Note 7)	Redraft as: Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation <i>and through the establishment under UN auspices of a Global Fund for Social Protection</i> to provide adequate and predictable means for developing countries, in particular LDCs, to implement programmes and policies to end poverty in all its dimensions
1.b	The bland target of creating ‘sound policy frameworks, at national, regional and international levels, based on pro-poor and gender-sensitive development strategies to support accelerated investments in poverty eradication actions’ needs to be strengthened by specifying that pro-poor policies should not mean policies targeted only at the poor and that the policies should be based upon existing comparative evaluation of what actual social policies work best.	Redraft as: Create sound social policy frameworks, <i>at national, regional and global levels including those of redistribution, regulation and rights which ensure poverty eradication through tried and tested policies aimed at ensuring greater equity and social solidarity within countries and regions</i> .

[Key indicating: Green (good), amber (needs work), red (poor, needs much work or delete)]

## LINKAGE WITH OTHER SDGs

SDG1 is a fundamental goal; the meeting of its targets is dependent on the meeting of most of the other SDGs. We recommend that there is wording added in all other SDGs to express the need to prevent and avoid trade-offs between poverty and sustainability. Thus, this goal is directly and indirectly related to all other SDGs, but is especially dependent on immediate and substantial progress towards Goals 2, 3, 4, 5, 6, 8, 10, 13, 16 and 17. Goals 1 and 10 should have equal standing.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→ 2	Particularly close link with food security. Note that the UN Special Rapporteurs on Extreme Poverty and on the Right to Food jointly advocated a Global Social Protection fund.	2.1 especially
→ 3	Access to free health care is fundamental to poverty eradication.	3.8
→ 4	Access to free education complements access to social protection (Goal 1) and health care (goal 2).	4.1
→ 5	Equitable treatment of women and girls is fundamental to poverty eradication.	5.1
→ 6	Some important linkages between water access and poverty eradication	6.1, 6.2
→ 7	Access to modern and sustainable energy is fundamental for eliminating poverty	7.1
→ 8	Macroeconomic policies stimulating full and productive employment and decent work for all women and men are crucial to poverty reduction and eradication	8.5 especially, 8.6, 8.7
→ 9	Some linkages.	
→ 10	The reduction of inequality is of equal importance to eradicating poverty and would be the surest way of ensuring it.	10.1 especially and 10.4
→ 11	Increasingly important linkages between affordable housing and poverty.	11.1, 11.2
→ 12	Some linkages	
→ 13	There are key linkages. Climate change impacts as well as climate policies can have enormous impact on poor people in the next years.	13.1 and 13.2 especially
→ 14	Some linkages	
→ 15	Some linkages	
→ 16	Achieving this target will strengthen fiscal capacities in LDCs.	16.4
→ 17	Revitalizing the global partnership is fundamental	17.1, 17.2, 17.3

## **MONITORING AND EVALUATING PROGRESS**

There is a long history of poverty measurements and indicators and a wealth of lessons about what works or not, as well as on the difficulties of obtaining appropriate data on non-income measures. But scientific work on multidimensional poverty indicators has advanced, as has their implementation, for example for capability poverty indicators. What we learn is that a multiplicity of measurements are needed in order to have an appropriate view of the poverty numbers in a certain region, dimensions that are covered in other SDGs, such as access to education, health, natural resources, energy or sanitation etc. We suggest particular attention to measurements related to the implementation of social policy frameworks, employment, social insurance, and central attention to inequality indicators. Rather than new metrics, what is needed is more effort in multidimensional poverty data collection and a systematic comparative analysis of nationally appropriate poverty lines and definitions to ensure international comparability and consistency. Equally important is considering new ways of obtaining data through participatory and transparent methods and systems such as those proposed by [www.worldwewant2015.org/](http://www.worldwewant2015.org/). As pointed out in SDG10 review, there is a need for new metrics and indicators that capture multidimensional wellbeing in relation to environmental issues beyond income metrics.

## **SUMMARY**

SDG 1 is central to the post-2015 development agenda and special attention is required to identify synergies with other related goals and avoid potential trade-offs between poverty eradication and environmental sustainability. The targets are overall reasonable but would require further specification to address jointly the provision of basic income and social protection to eliminate extreme poverty, and effective and equitable processes of wealth creation and distribution, employment and insurance in the present and the future. Success on this goal will significantly depend on the adoption and implementation of actual concrete social policies, in particular the implementation of social protection floors.

## **REFERENCES**

Some references to complement usual poverty measurements such as World Bank or UNDP and some references summarizing a comparative analysis of which social policies work best to reduce poverty.

Alkire, S. and Forster, J. 2011. Counting and multidimensional poverty measurement; *Journal of Public Economics*. Volume 95, Issues 7–8, August 2011, Pages 476–487

Comparative Research Program on Poverty (CROP) <http://www.crop.org/Publications/BriefsSeries/default.aspx>

Gough, I and Woods G (2004), *Insecurity and Welfare Regimes in Asia, Africa and Latin America*, Cambridge, CUP.

Kaasch, A and Stubbs. P Eds. (2014), *Transformations in Global and Regional Social Policies*, Basingstoke, Palgrave.

Lawson, V. 2012. De-centering Poverty Studies: middle class alliances and the social construction of poverty <http://depts.washington.edu/relpov/de-centering-poverty-studies-middle-class-alliances-and-the-social-construction-of-poverty/>

Mehrotra S and Jolly R (1997), *Development with a Human Face*, Oxford, Clarendon

Mosse, D. 2010. A Relational Approach to Durable Poverty, Inequality and Power. *Journal of Development Studies*. Volume: 46 Issue: 7 Pages: 1156-1178

Olsson, L., M. Opondo, P. Tschakert, A. Agrawal, S.H. Eriksen, S. Ma, L.N. Perch, and S.A. Zakieldeen, 2014: *Livelihoods and poverty*. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 793-832.

Sen, A.K., 1985: *Commodities and Capabilities*. Oxford University Press, Oxford, UK,

Surrender, R and Walker, R Eds (2013), *Social Policy in a Developing World*, Cheltenham, Edward Elgar.

GOAL

# 2

## END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION, AND PROMOTE SUSTAINABLE AGRICULTURE

*Mary Scholes, Claudia Ringler, Joachim von Braun*

### PREAMBLE

There is adequate scientific evidence to support this multi-dimensional goal, because human development requires food security and nutritional improvement and environmental issues are critical for sustainable agricultural development. Achieving this goal is complex because it couples natural biophysical processes with social and economic processes and because there is currently insufficient evidence on how to successfully scale up food security and nutrition strategies. Legislative goodwill and practice must target policy in favor of vulnerable small-scale producers and under and mal-nourished populations. Sustainable food production is not the only factor important for achieving this goal, safe drinking water and sanitation, and decreasing inequality, are also essential but are not explicitly included.

### REFINING TARGETS

This goal has a series of targets to support the three interrelated components of the goal: ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture. Most concern the latter, which itself directly contributes to ending hunger and achieving food and nutrition security.

The targets for this goal do not provide a comprehensive set. Only targets 2.1 and 2.2 directly address hunger and malnutrition and even for these the formulation is confusing and potentially contradictory. For example, target 2.2 refers to 2025 undernutrition while target 2.1 focuses on 2030 nutrition. The other six targets relate in some form to sustainable production systems, providing a somewhat unbalanced view of the SDG2.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
2.1	Access by all people already suggests that those who have least access will need special attention; despite this we suggest to keep an extra focus on the first 1000 days due to the general irreversibility of undernutrition suffered at that stage.	By 2030 end hunger and ensure access by all people to safe, nutritious and sufficient food all year round, <i>with a particular focus on the first 1000 days</i>
2.2	It is advisable to explain that malnutrition includes undernutrition, obesity and micronutrient deficiencies; while there are targets for 2025 on stunting and wasting in under-fives, food security goals should have a consistent timeframe.	By 2030 end all forms of malnutrition, including <i>undernutrition, obesity and micronutrient deficiencies</i>
2.3	Singling out various constituencies and various avenues does not seem essential; sustainability needs to be added. It will be challenging to monitor this target. It should be merged with target 2.4.	Merge with 2.4: <i>by 2030 increase agricultural productivity sustainably, that is, without adverse impacts on the natural resource base and the environment, with a focus on small-scale producers</i>
2.4		Merge with 2.3
2.5	This target benefits from reduced wording. Not clear why the 2020 timeframe was chosen here, but at least it does not directly conflict with other targets. Monitoring will be challenging for non-cultivated plants and animals.	By 2020 maintain genetic diversity of <i>all</i> seeds, <i>including</i> cultivated plants, farmed and domesticated animals and their related wild species and ensure access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed
2.a	No change, but will be difficult to monitor.	
2.b	Shortened and merged with 2.c; market information and market functioning will be challenging to monitor.	Merge with 2.c: correct and prevent trade restrictions and distortions in world agricultural markets in accordance with the mandate of the Doha Development Round; ensure proper functioning of food commodity markets, and facilitate timely access to market information, including on food reserves
2.c		Merge with 2.b

Some additional aspects that could be considered in a comprehensive set of targets are:

- Invest in strategies that improve nutrition outcomes in the first 1000 days, including the elimination of micronutrient deficiencies

## LINKAGE WITH OTHER SDGs

There are strong interlinkages between this goal and the other SDGs: many of the targets for this goal also contribute to other SDGs while some targets under other SDGs contribute to reducing hunger and improving food and nutrition security, and sustainable agriculture.

In general, this goal moves in tandem with Goals 1, 3, 4, 5, 10, and 12; but there are likely to be trade-offs between this goal and the environmentally focused targets of Goals 6, 7, 13, 14, and 15. These trade-offs need to be explored at an early stage to ensure that the costs of the trade-offs are minimized.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→ 1	Eradication of extreme poverty and reduction of poverty in all its dimensions as well as access to basic services links to all aspects of SDG2.	1.1 especially, and all
→ 3	The reduction of maternal, infant and under-five deaths and the reduction of disease contributes to SDG2.	3.1, 3.2, 3.3, 3.9, 3.b, 3.c, 3.d
→ 4	Equal access to education will support food and nutrition security and also more sustainable agriculture.	4.1, 4.2, 4.3, 4.5, 4.6, 4.7
→ 5	Gender equality and empowerment will enhance food security and nutrition, including reducing micronutrient deficiencies and enhancing sustainable agriculture.	5.1, 5.3, 5.5, 5.a., 5.b, 5.c
→ 6	Universal access to safe drinking water and sanitation are essential for food security and nutrition and access to water of adequate quantity and quality is essential for sustainable agriculture.	6.1 especially, and all
→ 7	Access to modern, renewable energy is important for sustainable agriculture and also for food security and nutrition (through enhancing access to better food).	7.1, 7.2, 7.3, 7.a, 7.b
→ 8	Sustained economic growth and enhanced resource use efficiency are important for food security and sustainable agriculture.	8.1, 8.4
→ 9	Developing and upgrading rural infrastructure will be important for agriculture and agro-processing industries and thus can support sustainable agriculture and food security.	9.1, 9.4, 9.a, 9.b, 9.c
→ 10	Rapid growth in the poorest countries as well as reduction or elimination of inequality in the policy and legal arenas should enhance food and nutrition security as well as sustainable agricultural production.	10.1 especially, 10.2, 10.3, 10.4, 10.5, 10.6, 10.a, 10.b
→ 11	Enhanced infrastructure and reduced disasters in settlements as well as better connection between rural and urban areas will contribute to food and nutrition security and can support sustainable agriculture.	11.2, 11.5, 11.a
→ 12	Sustainable production and consumption directly link to sustainable production and food and nutrition security in SDG2.	12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.8, 12.a, 12.c
→ 13	Enhanced resilience to climate change will support more sustainable agriculture as well as food and nutrition security; however, agriculture also contributes to climate change.	All
→ 14	More sustainable ocean fisheries and better access of small-scale fishers will support food security and nutrition in the long term.	All
→ 15	Sustainable use and conservation of natural resources links directly with more sustainable agriculture, as well as food and nutrition security; but there could be potential trade-offs with some environmental dimensions, such as halting biodiversity loss.	15.1, 15.2, 15.3, 15.4, 15.6 15.8, 15.a, 15.b

→16	Enhanced governance supports sustainable agriculture and food and nutrition security.	16.1, 16.4, 16.5, 16.6, 16.7, 16.8, 16.10, 16.a, 16.b
→17	Enhanced finance, technology, capacity building and trade, policy coherence, partnerships and monitoring can support food security and nutrition as well as sustainable agriculture.	All

### MONITORING AND EVALUATING PROGRESS

There is consensus on key food security and nutrition indicators. They include calorie availability per capita and per day, dietary diversity score, stunting/wasting with a focus on those below the age of 5 and a specific focus on those below the age of 2, as well as the measuring of micronutrient deficiency indicators keyed to the regions where specific deficiencies are most prevalent. However, many of these data are currently estimates and need supplementing by observations with a focus on food insecurity hotspot countries.

Indicators for sustainable agriculture are more complex as important trade-offs exist among some indicators. The indicators are also multi-dimensional location/season/crop, etc. specific (yield/ha, input use/ha, emissions/ha at farm, in the food chain, etc.) and there could be synergies but also trade-offs with other goals, such as Goals 6, 7, 13 and 15.

### SUMMARY

Achieving goal 2 is complex as it couples natural processes with social and economic processes. Policy should be targeted in favor of vulnerable small-scale producers. Most targets concern the promotion of sustainable agriculture; this creates an imbalance and an additional target is proposed for nutrition. There is consensus on key food security and nutrition indicators but trade-offs with the environmentally focused goals make indicators for sustainable agriculture more complex.

## ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES

Amina Aitsi-Selmi, Virginia Murray

### PREAMBLE

Health constitutes human capital in sustainable development as well as being a desirable outcome in its own right. It creates resilience to shocks and is a critical element in the cycle of sustainable development: improving health leads to economic development which usually leads to improvements in health (1). Average population health levels and inequalities in health are a good barometer of societal functioning (2). This goal is wide-ranging and includes non-communicable diseases, mental health, disease prevention, tobacco control, disaster risk reduction and intellectual property. Missing elements include acknowledgement of the role of the global food system, the built environment, and socioeconomic factors such as education and working conditions/occupational health which are all determinants of the global disease burden (2). This could be addressed through stronger links with Goals 4, 8, 10, 11, 12 and 16.

### REFINING TARGETS

The targets are fragmented and the recognition of the importance of country-specific baselines is missing for many. General concerns include:

(I) no mention of life expectancy and inequalities between and within countries – this is an obvious synergy with SDGs 10 and 16;

(II) disharmony in language: the separate albeit complementary roles of ‘prevention’ and ‘adequate response/treatment’ for human health should be more obvious;

(III) the need for greater clarity on where health is treated as an input to sustainable development and where it is a desirable outcome that provides a measure of sustainable development;

(IV) the need to consolidate factors related to the physical, social and economic environment since a large body of evidence shows these are important determinants of health and wellbeing (2) and highlighting synergies with the other landmark UN agreements on climate change and disaster risk reduction;

(V) no acknowledgment of country-specific assessments to identify the most urgent priorities: such as

infectious diseases and malnutrition and/or a rapid rise in non-communicable diseases and obesity;

(VI) a need to mention community engagement and acknowledge political feasibility;

(VII) recognition of the role of rapid unplanned urbanization, internal migration from rural to urban areas, disasters and climate change impacts (3, 4); and

(VIII) the consequences for SDGs of demographic change in emerging nations where youth predominate and ageing populations in developed nations.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
3.1	Too much country variation for this to be meaningful.	Consider merging with 3.7
3.2	Very ambitious – could be more specific and acknowledge some of the known causes -(undernutrition, poor sanitation, unsafe homes, preventable infectious diseases including diarrhea and respiratory disease).	Refer to causes and consider adding: “ <i>that are linked to poverty or for which there are vaccines, preventive measures or treatment</i> ”
3.3	Sounds like a catch-all for infectious diseases. Emerging countries have a triple burden of communicable and non-communicable diseases, and traffic accidents. The target should be more focused. It should also refer to emerging infections e.g. Ebola, new influenza strains.	Consider reframing as follows: “ <i>By 2030 end the epidemics of preventable infectious diseases for which there are preventive measures, immunization or treatment and implement disaster risk reduction measures related to emerging infections and pandemics</i> ”
3.4	Very ambitious. Good that the target mentions mental health and wellbeing even if there are substantial measurement issues, it is important that these elements stay.	Target 12.8 could refer to: “ <i>... with nature and physical and mental health</i> ”
3.5		Could be merged with the target on tobacco to create a global framework of addictive and harmful substance control and trade agreements that reduce risk from addictive and harmful substances including tobacco, alcohol and narcotics. This could help to break silo working and address the clustering of these risk factors more efficiently.
3.6	Overlap with Goal 11 for safe environments and transport (e.g. 11.2 and 11.3). Urban health needs to be addressed as a system which comprises both subsystems and a super-system such as climate change.	This target could refer to the need for building safer, sustainable cities and transport systems Target 12c could refer to: “ <i>... to reflect their environmental and health impacts, taking fully ...</i> ”
3.7	The burden of reproduction falls largely on women and burdens disempowered, anemic and poorly nourished women. This target is closely linked to Target 2.2 and Goal 5.	This target could be amended to: “ <i>...integration of reproductive health, gender equality and women’s empowerment into national and local strategies and programmes</i> ”
3.8	Important synergy with Target 11.1 in the commitment to ensure the provision of basic services for all.	
3.9	Important synergy with physical and ecological targets, for example, 6.1, 6.4, 9.4, 12.4, 12.5.	Target 12c could refer to: “ <i>... to reflect their environmental and health impacts, taking fully ...</i> ” to strengthen the synergy
3.a	This is an important target and a link could be made with the target on harmful and addictive substances (Target 3.5).	This target could be merged with the target on substance misuse tobacco to create a global framework of control of addictive and harmful substances and trade agreements that reduce risk from addictive and harmful substances including tobacco, alcohol and narcotics.
3.b	This is too long and touches on the need for better trade-related and economic practices.	The core elements of this target are: Support research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration which affirms the right of developing countries to provide access to medicines for all
3.c	Supports the need for health systems but is neither time-bound nor quantified.	Requires further work to agree on a timeline and proposals for the amount of financing needed.

### 3.d

This is a vital target linking to the post-2015 Disaster Risk Reduction Framework. It could refer more explicitly to the targets and indicators included in HFA2.

Consider reframing as follows: “*Strengthen the capacity of all countries, particularly developing countries, for early warning, risk reduction, and management of national and global health risks and increase the number of countries with national and local strategies. Specifically, reduce disaster mortality, reduce the number of affected people, reduce direct disaster economic loss, and reduce disaster damage to health and educational facilities*”

#### LINKAGE WITH OTHER SDGs

Health is related to every other aspect of development either as an input or as a consequence of activity in other goals. Rapid urbanization along with demographic change in Africa and Asia, climate and related environmental change, poor implementation, and lack of technologies are affecting health and well-being. From the perspective of early diagnosis and treatment, Goal 9 could include a reference to the need for resilient hospitals and, in particular, health facilities (4). From the perspective of disease prevention and health promotion, improvements in all other goal areas would contribute to health improvements especially SDG 10 since socioeconomic inequalities are directly related to health inequalities (2). Other goals with clear links to health are SDGs 1, 2, 5, 6, 7, 8, 11, 12 and 16. Some of the targets under these other goals could be consolidated with targets under SDG 3. There is also an opportunity to make the link with the targets and indicators proposed in the disaster risk reduction framework (5).

#### SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→ 1	Poverty is a major cause of ill health and eradicating poverty will improve health and reduce health inequalities.	All (especially 1.3, 1.4, 1.5)
→ 2	Food security is a major determinant of health.	All (especially 2.2, 2.4, 2.c)
→ 4	Education is a major determinant of health and can help reduce health inequalities.	All (especially 4.1, 4.2, 4.4)
→ 5	Gender can be a barrier to access to services resulting in social exclusion and women are at a particular disadvantage in low- and middle-income settings where maternal and reproductive services are limited.	All (especially 5.2, 5.3, 5.6)
→ 6	Water and sanitation are key factors in health and wellbeing and contribute significantly to the reduction in child mortality.	All (especially 6.1, 6.2, 6.3)
→ 7	Climate change and unsustainable energy use are among the biggest threats to human welfare in the coming decades.	All (especially 7.2, 7.3, 7.a)
→ 8	Access to gainful employment and decent working conditions determine mental and physical well-being for families, young people and adults.	8.3, 8.5, 8.6, 8.7, 8.8 (especially 8.6, 8.7, 8.8)
→ 9	Sustainable practices will help create healthy and sustainable environments that minimize disasters and promote healthy living over the long term.	All (especially 9.1, 9.3, 9.5)
→ 10	Socioeconomic inequalities are strong determinants of health inequalities. Equitable policies that reduce socioeconomic inequalities can help reduce health inequalities.	All (especially 10.3, 10.4, 10.5)
→ 11	Housing, transport and access to green spaces are major determinants of health and well-being.	All (especially 11.1, 11.2, 11.b)
→ 12	Excess consumption of natural resources including land and inappropriate food production and consumption patterns are detrimental to health and a major threat through the effects on the climate and modern epidemics such as obesity. Sustainable natural resource and land use and product consumption practices are needed to encourage lean consumption and fair redistribution.	All (especially 12.1, 12.6, 12.a)

→13	Climate-related hazards and disasters are among the biggest threats to human health at present.	All (especially (13.1, 13.2, 13.3)
→14	Unsustainable fishing practices and poor ocean management threaten food supply and therefore health.	All (especially (14.3, 14.a, 14.c)
→15	Unsustainable land management is a threat to food supply and human health.	All (especially (15.3, 15.5, 15.c)
→16	Poor governance and organized crime can disempower ordinary citizens politically as well as through crime and poor	All (especially 16.2, 16.3, 16.8)
→17	Good governance and macro-economic policies are important societal determinants that create the societal structures necessary for people to thrive and lead healthy lives.	All (especially 17.6, 17.7, 17.19)

## MONITORING AND EVALUATING PROGRESS

Good indicators from a health perspective that appear to be missing are: life expectancy at birth and disability-adjusted life years (which take into account quality of life as well as life expectancy). Disaggregation of health data by socioeconomic status would provide a measure of inequality alongside other measures like the Gini coefficient. Target 17.18 is critical as it promotes monitoring of disaggregated data by ‘income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts’. It is vital that this target be retained to ensure the health and wellbeing monitoring is complete.

## SUMMARY

Health is closely related to other aspects of economic development either as an input or as a consequence of economic activity. Therefore, some of the targets under related goals could be consolidated with those under this goal. Specifically, the health goal as currently articulated is missing mention of the role of important social determinants for which there is clear evidence of impact on health. These determinants include the global food system, the built environment, and socioeconomic factors such as education and employment conditions. This could be addressed by making synergies and links with other goals more obvious as suggested in the recommendations table, which would help to reduce the sense of fragmentation of the targets and create a stronger meta-narrative. Mention of the need for country-specific baselines is missing for many of the targets. Target 17.18 will be critical to ensuring that the monitoring of health and wellbeing is undertaken.

## REFERENCES:

Overview paper on resilient economies and societies. Meeting of the OECD Council at Ministerial Level. Paris, 6-7 May 2014. Available at [http://www.oecd.org/mcm/C-MIN\(2014\)7-ENG.pdf](http://www.oecd.org/mcm/C-MIN(2014)7-ENG.pdf)

Report of the WHO Commission on the Social Determinants of Health, 2008. [http://www.who.int/social\\_determinants/thecommission/finalreport/en/](http://www.who.int/social_determinants/thecommission/finalreport/en/)

IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

Report of the UNISDR Science and Technical Advisory Group, 2013. <http://www.unisdr.org/we/inform/publications/32609>

Informal Working Group on Targets and Indicators. [http://www.wcdrr.org/uploads/Report-of-the-Facilitator-of-the-IWG-on-Targets-and-Indicators-to-Co-Chairs-151114\\_.pdf](http://www.wcdrr.org/uploads/Report-of-the-Facilitator-of-the-IWG-on-Targets-and-Indicators-to-Co-Chairs-151114_.pdf)

# ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFE-LONG LEARNING OPPORTUNITIES FOR ALL

Stephen Sterling

## PREAMBLE

Education has been recognized for many years as a critical factor in addressing environmental and sustainability issues and ensuring human well-being. The importance of education and learning in supporting change is justified by research evidence. Education programs – particularly in non-formal settings – and when widely accessible to women and girls have broad positive effects. These include beneficial effects on family planning and mortality, social equality, economic vitality and entrepreneurship and lifting people out of poverty, food security, improved health, social coherence and political stability, and better natural resource management in developing countries. Education is a key part of working to reduce vulnerability to economic, social and environmental dislocation and building more resilient systems. In developed countries, research indicates that education enables people to perform better economically, enhances health and extends life span, promotes civic engagement, and improves sense of wellbeing.

This goal is both an *end* and a cross-cutting *means*. That is, achieving this goal is desirable in itself for the evidence-based reasons given above. What is much weaker in the current articulation of the goal and its targets is education as a vehicle or instrument for change. Education can play a vital role in bringing about sustainable change over time because it is change which is owned by affected and participating stakeholders.

The goal currently emphasizes education in terms of its potential economic and social benefits – there is no recognition that education through awareness raising, training and capacity building can help protect environmental quality and lead to wiser resource use; only Target 4.7 mentions sustainable development as such.

This goal would benefit greatly from extended wording to reflect the fact that *most educational policies and programs do not yet reflect the purposes and goals of sustainable development*, and some even exacerbate sustainability issues. For many education policies and programs, a radical re-alignment towards sustainable development and sustainable futures is

required. It is recommended that SDG 4 is revised as follows: *"Ensure inclusive and equitable quality education and promote life-long learning and opportunities for all, and further, review and reform the purposes, methods, and values that underpin all education and training policies and programs with a view to reinforcing the integration of culturally relevant education for sustainable development as a critical means of assuring a more sustainable future."*

## REFINING TARGETS

The targets are all relevant but a stronger emphasis on sustainable development is required. Targets 4.1, 4.2, 4.3, 4.6 and 4.7 are the most important. Four targets have the percentage of target group left blank – this needs urgent attention. The targets are ambitious in terms of their universality and will be difficult to achieve.

Ideally, the targets would reflect more closely the carefully developed five ‘priority action areas’ that UNESCO has set out as part of its “Roadmap for Implementing the Global Action Programme on Education for Sustainable Development” (UNESCO 2014). Among others, these include “increasing the capacities of educators and trainers to more effectively deliver ESD” and “at community level, scale up ESD programmes and multi-stakeholder ESD networks”.

There is no mention of non-formal education and learning across the targets. This often offers opportunities for embedding sustainable development more quickly than through formal programs, for example working with women’s and marginalized groups. In addition, while ‘life-long learning’ is part of SDG 4, the phrase is neither explicit nor represented in the targets. Given the complex and changing nature of sustainability issues over time, life-long learning must be reflected in at least one target.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
<b>4.1</b>	Needs to be linked more explicitly to sustainable development.	... quality primary and secondary education leading to effective learning outcomes <i>relevant to sustainable development and sustainable living</i>
<b>4.2</b>	No comments.	
<b>4.3</b>	No comments.	
<b>4.4</b>	Link needed to the green economy. The percentage of the target group needs specifying – it is currently x%.	... technical and vocational skills, for employment, decent jobs and entrepreneurship, <i>particularly the percentage with skills relevant to employment related to sustainability and the green economy</i>
<b>4.5</b>	No comments.	
<b>4.6</b>	The percentage of the target group needs specifying – it is currently x%.	
<b>4.7</b>	The wording is confusing as it confuses <i>means</i> and <i>ends</i> . A small change of wording is recommended to indicate education for sustainable development as a means of moving towards the desirable ends listed in the goal.	... to promote sustainable development <i>through education for sustainable development programmes</i> which promote sustainable lifestyles, human rights...
<b>4.a</b>	No comments.	
<b>4.b</b>	Link needed to the green economy. The percentage of the target group needs specifying – it is currently x%.	... engineering and scientific programmes in developed countries and other developing countries, particularly the percentage related to sustainability challenges and the emerging green economy
<b>4.c</b>	The percentage of the target group needs specifying – it is currently x%.	

**Some additional aspects that could be considered in a comprehensive set of targets are:**

- Ensure opportunities for life-long and social learning for sustainable living and living with risk and change are reflected in adult, community, non-formal and informal learning environments

## LINKAGE WITH OTHER SDGs

Education, training and learning need to be properly recognized not only as relevant to all other SDGs, but also as a means by which progress on the other SDGs – particularly those which affect or must involve mass populations – can be secured. It is also important to develop specialist and technical expertise in relation to the SDG themes and goals. This is relevant to all goals but especially SDGs 1, 2, 3, 5, 8, 12, 13, and 16.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→1	Education is critical to lifting people out of poverty.	1.1, 1.4, 1.5
→2	Education plays a key role in helping people move towards more sustainable farming methods, and understanding nutrition.	2.3, 2.4
→3	Education can make critical difference to a range of health issues, including early mortality, reproductive health, spread of disease, healthy lifestyles and wellbeing.	3.2, 3.7, 3.c
→5	Education for women and girls is particularly important to achieve basic literacy, improve participative skills and abilities, and improve life chances.	5.5, 5.a, 5.b
→6	Education and training increases skills and capacity to use natural resources more sustainably and can promote hygiene.	6.2, 6.b
→7	Educational programs, particularly in non-formal and informal sectors can promote better energy conservation and uptake of renewables.	7.2
→8	There is a direct link between such areas as economic vitality, entrepreneurship, job market skills and levels of education.	8.3, 8.4, 8.6
→9	Education is necessary to develop the skills required to build more resilient infrastructures and more sustainable industrialization.	9.4, 9.5, 9.c
→10	Where equally accessible, education makes a proven difference to social and economic inequality.	10.2, 10.3
→11	Education can give people the skills to be participants in shaping and maintaining more sustainable cities, and achieve resilience in disaster situations.	11.5, 11.7, 11.b
→12	Education can make a critical difference both to production patterns (e.g. with regard to the circular economy) and to consumer understanding of more sustainably produced goods and prevention of waste.	12.3, 12.8
→13	Education is key to mass understanding of the impacts of climate change and to adaptation and mitigation, particularly at the local level.	13.1, 13.3, 13.b
→14	Education is important to developing awareness of the marine environment and building pro-active consensus regarding wise and sustainable use.	14.1, 14.4, 14.a
→15	Education and training increases skills and capacity to underpin sustainable livelihoods and conserve natural resources and biodiversity particularly in threatened environments.	15.2, 15.3, 15.c
→16	Social learning is vital to facilitate and ensure participative, inclusive and just societies, as well as social coherence.	16.7, 16.10
→17	Life-long learning builds capacity to understand and promote sustainable development policies and practices.	17.9, 17.17

#### **MONITORING AND EVALUATING PROGRESS**

UNESCO will monitor progress in implementing its Global Action Programme (GAP) on ESD by creating targets and benchmarks. Emphasis will be placed on: increase in the number of countries that have integrated ESD into education and sustainable development policies and strategies; increase in the number of training and education institutions that have adopted the whole-institution approach; increase in the number of training and education institutions for teachers and trainers that have integrated ESD into their programs; increase in the number of youth-led initiatives on ESD; and increase in the number of local ESD initiatives. These UNESCO indicators on ESD should form an important part of the monitoring of this goal.

#### **SUMMARY**

Education is key to reducing vulnerability to economic, social and environmental dislocation and to developing more resilient systems, through building awareness, understanding, skills and capacity. Additional dimensions should be considered for SDG 4 to address the problem that most educational policies and programs do not yet reflect the purposes and goals of sustainable development. The emphasis on sustainable development must be strengthened in at least two of the targets. A new target is recommended on life-long learning. The UNESCO indicators for monitoring progress on ESD should form part of the present initiative.

#### **REFERENCE**

UNESCO, 2014. *Roadmap for Implementing the Global Action Programme on Education for Sustainable Development*. United Nations Educational, Scientific and Cultural Organization, Paris.

GOAL

# 5

## ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

*Mary Nyasimi and Linda Peake*

### PREAMBLE

SDG 5 builds on some of the targets that began in the MDGs, specifically MDG 3 which failed to provide a springboard for development policy and practices that promoted gender equality and women's and girls' rights. Women and girls continue to face discrimination across economic, social and political spheres and entrenched gender disparities remain a major driver of poverty and inequality. SDG 5 should promote socio-political transformation at local, national and global levels. Specifically, it could lead to increased social justice and gender equality and provide an environment where all women and girls will be able to realize their rights free from discrimination.

SDG 5 would also benefit from a focus on the boy child. The boy child is also vulnerable in some countries to withdrawal from education, enforced labour, and sexual abuse and trafficking. The boy child also needs social protection and international law enforcement with regards to targets 5.1, 5.2 and 5.4.

### REFINING TARGETS

The targets address the root causes of women's and girls' inequality. However, they lack outcome statements that will lead to transformation both at the individual and institutional social-political level. Targets on institutional transformation are of critical concern because they will demonstrate overall political feasibility, including dedicated resources to implement and monitor progress and mainstreaming of SDG 5 across the other SDGs. The targets also need to be time specific. Moreover, SDG 5 is missing vital economic and social targets on:

- any reference to women's engagement in wage work such as achieving full and productive employment of women, equal pay for work of equal value, reduction of discrimination in labour markets;
- the need for equal access to education, the elimination of gender disparities in education;
- women and children's mental and physical health beyond that of reproduction.

TARGET	COMMENTS	RECOMMENDATIONS
5.1	Will eliminate social control and unequal power relations of women and girls. Will lead to short, medium and long term changes	'Discrimination' is too weak a phrase and open to many interpretations. Replace with ' <u>injustice</u> ', which is more open to specific and legal definitions within different national contexts
5.2	Might be hampered by lack of mechanism/ strategies/ tools to monitor and report discrimination	To make it more encompassing (violence is not just physical but structural) consider changing "including trafficking and sexual and other types of exploitation" to: <u>including economic, sexual and other types of exploitation</u>
5.3	Might be hampered by persisting and strong socio-cultural practices. Lead to short, medium and long term changes	The examples of harmful practices are restricted to issues of marriage and social reproduction, the two most prevalent stereotypes of women and girls. This goal could be incorporated into goals 5.1 and 5.2. Or else it should read as " <i>Eliminate all harmful practices against women and children</i> ". Putting examples in the goal itself will tend to reduce the goal to only those examples
5.4	Includes women and girls who are still ignored, voiceless and unseen. Lead to short, medium and long term changes	Remove the phrase "as nationally appropriate"; no other target has this caveat and shared responsibility is either a principle or it is not. Measuring of progress on "promotion of shared responsibility within the household and the family as nationally appropriate" will be difficult because virtually all countries will be hampered in data collection.
5.5	Can build on progress made in MDG3. Lead to medium and long term changes	Change "equal opportunities", which is a phrase specific to certain countries (eg the UK) to " <u>equality of opportunity</u> "
5.6	Can build on progress made in MDG3. Lead to short, medium and long term changes	Include boys as well in the target.
5.a	It will guarantee the economic independence of women and girls and provide social policy instruments to support women's empowerment. Will lead to short, medium and long term changes	This is an extremely important target and should be measured in relation to various inequality indicators
5.b	Lead to short to medium term changes	
5.c	A mechanism to ensure the voices of poor working women (the majority of the world's population) are heard is crucial. Lead to medium to long term changes	

## RELATIONSHIP WITH OTHER SDGs

Gendered inequalities are the most pervasive of all inequalities, hence there are very strong interlinkages between this goal and the other SDGs. We recommend that wording is added to all other SDGs to recognise that without attention to women and to gendered inequalities that sustainable change is unlikely.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→1	Equitable treatment of women and children is fundamental to poverty eradication.	1.4 especially; 1.1, 1.2, 1.3, 1.5, 1.a, 1.b
→2	Women's engagement in enhancing food security and improved nutrition initiatives is vital given their central roles in securing food for families and communities.	2.1, 2.2, 2.3, 2.4
→3	Attention to women and children in health initiatives is vital given their central roles in both social and biological reproduction and their need for access to health related services	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3c
→4	Women's and children's engagement in education initiatives, especially basic literacy, is central to improving life chances	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4a. 4b, 4c
→6	Women's role is central given their responsibility for the social reproduction of families and communities and the centrality of water and sanitation to this and the daily time and physical burdens this places on women in many world regions	6.1, 6.2, 6b
→7	Women's role is central given their responsibility for social reproduction and the centrality of energy to food preparation	7.1, 7b
→8	Women's involvement in economic growth is central given their roles in both waged employment and unwaged work in their homes and communities	8.5, 8.6, 8.7, 8.8
→9	Women's concern with infrastructure provision, and its links to resources, is central to their daily lives given their roles in both production and social reproduction activities	9a, 9b
→10	The reduction in inequality is the surest way of reducing gender inequalities and increasing the empowerment of women and children.	10.6 especially; 10.1, 10.2, 10.3, 10c
→11	Women's and children's needs in relation to land, housing, services, transport, sanitation are central to the planning of sustainable cities	11.1, 11.2, 11.3, 11.5, 11.7
→12	Women's and children's access to basic needs – land, water, food and energy – form the basis of sustainable production and consumption	12.3, 12.5, 12.8, 12a
→13	Climate change disproportionately affects women and children. Women's responsibilities in relation to production and social reproduction are central to making climate change initiatives sustainable	13.1, 13.3, 13b
→14	There are synergistic links given women's roles in community conservation, the preservation of biodiversity and environmental decision-making	
→15	There are synergistic links given women's roles in community conservation, the preservation of biodiversity and environmental decision-making	

→16	Without women's engagement in peaceful development initiatives they will fail	16.1 especially; 16.2, 16.3, 16.7, 16.9, 16a, 16b
→17	Without the implementation of sustainable development for women, sustainable development in many other sectors will fail.	17.1, 17.7

#### MONITORING AND EVALUATION

Indicators must be gender disaggregated, consensus-based, universal, and managed by designated organizations and with clear links to each target. In addition, more effort is needed to develop indicators that make sense at local scales. In this sense, engaging local stakeholders, citizen groups, including marginalized communities is needed. Baseline conditions, determined with local and global data, need to be established. A system for updating the indicators periodically through national and international reporting systems is also needed.

#### SUMMARY

It is important for SDG 5 to go beyond MDG3, and in order to do that the targets need to have outcome statements, they need to be time-specific, and there needs to be inclusion of a number of key economic and social targets on employment, pay, education, mental and physical health.

# GOAL

# 6

## ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

*Richard Lawford, Blanca Jiménez-Cisneros, Hong Yang*

### PREAMBLE

A water goal, addressing water resources management and service is essential for sustainable development. This goal is based upon extensive science linking water supply and sanitation management to improved health, wellbeing and economic productivity. However, this goal should be viewed as an ambitious aspiration that will be very challenging to achieve given that it may require major changes in water management among many nations to harmonize governance, data collection and sharing policies, and the use of models and tools. To do so would require a full commitment from every nation, state and county and all the stakeholders within them, as well as changes in infrastructure and policies that would have large financial and political costs.

Data, science, and applications of good management and governance principles will also be needed to achieve this goal. Research and technology will be needed to better understand and manage the impacts of local decisions on the basin scale, and at the same time there is a need to downscale global model projections to the local level for improved planning. Remote sensing and in-situ observations along with models are needed to support the ongoing goal monitoring. Few countries keep reliable records of wastewater production, treatment and reuse. Other research needs include linking physical processes to socio-economic and health data, and assessments of water control infrastructure and use patterns' impact on local water budgets.

### REFINING TARGETS

In general, the targets are supported by science and address the critical issues introduced by the goal. However, some targets seem ambitious or ambiguous because they fail to indicate the population percentage that should be benefitted by 2030 or involve several issues which are not clearly related. Unconvincing targets could deter donor agencies. Discussions, careful assessments and experimentation are needed to clarify target statements. Sustainable water use is likely to provide a better paradigm than sustainable water management for many of these targets.

Regional differences need to be addressed. The targets should retain some flexibility and allow countries to focus on their most urgent problems. For instance low income countries may wish to focus on controlling solid waste discharges, emerging countries may focus on wastewater treatment, and all countries may focus on recycling and reusing water. Indicators associated with these targets should be measureable, combinable (so multiple indicator values can be combined to assess whether a specific target is met) and contribute to a logical structure connecting the goal, targets and indicators.

The water goal should be reduced to a minimum number of targets through consolidation and possibly elimination, while still capturing principles of universality, integration, and transformation (see mergers proposed in Table). Targets 6.a and 6.b could be merged, or Target 6.a could become part of SDG 10 since it promotes equality and Target 6.b could become part of SDG 16 which addresses effective, accountable and inclusive institutions at all levels.

In summary, it is recommended that, in addition to sanitation, targets be consolidated and framed around three general themes:

- (I) water, sanitation and health;
- (II) reducing pollutant and untreated waste water discharge into rivers and water bodies; and
- (III) reducing water scarcity by protecting water sources, increasing the efficiency of water use, and better governance. (This could include establishing a water rights/permits framework tailored to each country's need that would harmonize decisions related to water.)

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
6.1	Safe drinking water should be measured both in terms of water quality and safe access to the water supply.	
6.2	None.	
6.3	Research and technological advances needed for wastewater monitoring and treatment. Upgraded methods for calculating wastewater production required. This is a very complex target that includes too many issues On the pollution side it leaves out many pollution problems.	Consider reframing as follows: By 2030, halve the point and non-point pollution, and untreated waste water discharges into water sources, and double the recycling and safe reuse of waste water
6.4	Increasing water use efficiency is fundamental to attaining Targets 6.5 and 6.6 as well as achieving other aspects of Target 6.4.	Merge 6.4, 6.5 and 6.6: By 2030, halve the number of people affected by water scarcity through protection of water sources including ecosystems, more efficient water use and better governance through integrated water resources management
6.5	One of the primary means of implementing this goal could be national water right/permits programs which would consider ecosystems as users.	
6.6		
6.a	This target needs a strategy to encourage investment in projects to build water infrastructure, and human and institutional capacity.	6.a could be incorporated into SDG 10
6.b	This target could most effectively be handled as part of a larger perspective on the role of community involvement in planning and managing water resources.	6.b could be incorporated into SDG 16.

## LINKAGE WITH OTHER SDGs

This goal is linked directly or indirectly with targets in each of the other SDGs. In particular, this goal has strong links with SDGs 2, 3, 5, 7, 12, 13, 14 and 15. Through effective use of water information this goal also contributes to SDGs 1, 4, 8, 9, 10 and 16. A strong, central, water-specific goal that coordinates its knowledge and information with other SDGs is key.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→1	Water is a factor for economic development at all levels and for all users.	1.2, 1.4, 1.5 especially
→2	Water is essential to increase agricultural productivity and industrial food processing.	2.3 especially, 2.4, 2.a
→3	Clean water is essential for human health.	3.3 especially, 3.4, 3.9
→4	Providing sanitation in schools is key to keeping girls in school.	4.5, 4.7, 4.b
→5	Relieving the burden of women in many countries who spend excessive time accessing safe water for their families.	5.4, 5.5, 5.a
→7	Water is essential for most forms of energy production.	7.2, 7.a, 7.b
→8	Water facilitates all types of economic activity – secure water of proper quality is essential for development.	8.4, 8.8, 8.9
→9	Infrastructure is needed for flood and drought protection and water management.	9.1, 9.4, 9.a
→10	Water stress and water disasters reduce opportunities for development. Basic human water rights must be assured by water transport.	10.2, 10.3, 10.b
→11	Water services (water supply and sanitation) must be a central part of urban planning and development.	11.1, 11.5, 11.6
→12	Consumption drives the industrial demand for water. Cleaner production practices reduce water use and pollution emissions.	12.2, 12.4, 12.8
→13	Climate change affects water availability and sustainable water and sanitation development. Efforts of the UNFCCC should be supported.	13.1, 13.2, 13.b
→14	Develop management strategies to reduce fluvial erosion and pollution. These strategies could include a program of water rights /permits for pollution discharge.	14.1, 14.2, 14.7
→15	Water in proper quantity and quality is needed to maintain ecosystems and ecosystems services.	15.1, 15.4, 15.9
→16	International agreements and national strategies through programs such as water rights can promote the development of peaceful societies and institutions with meaningful roles.	16.6, 16.7, 16.a,
→17	Without the implementation of sustainable development for water, sustainable development in many other sectors would fail.	17.1, 17.7, 17.9

## **MONITORING AND EVALUATING PROGRESS**

Measurable indicators with clear links to each target need to be developed. Baseline conditions determined with local and global data need to be established. A system for updating the indicators periodically through national and international reporting systems is also needed. New metrics based on Earth observations and novel data should be developed. Specific indicators which could take advantage of Earth observations include measures of water use efficiency, natural water capital and water quality inferred from the optical properties from water quality phenomena such as high sediment concentrations and algal blooms. Information on the frequency and intensity of short-term events affecting sustainability (i.e. flooding) should also be monitored. Regular geospatial data from satellites and GIS systems should be more effectively exploited for this goal.

The science community supports this goal but recommends that steps be taken to strengthen its credibility through the more effective use of science and state-of-the-art data and information systems and innovative policy programs.

## **SUMMARY**

Steps should be taken to strengthen the credibility of goal 6. Some targets are, or at least seem to be, overly ambitious. Three targets could be merged, one could form part of Goal 10 and another could form part of Goal 16. In addition the water quality target could be broadened. Measurable indicators with clear links to each target need to be developed. Baseline conditions need to be established using national data supplemented by global data sets. New metrics based on Earth observations and novel data should be developed.

## GOAL

# 7

## ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE, AND MODERN ENERGY FOR ALL

*Diana Ürge-Vorsatz, Luis Gomez-Echeverri, Asun Lera St. Clair,  
Felicity Jones, Peter Graham*

### PREAMBLE

This goal is feasible by and large. However, a clearer definition of “access” will be key to it being successful. Meeting which energy services and at what level is considered adequate “access”? Without being specific about this, the goal risks becoming weak and subject to loopholes. For an optimal outcome, access should be defined by specifying both the types and the level of energy services all people should have access to, rather than a physical quantity of energy supply.

With regard to the level of ambition, the goal as phrased today and interpreted as covering energy services as suggested below is feasible, although it would require major efforts. Several important, reputable research efforts, including the IIASA Global Energy Assessment and the World Energy Outlook of the IEA, have demonstrated that it is feasible to reach universal access to modern energy services for all by 2030 and that there are multiple pathways to do this.

The goal adequately addresses the economic ('affordable'), social ('reliable' and 'modern') and environmental ('sustainable') aspects of energy.

### REFINING TARGETS

Targets 7.1, 7.2 and 7.3 are all relevant and required, but need greater quantification/specification to ensure they have the desired impact.

We also suggest the introduction of an additional target that we think is needed to ensure the ambitions of the goal are met, and to ensure the meeting of other SDGs that are linked with SDG 7:

7.4 “Ensure by 2030 access to all to energy carriers and/or energy consuming devices that keep indoor air and other local pollution levels within safe limits.”

This fourth target is needed to ensure the clean and safe nature of energy usage. This primarily refers to cooking (and heating) with traditional biomass that is presently responsible for millions of deaths and DALYs (Disability-Adjusted Life-Years), women and children being most affected. All energy uses must become clean, if the other SDGs are to be met. A new target is proposed on energy usage, and it is recommended that targets 7.1, 7.2 and 7.3 be further specified. Targets 7a and 7b would not be required.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
7.1	<p>To ensure that the ambition level of this goal is adequate for reaching the other SDGs, it is important that the definition of access for this goal covers at least the following energy services: nutrition, sanitation and hygiene, illumination, thermal comfort, access to communication and information, connectivity to enable conducting productive activities and basic social comfort.</p> <p>It is important that the type and level of energy services to be covered under Target 7.1 is specified clearly and in detail. This is a more adequate and useful way of specification than giving numbers for energy quantities as these can be extremely variable by location and culture, and also misses the key point that the efficiency at which the energy is being used determines the level of services enjoyed from the same energy quantity in a fundamental way.</p>	<p>Specify as follows:</p> <p>By 2030 ensure universal access to affordable, reliable, and modern energy sources <i>that ensure adequate levels of energy services to meet basic productive household and community needs.</i></p>
7.2	<p>A more quantifiable approach would improve measurability, and align with the findings of the Sustainable Energy For All (SE4All) Global Action Agenda.</p> <p>Renewable energy technologies have shown substantial cost reduction in recent years and many renewables technologies are now approaching maturity due to their widespread deployment. At least 144 countries already have renewable energy targets in place. This suggests that a more ambitious framing of the goal is now appropriate.</p>	<p>Specify as follows:</p> <p>Double the share of sustainably produced renewable energy in the global energy mix by 2030</p>
7.3	<p>The term "energy efficiency improvement" is vague and can be interpreted several ways.</p> <p>Several major research efforts, such as the IIASA Global Energy Assessment, and the IEA's Energy Efficiency Market Report have shown that this is a feasible target, although the ambition level would need to be strengthened to also meet Goal 13. The 2.9% figure is from the IEA and also from the Global Tracking Framework of SE4ALL being prepared by the World Bank, and is NOT by 2030, but needs to be achieved from today (i.e. the shortest feasible close future).</p> <p>Breaking this goal down to sectoral goals in some key sectors such as buildings, transport, lighting and appliances would be important – for example specifying that new buildings need to be nearly zero net final energy consumers in the close future will set an ambitious but achievable target for this sector.</p>	<p>Specify as follows:</p> <p>Double the global annual rate of improvement in energy intensity of GDP, to 2.9%/year.</p>
7.a	If targets 7.1 – 7.3 are made more specific as suggested above, these are redundant and can be deleted	Delete
7.b	If targets 7.1 – 7.3 are made more specific as suggested above, these are redundant and can be deleted	Delete

**Some additional aspects that could be considered in a comprehensive set of targets are:**

- Ensure by 2030 access to all to energy carriers and/or energy consuming devices that keep indoor air and other local pollution levels within safe limits.
- It is also recommended that concrete national targets are elaborated with regard to the renewables and energy intensity improvements. It is best if these reflect the global target as closely as possible rather than based on burden sharing schemes or national goal-setting processes.

## LINKAGE WITH OTHER SDGs

The related science underlines that while energy is not needed per se, it is a vital “resource” that is required to meet other SD goals: primarily health (SDG 3), poverty eradication (SDG 1), climate change (SDG 13), but also end hunger/nutrition (SDG 2), education (SDG 4), gender equality (SDG 5), clean water and sanitation (SDG 6), productive opportunities (SDG 8), cities (SDG 11), infrastructure/industrialization (SDG 11) and sustainable consumption (SDG 12). Without meeting SDG 7, it is impossible to meet these other goals.

In some cases however, SDG 7 is subject to the checks and balances provided by other goals. For instance, the renewable energy projects required to deliver Target 7.2 must be carefully sited to avoid negative impacts on local terrestrial and/or ocean biodiversity (SDG 14 and 15).

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

GOAL	LINKAGE	TARGET
→1	Access to basic energy services is a requirement for poverty eradication.	1.4, 1.5
→2	Agriculture and energy at times compete for land – for instance in biomass feedstock production.	2.3, 2.4
→3	Air pollution from traditional biomass usage is a prime cause of premature deaths, particularly amongst women and children.	3.9
→4	Basic energy services are required to deliver education.	4.1, 4.3, 4.6
→5	Women’s use of traditional biomass methods for cooking puts their health at risk.	5.4
→6	Conventional forms of power generation have substantial water requirements.	6.1, 6.3, 6.5, 6.6
→8	The energy intensity of economic growth needs to be reduced.	8.1, 8.3, 8.4, 8.5
→9	Resilient grid and transport infrastructure across borders is required to ensure access to energy for all, and to maximize energy efficiency.	9.1, 9.2, 9.4, 9.5, 9a
→10	Distributed generation brings potential to genuinely bring energy for all, including in remote rural areas, thus reducing inequalities.	10.1
→11	Cities require careful energy planning – especially to minimize combustion-driven air pollution for residents.	11.1, 11.2, 11.6, 11.b
→12	Renewable energy and energy efficiency are a key part of a future in which there is sustainable consumption.	12.1, 12.2, 12.8, 12.a, 12.c
→13	The carbon-intensive energy sector is a key driver of climate change.	13.2, 13.3, 13.a
→14	The ocean space can be used for marine energy (e.g. offshore wind).	14.2, 14.5, 14.7, 14.c
→15	Energy projects need to be carefully sited and the energy mix needs to be carefully planned to avoid a negative impact on ecosystems and biodiversity.	15.1, 15.2 , 15.9
→16	Transparent and corruption-free regimes are key to delivering energy services affordably	16.1, 16.5, 16.6, 16.7, 16.B
→17	Finance is required for capex-heavy energy infrastructure investments, Free trade will help to ensure affordability.	17.3, 17.5, 17.6, 17.7, 17.8, 17.10, 17.12, 17.14, 17.15, 17.16, 17.19

## **MONITORING AND EVALUATING PROGRESS**

A substantive amount of scientific work has gone into developing metrics and indicators to monitor access to modern energy services, improvements in energy efficiency, the share of renewable energy in the global energy mix and clean energy use. All these indicators are tools to monitor the targets of SDG 7. There are also commonly used metrics tracking renewables' progress, energy intensity improvements, and to measure energy poverty. More work is needed in developing ways to monitor and to develop data collection systems producing comparable data. Another crucial issue with monitoring and evaluation is the establishment of the right baselines, such as those for energy efficiency and renewables improvements. It is also crucial to introduce national and sectoral targets for both implementation and monitoring & evaluation purposes. The Global Tracking Framework of SE4ALL is also in the process of developing a system of tracking and monitoring progress on the three targets of SE4ALL to be reached by 2030: reaching universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and doubling the share of renewable energy in the global energy mix.

## **SUMMARY**

SDG 7, while striking a good balance between levels of ambition and feasibility, suffers from poor definitions, especially of the key concept of "access". Better quantification of targets is needed to ensure that progress is measurable and potential loopholes are closed. The goal also neglects the issue of indoor and local pollution from energy use, and a suggested additional target would go a long way in addressing that concern. Data collection systems for this goal still need to be developed, and the right baselines to measure progress need to be established.

## **REFERENCES**

- [http://www.iiasa.ac.at/web/home/research/researchPrograms/Energy/IIASA-GEF-UNIDO\\_Access-to-Modern-Energy\\_2013-05-27.pdf](http://www.iiasa.ac.at/web/home/research/researchPrograms/Energy/IIASA-GEF-UNIDO_Access-to-Modern-Energy_2013-05-27.pdf)
- IEA (2014) "Energy Efficiency Market Report 2014" World Energy Outlook International Energy Agency, Paris.
- Pachauri, S and Spreng, D. 2011. and Measuring and monitoring energy poverty. Energy Policy Volume 39, Issue 12, December 2011, Pages 7497–7504
- REN21 (2014). Renewables 2014 Global Status Report. Available online: [http://www.ren21.net/Portals/0/documents/Resources/GSR/2014/GSR2014\\_KeyFindings\\_low%20res.pdf](http://www.ren21.net/Portals/0/documents/Resources/GSR/2014/GSR2014_KeyFindings_low%20res.pdf) [Accessed 19 Nov 2014].
- The Secretary-General's High-Level Group on Sustainable Energy for All (April 2012). Sustainable energy for all: A Global Action Agenda. Available online: <http://www.un.org/wcm/webdav/site/sustainableenergyforall/shared/Documents/SEFA-Action%20Agenda-Final.pdf> [Accessed 19 Nov 2014].

## GOAL

# 8

## PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL

Pablo Muñoz, Chuluun Togtokh

### PREAMBLE

Economic growth mostly refers to changes in Gross Domestic Product (GDP). This metric is commonly used as a proxy for a country's material living standards (also referred to as 'economic welfare'). Moreover, changes in GDP (or economic growth) are understood to reflect changes in welfare. GDP also has the potential to explain and forecast the level of employment, since fluctuations in economic output induce changes in labor. Other conditions that make economic growth more meaningful are 'inclusiveness' (benefits also reaching out the most vulnerable sectors of a society in terms of income) and 'sustainable' (respecting the environmental, economic, and social sources – or wealth – that determine growth possibilities in the long run, and more broadly human well-being). However, economic growth largely disregards the environmental dimension (the depletion of natural resources would, for example, record positive changes in GDP); strong trade-offs between economic growth and the environment should therefore be expected.

Recent science suggests that inclusiveness (full and productive employment and decent work for all are key to economic inclusiveness) is critical for sustaining economic growth. As such, the goal could be better worded as "*Promote sustainable and inclusive economic growth ...*".

### REFINING TARGETS

Many groups exist within the 'informal economy', particularly in developing countries, and these are not mentioned in the SDG 8 targets. This includes the millions of people living in slums, who all require stable jobs, social security and pensions. People moving from rural to urban areas also face serious problems of inclusiveness within the economy. This issue is addressed by the reframing proposed for Target 8.8.

Only Target 8.1 is quantified and even then the value used (7%) appears arbitrary. The rate of growth should be adjusted to take account of inequality to capture aspects of inclusiveness – this is reflected in the changes proposed for Target 8.1. Economic growth should not come at the expense of a country's 'inclusive' wealth, which encompasses multiple determi-

nants of well-being, namely environmental, human & produced capital.

There are important synergies between growth and employment. The key issue concerns the trade-offs to be expected in achieving economic and environmental targets. Growth is driven by energy and materials (fossil fuels, minerals, biomass, water, etc.) – decoupling the economy from the environment is likely to require substantial structural changes and innovation to improve resource use efficiency, as well as a change in consumer preferences. Without radical shifts in these areas, growth would threaten other goals aiming to protect the environment or reach climate targets.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
8.1	The target should be inclusive and also aimed at reducing income inequality. The rate of economic growth should take into account that the inclusive wealth of the country (including natural capital) is not declining.	Sustain per capita economic growth and reduce income inequality in accordance with national circumstances as well as non-declining wealth, and in particular ...
8.2	Incorporating resource efficiency or resource use efficiency would address environmental sustainability.	Achieve higher levels of productivity and resource efficiency of economies ... <i>or</i> Achieve higher levels of productivity and environmental innovation of economies ...
8.3	The target is not relevant in this form because it cannot be measured.	Merge with targets 8.2. and 8.4
8.4	This target is well suited for sustainable development.	... in accordance with the 10-year framework of programmes on sustainable consumption and production, and promote innovations and structural changes with developed countries taking the lead The target could be combined with SDG 12.
8.5	This target is well suited for sustainable development.	It would be better to reorder the position of this target such that it becomes the second target of SDG8 to highlight inclusiveness (i.e. target 8.2)
8.6	The target needs quantifying.	By 2020 halve the proportion of youth not in employment, education or training
8.7		The target could move to SDG 10
8.8	Need to include people working in the informal sector of the economy and whose living conditions (not only in terms of pension and social benefits) are unacceptable.	Protect labour rights and promote safe and secure working environments of all workers, especially those engaged in the informal economy with precarious employment conditions, including migrant workers, and in particular women migrants
8.9	Sustainable tourism, which promotes local natural-cultural integrity and diversity, is an important aspect of global sustainability.	By 2030 devise and implement policies to promote sustainable tourism which creates jobs, promotes local culture and products, understanding and stewardship of local ecosystems
8.10	No comment.	
8.a	Land-locked Developing Countries should be included.	Increase Aid for Trade support for developing countries, particularly LDCs and LLDCs, including through the Enhanced Integrated Framework for LDCs
8.b		Merge with target 8.6

## LINKAGE WITH OTHER SDGs

The issue of inclusiveness of economic growth in this goal has strong links with income inequality in SDG 10. Interestingly, an income inequality index/target was proposed independently by reviewers of this goal and SDG 10 as the (average income/share) ratio of the top 10% to bottom 40% of the population. This goal also has strong links with SDG 7 from both the inclusiveness and greenness points of view, especially because energy is the basis for economic growth (affordability and access is critical for inclusiveness, while increasing energy efficiency and the share of renewables is critical for greenness). Global partnership (SDG 17) is strongly linked with sustainability in this goal.

This goal also has strong synergies with SDGs 1 and 2, as well as strong trade-offs with SDGs 13, 14 and 15. The key challenge may be to advise national governments on how to achieve the socio-economic goals (e.g. SDGs 1, 2, 8 and 10), while addressing the environmental dimension (strongly represented in SDGs 13, 14 and 15).

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→1	Inclusive economic growth should aim at poverty eradication as one of its essential goals.	1.1, 1.2, 1.5
→2	One of the outcomes of sustainable and inclusive economic growth is food security.	2.1, 2.3, 2.a
→3	Expected longevity at birth can be a measure of quality of life as a main outcome of sustainable and inclusive economic growth.	3.2, 3.8, 3.d
→4	Education and skills can be understood as increases in human capital and productivity that improve the growth possibilities of a country. Economic growth should enforce sustainability and inclusiveness through feedbacks.	4.3, 4.4, 4.7
→5	Economic inclusiveness also addresses gender issues.	5.4, 5.a, 5.b
→6	Increases in production (growth) can increase water pollution, while water use efficiency can facilitate growth. Protection of natural resources may inhibit production and growth. Water is critical for sustainability of economic growth.	6.a, 6.4, 6.6
→7	Reducing the cost of accessing to energy could benefit growth. Energy and economic growth are interlinked because energy is the engine of economic development. Sustainability and inclusiveness of economic growth can be measured by a reduction in greenhouse gas emission and an increase in sustainable energy use by all. Achieving Target 7.3 could help make economic growth greener.	7.1, 7.3, 7.a
→9	Developing infrastructure (e.g. roads) facilitates production processes. Inclusive industrialization should promote decent jobs. Upgrading infrastructure should improve resource efficiency and to decouple the economy from the environment.	9.a, 9.4, 9.5
→10	Inclusiveness of economic growth can be measured by income inequality.	10.1, 10.3, 10.b
→11	Most of the future world economic growth will take place in urban spaces. Preparing cities for the new challenges will facilitate sustainable and inclusive economic growth – and vice versa, growth must play central role in urban planning and development.	11.1, 11.2, 11.4
→12	Sustainable production and consumption is key for sustainable and inclusive economic growth. All targets oriented towards increasing resource efficiency should contribute to decoupling the economy from the environment (Target 8.4) and promoting growth.	12.1, 12.2, 12.a
→13	Sustainable economic growth should focus on increasing carbon productivity in order to reduce greenhouse gas emissions.	13.a, 13.1, 13.b
→14	Sustainable economic growth should minimize the degradation of oceans and marine resources and contribute to long-term economic growth.	14.1, 14.4, 14.7

→15	Sustainable economic growth should minimize the degradation of terrestrial ecosystems. While the impact might be negative in the short term, synergies are expected over the long term.	15.1, 15.9, 15.a
→16	Promoting the development of resilient societies and institutions builds a country's social capital and improves capacities for sustainable development.	16.5, 16.7, 16.8
→17	International agreements and national strategies through programmes on sustainable development can bring about important spillovers to promote inclusive growth such as technology transfer and financial resources.	17.7, 17.9, 17.16

### MONITORING AND EVALUATING PROGRESS

How economic progress is measured is important. There is a growing global consensus that GDP does not provide a good measure of overall economic performance. This message was supported in the Synthesis Report of the UN Secretary-General launched in December 2014 (United Nations 2014), which called for going “beyond GDP and account for human well-being, sustainability and equity”.

Key indicators for progress include income inequality and wealth. Targets on decent work should include indicators capturing people with low pension and social security. Carbon productivity (GNI per capita/ CO2 per capita) is an excellent indicator for ‘greenness’ of the economy. Productivity can also be improved through material flows, renewable energy use and increased energy use efficiency with implementation of best available technologies. The idea of ‘sustained growth’ should be complemented by a measure of wealth (or inclusive wealth as it is also called - see UNU-IHDP and UNEP). This is important in order to understand whether or not the increase in GDP is at the expense of the resource or capital base of a nation. The resource or capital base includes: land, forest, minerals, fossil fuels (or more generally natural capital); buildings, roads, machineries (produced capital); education, skills, health (human capital) and institutions, personal networks (social capital).

Proxy indicators are needed for the informal economy (if the changes proposed for target 8.8 are accepted) that measure the ‘number of people’ engaged in this sector and their ‘contribution as a percentage of GDP’.

Income inequality is a key indicator. Using the ratio of average income of the top 10% to average income of the bottom 40% would ensure consistency with Target 10.1.

A simple Sustainable Development Index (SDI) index would be useful for integrating economic, social and environmental sustainability across human, societal and global scales, and capturing the principles of universality, integration and transformation for all developed and developing nations (Chuluun 2011, 2012). Adjusting growth by inequality should be part of the indicators. The economic index component indi-

cates inclusive economic growth, consisting of GNI/capita and income inequality; the social index component is defined by expected longevity at birth as in the HDI (it is only quality index in the HDI compared to other economic growth per capita and education indexes of the HDI); and the environmental index component is defined by carbon footprint (CO2/capita). The SDI would help tackle two global systemic risks: increasing greenhouse gas emissions and increasing income disparity. Using an integrated SDI such as this for ranking all countries would increase the synergy of the SDGs.

### SUMMARY

Recent science suggests that ‘inclusiveness’ is critical for sustaining economic growth. The goal and targets should be reframed to reflect this. There is a growing global consensus that GDP is not a good measure of overall economic performance; income inequality should be included in any measurement of inclusive economic growth. A new sustainable development index is proposed which integrates the economic (composite of GDP per capita and income inequality), environmental (CO2 per capita) and social (expected longevity at birth) dimensions.

### REFERENCES

- Chuluun T., 2011. *Time to stop celebrating the polluters*. Nature: World View, 479:269. doi: 10.1038/479269a.
- Chuluun T., 2012. *Greening the Human Development Index: Accounting for all pillars of sustainability*. Outreach: a multi-stakeholder magazine on climate change and sustainable development. 27 March 2012. ([www.stakeholderforum.org/fileadmin/files/OUTREACHINT3DAY2.pdf](http://www.stakeholderforum.org/fileadmin/files/OUTREACHINT3DAY2.pdf).)
- United Nations 2014. *The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet. Synthesis Report of the Secretary-General On the Post-2015 Agenda*. United Nations: New York.
- UNU-IHDP & UNEP. *Inclusive Wealth Report 2014. Measuring progress toward sustainability*. Cambridge: Cambridge University Press. (<http://mgiip.unesco.org/wp-content/uploads/2014/12/IWR2014-WEB.pdf>)

GOAL

9

## BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

*Arnold Tukker*

### PREAMBLE

This goal addresses the three dimensions of sustainable development. Together with SDGs 11 and 12, this goal aims to ensure that the global economic system is sustainable in terms of resource use and associated impacts (environmental sustainability), benefits the broadest number of people in society and supports their well-being and development (social dimension), and is affordable, and obviously delivers economic output serving human needs (economic dimension). Infrastructure has a long lifetime. It drives needs and flows of energy and materials over long periods, which will in turn create environmental pressures and impacts over long periods. Investment in non-sustainable infrastructure may cause lock-in for decades with (often powerful) investors defending its use in order to recover investments. This goal defines infrastructure in a broad sense, including ICT, financial services and scientific research, which are essential for fostering economic and social development.

### REFINING TARGETS

This goal is underlain by targets that prioritize action in certain areas. The targets are all relevant but would all benefit from clearer wording, better quantification and improved connectivity to other goals. The main concern is that the concept of 'sustainable infrastructure' is not defined. An additional concern is that, as is the case for most of the SDGs, this goal is not quantified and lacks target dates. This could be delivered by well-selected indicators, as all targets will need an indicator framework to articulate actions necessary to achieve the target and the interactions between different targets under different SDGs.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
<b>9.1</b>	Although the wording points at infrastructure that is environmentally sound and resilient to disasters, this leaves things still quite unspecified.	Define 'sustainable infrastructure' more specifically. Make the target time bound and quantitative.
<b>9.2</b>	Emphasis on industrial development alone may not be the right way forward, with offering results/services rather than products now widely seen as the best way forward to create added value and a circular economy.	Emphasize service development
<b>9.3</b>	A good system of financial services is key to economic activity and development, but the target is vague on what this means operationally.	Make the target time bound and quantitative.
<b>9.4</b>	The target is vague, not quantified, not time-bound, and misses in full the point that leapfrogging, next to upgrade/retrofit, can be a key strategy for achieving sustainable infrastructure, particularly for LDCs that have limited infrastructure in place.	Emphasize the potential for leapfrogging (e.g. creating an urban infrastructure and fabric that inherently supports public transport rather than automotive transport – compare Hong Kong with other Asian cities). Do not mention retrofit only. Make the target time bound and quantitative.
<b>9.5</b>	This is an important target as scientific progress is key to sustainability; quantification ('x%') still appears to need agreement.	Make the target time bound and quantitative. An often mentioned target is that R&D should be 3% of GDP.
<b>9.a</b>	Sustainable infrastructures is undefined. No targets in time or support levels.	Make the definition of sustainable infrastructure smart. Make the target time bound and quantitative.
<b>9.b</b>	Some overlap with 9.5.	Merge with target 9.5.
<b>9.c</b>	No target level.	Make the target time bound and quantitative (e.g. 90% of the population below 50 years of age to have access to ICT by 2025).

## LINKAGE WITH OTHER SDGs

This goal has several potential synergies with the other SDGs. These synergies vary according to the types of infrastructure addressed (e.g. water/sanitation, cities). The three most important links between this goal and targets under other SDGs concern SDGs 11, 12 and 13.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

GOAL	LINKAGE	TARGET
→1	Infrastructure in a broad sense (as defined here) can support poverty reduction and access to natural resources and technology.	1.2 & 1.4
→2	Infrastructure, including scientific research can enhance agricultural productivity and sustainable food production.	2.3 & 2.4
→3	Indirect links via enhancement of scientific research.	
→4	Inclusive sustainable industrialization requires access to education and skills for entrepreneurship.	4.3 & 4.4
→5	No direct link.	
→6	Sustainable infrastructure and industrialization will include water and sanitation infrastructure, and enhancing water use efficiency.	6.4 & 6.a
→7	Energy infrastructure is a specific form of infrastructure.	7.2, 7.3 7.a & 7.b
→8	Infrastructures largely determine the direct use of resources for capital investment, and the indirect use of resources for maintenance, and thus whether a decoupling of economic growth and environmental degradation is possible. Access to financial services overlaps with access to banking.	8.1-3, 8.4 & 8.10
→10	Infrastructure includes transport infrastructure which determines reduction of transport costs.	10.5 & 10.c
→11	Infrastructure includes housing, transport and spatial planning, and determines the sustainable use of resources, including building materials.	11.1, 11.2, 11.6, 11.7, 11.b & 11.c
→12	The organization of infrastructure largely determines consumption and production structures and so relates to almost all targets under SCP.	12.2, 12.3, 12.4, 12.5, 12.6 & 12.a
→13	Adaptation to climate change requires investment in resilient infrastructure (e.g. adaptive measures should be environmentally sustainable, with low energy and material use)	13.1 & 13.a
→14	No direct links	
→15	No direct links	
→16	No direct links	
→17	Like for all SDGs, implementation is key – so there is a strong relation with SDG 17, which lists measures facilitating implementation of SDGs in general.	

## **MONITORING AND EVALUATING PROGRESS**

Without clearer wording and better quantification for the targets, it will be difficult to monitor and evaluate progress. Potential indicators include a combination of policy response indicators, pressure indicators, environmental status/impact indicators, and information about infrastructure stocks. As outlined in the UN System of Environmental and Economic Accounts, a combination of indicators on resource extraction and emissions, economic structure and relations (supply and use, and input-output tables), and economic, social and environmental stocks could be used to help identify the environmental consequences of infrastructure. Building upon current efforts of the research community, OECD, UN Statistical Division and others, leverage could be created for such a monitoring system. The contribution from the research community could be coordinated via Future Earth.

## **SUMMARY**

The targets under goal 9 all require clearer wording, better quantification and improved connectivity to other goals, especially SDGs 11, 12 and 13. Two of the targets need much work and two could be merged. 'Sustainable infrastructure' needs defining. Because this goal is not quantified and lacks target dates, refining the targets would improve the potential for monitoring and evaluating progress.

## GOAL



# REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES

*Richard Wilkinson, Deborah Rogers*

## PREAMBLE

There is a vast literature on all dimensions of inequality in economics, sociology, psychology, anthropology, public health, medicine, and biology, including studies on how inequalities developed and have increased over time and on consequences and impacts of inequalities. Research shows that economic inequality damages health, well-being and social cohesion, promotes status competition and consumerism, and increases violence. Inequality hampers poverty reduction, weakens economic growth, and compromises democracy.

The goal has neither qualitative nor quantitative endpoints. It would have been better to word this goal as: "*Minimize social, economic, political and educational inequalities within and between countries*".

The goal is unspecific, but the targets address all dimensions. The danger is that 'reducing inequalities' could be interpreted as reducing *social* inequalities, so avoiding confronting the income and wealth differences which are formative of other dimensions of inequality.

## REFINING TARGETS

The proposed targets are relevant but inadequately developed. Most are framed as activities rather than endpoints. Each needs revision to provide measurable targets. As currently stated, it would be impossible to tell whether the targets had been met. Apart from targets 10.1 and 10.c, the targets are not quantitative and as a result, cannot be measured. Recommendations are made for reframing six existing targets and including four new targets.

If target 10.1 is revised to include a measureable reduction of economic inequality, this target would be the most important for this goal because minimizing economic inequalities would help meet most other targets. Proposed new targets on collection of disaggregated data and on preventing illicit financial outflows are also essential.

By addressing economic inequalities within countries, target 10.1 is essential to progress on other targets as well as for SDG 1. Because of its centrality, target 10.1 must be articulated as precisely as possible so it is clear, easily measured, and stands as an ambitious target facilitating progress across the entire sustainable development agenda.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
10.1	Minimizing economic inequalities within and between countries would help meet most other targets by ensuring that they are inclusive, applying to everyone. The ratio of top 10% to bottom 40% is particularly variable and important to wellbeing.	By 2030 progressively achieve and sustain income growth of the bottom 40% of the population at a rate higher than the national average – <i>reducing the ratio of the income share received by the top 10% to the income share of the bottom 40% to less than 1.</i>
10.2	None	
10.3		Ensure equal opportunities for children and minimize inequalities of outcome, including <i>economic, social, political, health and environmental inequalities</i> by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and actions.
10.4	None	
10.5		Improve regulation and monitoring of <i>multinational corporations, global financial markets and institutions</i> and strengthen implementation of such regulations to <i>eliminate structural inequalities within and between countries.</i>
10.6		Ensure enhanced representation and voice of developing countries in decision making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions, and <i>enhanced democratic influence by citizens on economic and development policy and decisions within the work place.</i>
10.7		Facilitate orderly, safe, regular and responsible migration and mobility of people, including through implementation of planned and well-managed migration policies, <i>ensuring that all people can assert their interests without the barrier of illegal status, and ensuring shared international responsibility for refugees from climate change.</i>
10.a	None	
10.b		<i>Attain long term debt sustainability through coordinated policies of debt financing, relief, and restructuring, and encourage ODA and financial flows to states where the need is greatest, in particular LDCs, African countries, SIDS, and LLDCs, in accordance with their national plans and programs, to ensure that needs of the poorest citizens are met.</i>
10.c	None	

Some additional aspects that could be considered in a comprehensive set of targets are:

- By 2030 reduce inequalities between nations to less than a 10-fold difference between the richest and poorest 10% of nations in per capita income and carbon output
- Maximize well-being within environmental constraints through use of national policies that increase subjective and objective measures of wellbeing rather than GDP per capita
- Ensure financial resources for reducing inequalities by minimizing illicit financial outflows, corruption, tax avoidance and evasion

## LINKAGE WITH OTHER SDGs

This goal is related to all the other goals – in that no goal should be considered met unless it has been met equitably for all segments of the society. Moreover, inequality is *in itself* harmful because it leads to various social dysfunctions including lower social cohesion and increased violence.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→ 1	Studies have shown that redistribution and the reduction of inequalities is essential for poverty reduction. Growth without reduction of inequalities does not reduce poverty, and can even increase the impacts of poverty by raising prices.	1.3, 1.4, 1.a
→ 2	Hunger and food security are closely related to poverty, and thus to inequality. Reducing inequalities through land reform and other methods empowers people to meet their own needs for food.	
→ 3	Studies show that health and well-being are directly impacted by the level of inequalities in a society. Reducing inequalities gives great health and longevity benefits.	3.4, 3.5
→ 4	Inclusive and equitable education is both a consequence and a cause of reduced inequalities.	4.5, 4.b, 4.c
→ 5	Gender equality and empowerment of women is one manifestation of reduced inequalities, and is also greatly facilitated by the healthier identities and interactions of people in an economically thriving community.	5.1, 5.a, 5.c
→ 6	Access to sanitation and clean water are closely related to poverty, and thus to inequality. Reducing inequalities will empower people to ensure their own access to clean water.	6.a
→ 7	Access to appropriate energy sources is closely related to poverty, and thus to inequality. Reducing inequalities will empower people to ensure their own access to appropriate energy.	7.a, 7.b
→ 8	Inclusive economic growth, full employment, and decent work are both a consequence and a cause of reduced inequalities. Recent studies have shown that high levels of inequality can destabilize economies and block growth.	8.1, 8.5
→ 9	Infrastructure and industrialization need to be structured in such a way that they are inclusive and do not harm or leave out particular segments of society.	9.2, 9.a
→ 11	Cities and settlements also need to be structured in such a way that they are inclusive and do not harm particular segments of society.	
→ 12	Sustainable consumption will be facilitated by the move towards greater equality, because the desire to avoid slipping down the social ladder often promotes overconsumption for shows of status.	
→ 13	Reduced inequalities will empower more people to take needed steps to combat climate change, mitigate and adapt.	13.a, 13.b
→ 14	Reduced inequalities will empower local fishing communities to assert their rights and stop large-scale factory fishing by outsiders.	

→15	Reduced inequalities will empower local citizens around the world to promote sustainable local management of resources instead of large-scale extractive management.	
→16	Peaceful and inclusive societies, justice for all, and inclusive institutions are both a consequence and a cause of reduced inequalities. Neither is possible without the other.	16.1, 16.3, 16.5, 16.7, 16.8
→17	Data must be collected throughout all segments of the population and analyzed in disaggregated form to ensure targets are being met for everyone.	17.2, 17.4, 17.5, 17.7–17.12, 17.17, 17.18

## MONITORING AND EVALUATING PROGRESS

Funding participatory monitoring and accountability networks (see the UN's PM&A Consultation – [www.worldwewant2015.org/accountability2015](http://www.worldwewant2015.org/accountability2015)) to ensure all citizens can give feedback on progress would enhance monitoring and evaluation.

Data disaggregated by population subgroups (gender, ethnicity, social status) is needed to assess the scale of inequality and progress towards greater equality in each outcome. Data should be gathered by country and globally as follows: targets 10.1, 10.2, 10.3 (inequality indicators including Palma, GINI, and income share of top 1%); targets 10.1, 10.2, 10.3 (percent of income and wealth – by population deciles); target 10.2 (homicide rates, violence against women and other discriminatory violence including ‘hate crimes’); targets 10.3, 10.4 (review economic and fiscal laws, regulations, policies and programs to ascertain levels of structural discrimination); targets 10.3, 10.4 (review fiscal, wage, and social protection policies [housing, health care, educational, and pensions] for adequacy and discrimination); targets 10.3, 10.4 (representation by women and different population groups in local, national and international governing bodies); target 10.5 (review regulation and monitoring of global financial markets and institutions); target 10.5 (accurate data on tax avoidance and evasion); target 10.6 (review representation of developing countries in international economic and financial institutions); target 10.7 (review laws, regulations and policies concerning migration and legal status of peoples); targets 10.7, 10.a (migration and legal status of peoples in relation to employment, income, deprivation, discrimination); target 10.b (aid and financial flows to LDCs, African countries, SIDS, and LLDCs); and target 10.c (transaction costs of migrant remittances).

New metrics are needed in the following areas: human well-being (all dimensions, including physical, emotional, environmental, social, political, and economic); discrimination (social, economic, environmental, legal, penal and political); life expectancy inequalities (differences in life expectancy between top and bottom deciles or quintiles of income).

## SUMMARY

SDG 10 is unspecific but the targets address all dimensions. The goal has neither qualitative nor quantitative endpoints. The proposed targets are relevant but inadequately developed. Recommendations are made for reframing six existing targets and for adding four new targets. New metrics are needed in the following areas: human well-being, discrimination and life expectancy inequalities.

# MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

*Angel Hsu, Susan Parnell, Roberto Sánchez-Rodríguez*

## PREAMBLE

The science behind the urban goal draws from a wide range of disciplines including demography, economics, climate science, ecology, health, engineering, planning and the humanities. Human settlement is now overwhelmingly urban and urbanization is likely to persist and intensify, with cities commonly seen as potential drivers of, or barriers to, sustainable development. Urban infrastructure and residents will both drive consumption and increase demand on global resources. The increasing dominance of urbanization impacts across all dimensions of global change and makes intervention at the urban scale imperative to achieve sustainable development. The complex social, cultural, economic, environmental, technological, physical, and political realities of urban life require stronger city-focused institutions than ever before, implying some devolution of power from nation states.

The proposed 'urban' goal is ambitious because it introduces a sub-national scale of intervention and requires spatially targeted planning and action across scales of government. It also implies integrated urban management across diverse sectors such as transportation, health and public finance. The goal is likely to face both political and operational challenges because of conflicts of interest but also as the data and funds necessary for implementation will be hard to identify, coordinate and/or directly link to development interventions. This, in combination with the complexity of forces that determine urban development outcomes, suggests that the goal may not, immediately, meet all expectations of inclusion, safety, resilience and sustainability. One of the difficulties with the goal is that there are, as yet, no standardized metrics for these objectives and the SDG process will only introduce a limited number of urban targets and indicators for what is a huge and complex domain in which states are one of many actors alongside the private sector and citizens.

The current framing of the goal is broad and speaks to all dimensions of sustainable development. Such an inclusive approach is appropriate, as cities have been shown to be the pathways to social, economic and environmental development. However, there is possible tension in the wording of the goal that deals with overlapping and possibly contradictory aspira-

tions of inclusion, safety, sustainability and resilience. This, plus the different meanings that are attributed to each of these ideals by both scholars and practitioners, may dilute the clarity and potency of goal 11.

## REFINING TARGETS

The focus on cities as a spatial nexus is a clear acknowledgement of the linkages between the three dimensions of sustainable development and the targets appropriately cover all three dimensions of sustainable development. However, the targets neglect attention to the institutional dimension (especially local government and land and finance management capacity) that is critical to meet other targets, especially in the developing world where urban challenges are greatest and institutions are weakest. The targets also lack a specific mention of social wellbeing and the need to reduce intra-urban inequality and poverty, and to improve urban health. Indicators or targets related to ICT or connectivity are absent. Jobs and the urban economy are not given enough attention. Earlier OWG framing of SDG 11 included the idea of productivity, and it may be worth reinserting this cities' central role as economic engines of national development and revenue generation and global finance.

Enormous differences in the challenges facing cities and the resources available to deal with them mean that the principles of universality, integration and transformation will have to be realized differentially within and across nations. Country and city specific targets and indicators will need to be agreed in a wider framework of reporting on SDG 11.

From the perspectives of cities, there are significant synergies among the proposed targets but the development of these synergies requires attention to multidimensional and integrated urban governance and to promoting collaboration between states and civil society. Significant areas include the focus on access to affordable housing, basic services, reduce slums (11.1), affordable transport systems (11.2), reducing the adverse per capita environmental impacts of cities (11.6), reducing the number of deaths and economic losses caused by disasters (11.5), and provide access to green and public spaces (11.7) depend on inclusive and multidimensional planning (11.3) and target 11.b.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

Key indicators to monitor progress relevant to SDG 11 were identified in OWG 13 and assessed by the SDSN in December 2014. This provides a useful basis for refining the targets and specify the indicators and monitoring framework for this goal.

TARGET	COMMENTS	RECOMMENDATIONS
11.1	<p>This target builds on MDG7/11 and is important for the focus on the right to shelter, which was a major success negotiated at Habitat 11. It is a broad and ambitious target, but lies at the core of the urban challenge.</p> <p>Monitoring this goal required disaggregated data including by age and gender, which is difficult or impossible to obtain, especially in those countries that are facing the biggest challenges.</p> <p>Given accumulated shelter and service deficits and the projections of urban growth in developing countries, it is too ambitious to expect universal access by 2030.</p>	<p>It would be preferable to have nations define realistic institutional improvements at the city scale and in national urban development plans and budgets.</p> <p>Some continuity with established MDG 7/11 indicators would be sensible and alignment with indicators related to the provision of urban services would be important.</p>
11.2	<p>The target addresses social, economic and environment aspects of development and is relevant across rich and poor cities.</p> <p>Given political, fiscal and institutional obstacles, meeting the universal target by 2030 is very ambitious.</p> <p>Differentiated indicators are difficult to obtain in many developing countries, especially at the urban scale.</p>	<p>It might be preferable to define the targets in terms of a percentage improvement of the population serviced by safe and affordable public transport systems by 2030, with specific targets set out at the city scale and in national urban development plans and national and sub-national budgets.</p> <p>Changes in law (and enforcement) could also stimulate reaching these targets.</p> <p>Indicators should not only focus on major urban areas but also include urban population living in towns with a population under 250 000 inhabitants.</p>
11.3	<p>Data may be difficult to obtain at the urban level and indicators may not be relevant at the national level.</p> <p>A more specific focus on local state capacity, appropriative rights systems for sustainable urban management and tax and budgetary capacity would be better.</p> <p>More attention needs to be given to non-state actors who control urban settlement, development and management, including local government, traditional authorities, the private sector and informal landlords.</p>	<p>Focusing on institutional indicators of sustainable human settlement planning and inclusive urbanization must be done at various scales and may be nationally co-ordinated, for example in law, budgets or in the development and execution of national urban development budgets and plans (where regulatory reform, specific targets on shelter, basic services, transport and other nationally defined SDG targets are set).</p>
11.4	<p>This target is defined in very general terms that do not make explicit the relevance of the urban scale or role of municipalities in protecting cultural and natural heritage.</p> <p>The issue of the role of public space in the city is not addressed by the focus on urban cultural and natural systems.</p> <p>Improved protection of urban cultural and natural heritage will be exceptionally difficult to monitor outside of nationally determined indicators and specific powers and resources for local government.</p>	<p>It may be possible to modify the Singapore Biodiversity index</p>
11.5	<p>Disasters are not defined.</p> <p>It would be helpful to define the desired percentage reduction of deaths, affected people as well as of economic losses.</p>	<p>Disasters are not exclusively major events, they must include exposure to systemic risk in the city (such as polluted water). It would be important to separate the percentage of death and affected people from the percentage of economic losses. Economic losses in developing countries do not reflect the extent of damages caused by disasters in developing countries.</p> <p>Overlap with target 11.b</p>

## 11.6

There is some possible overlap with SDGs 6 and 7, if the selected indicators are defined at the city scale and to reflect urban dynamics of pollution and resilience. But there is not enough attention to urban environmental health, food security or biodiversity. Per capita indicators may also have the effect of overlooking or minimizing inequities in exposure or environmental burdens within urban areas.

## 11.7

This is a very ambitious target. Universal access is not realistic by 2030 in most developing countries, particularly given their current deficit.

### 11.a

There is some overlap with target 11.3

### 11.b

It would be important to define realistic indicators for this target. Part of this target duplicates 11.5.

### 11.c

This is an important target but the focus on using local materials over-simplifies the urban challenges identified in reaching other targets that are part of SDG 11 and puts too much focus on materials over key urban social, ecosystem or economic issues. The focus on LDCs does not consider extreme poverty in middle income countries – e.g. India.

A target that focusses on the Means of Implementation (such as the zoning scheme and local budget for maintaining green and open space) would be a better indicator than the percentage of unbuilt land. Other indicators could include distance from public green space or area of public space per capita.

Redefine and integrate the target to deal explicitly with planning, finance and the role of the sub-national state in urban development.

Avoid duplication with target 11.5 and define realistic indicators based on data that is available at the city scale. Include indicators that reflect the quality of policies or plans, rather than just a quantitative measure.

Remove the rural bias in global development assistance so that the percentage of aid reflects the urban/rural composition of recipient countries.

Build local capacity to build, plan and manage cities in line with SDG 11

### SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

Key goals that intersect with SDG 11 are 1, 3, 6, 7, 8, 9, 10, 13, and 16.

Progress on all other goals will have a positive impact in cities, especially as over the time period of the post 2015 focus, an increasing proportion of the world will live in urban areas. Similarly, the targets that relate to planning and integration/coordination between urban/rural and urban/national scales will have an overarching impact on many of the other goals' targets, including on poverty, health, the environment and climate change.

## MONITORING AND EVALUATION PROGRESS

The monitoring of this goal may be challenging as it will require access to disaggregated data and information which is challenging in some countries; and indicators at the urban level may not be relevant at the national level. The SDSN report on indicators provides a useful basis to monitor progress but needs to be tested in specific cities to ensure that they are available and practical indicators.

New metrics are needed for institutional development for target 11.3 for inclusive and multidimensional planning and management; for target 11.b to measure the efficiency of inclusive and equitable policies towards adaptation to climate change and resilience to disasters; efficiency of regional development planning linking urban, peri-urban and rural areas.

New metrics are also needed to monitor and evaluate the suggested targets using multidimensional and multi-scale planning budgeting and enforcement instruments, alternatively, to accommodate the vast differences that will be evident in addressing this goal, national proxies such as national urban development plans that embrace the values of SDG 11 should be used.

Indicators of efficiency and impact of developing local government capacity need to be developed and could include a comprehensive and transparent system of land use management and the ability to collect, spend and distribute taxation at the sub-national scale.

All sustainable development goals could and ideally should be reported on at the sub-national scale, as urban and rural development imperatives are different. Further, cities are a complex nexus that needs dedicated institutions and interventions to achieve sustainable development, over and above (not instead of) giving attention to the urban imperatives for achieving the development priorities set out in the other goals.

In addition to specific SDG 11 indicators, if data for other goals' targets were collected and represented using geospatial data, this would significantly enhance understanding of the spatial determinants of sustainable development, including the urban and rural patterns of progress.

## SUMMARY

Over the next decades the quest for sustainable development will be forged in the world's cities.

A sustained global campaign for an SDGs framework that acknowledged the centrality of cities in the future realization of global development aspirations, backed by extensive science from diverse disciplines, played a major role in the passage of SDG 11. This goal entails much more than the spatial concentration in cities and towns of action across all other goals. It implies some devolution of power to the sub-national scale. SDG 11 demands multi-sectoral, multi-scale and multi-actor planning, implementation, enforcement and innovation to ensure that cities become sustainable development pathways with regional and global impacts. Wide variation in the challenges and capacities of cities within and between nations suggests that limited universal reporting on targets, coupled with devolved processes and mechanisms for monitoring and evaluation on progress against the SDG, are most

likely to succeed. Gaps in data, especially in the global South, and the absence of a definition of cities will place significant demands on the international community to enhance geospatial and systems analysis capacities that capture the urban dynamics on which sustainable development rests.

## REFERENCES

- Lead Authors Revi, R., Simon, D., Parnell, S. Elmquist, S. Authors Haines, A., Rudd, A., Rok, A. Caren K. Dora, C. Skinner, C. Bahadur, C., Takase, C., Satterthwaite, D., Roberts, D., Mehrotra, S., Rosenzweig, C., Bilsky, E., Birch, E., Silva, E. Jain, G., Short, I., Algehed, J., Espey, J., Mattern, J., Seto, K., Oteng-Ababio,, Cardama, M., Cohen, M., Replogle, M., Peirce (2014) *Consultation on the UN Open Working Group on the SDGs' Urban SDG Goal 11: Targets & Indicators*, Mistra Urban Futures and SDSN, London.
- Elmqvist, T., Fragkias, M., Funeralp, B., Marcotullio, P., McDonald, R., Parnell, S., Sendstad, M., Seto, K., Wilkinson, C. (Eds.) (2013) *Global Urbanisation, Biodiversity and Ecosystem Services*, Springer.
- Revi, A and Rosenzweig, C. (2013,) *The Urban Opportunity: Enabling Transformation and Sustainable Development*, Background Research Paper, Submitted to the High Level Panel on the post 2015 Development Agenda; New York.
- Revi, A. and Satterthwaite, D. (2013) *IPCC WGII AR5*.
- Seto, K. C., Fragkias, M., Güneralp, B., & Reilly, M. K. (2011). A meta-analysis of global urban land expansion. *PloS one*, 6(8), e23777.
- Sustainable Development Solutions Network, (2014) Indicators and a monitoring framework for Sustainable Development Goals, Launching a data revolution for the SDGs, UN New York.*

## ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

*Yonglong Lu*

### PREAMBLE

Sustainable patterns of consumption and production in a world of limited resources is an essential requirement for sustainable development. Production and consumption processes need to be decoupled from escalating resource use and environmental degradation. This means addressing the following questions. Is there sustained provision of natural resources critical to human basic needs, such as land, water, food, and energy? How can key renewable and non-renewable resources such as metals and minerals be scientifically measured and sustainably managed? What are cost-effective methods for preventing and reducing pollution associated with production and consumption activities, such as emissions of greenhouse gases, toxic chemicals, and excess nutrients? Achieving sustainable consumption patterns is technically and politically more complex than changing production patterns, because it raises important issues such as human values, equity and lifestyle choices. Science-based education and awareness-raising among consumers, civil society, the private sector and policy-makers is also important in promoting sustainable consumption.

Sustainable consumption and production implies a broad societal change which requires a systematic approach to human development based on ecological, social and economic dimensions. In this regard, this goal does not present a clear systems approach that focuses across the whole lifecycle of materials, goods, and services. More focus is given to the economic and environmental dimensions than the social dimension. Targets are mostly based on developed country patterns of consumption and production which could not be replicated by developing countries. Thus, it is necessary to take into account different levels of development and common but differentiated responsibilities.

For example, “*by 2030 achieve sustainable management and efficient use of natural resources*” In this regard, what are the major criteria for sustainable management and efficient use of natural resources, and how could progress on implementation be measured? Another example, “*by 2030, substantially reduce waste generation*”. In this case, to what degree and extent can waste generation be said to be substantially reduced? The targets for this goal seem more qualitative than quantitative, which could make it difficult for states to achieve. The targets would benefit from quantification, clearer wording, and improved connection with other goals.

### REFINING TARGETS

This goal covers almost all areas of sustainable consumption and production, and the proposed targets are relevant and provide clear direction for member countries and stakeholders to follow. However, the goal and its targets appear too ambitious to be fulfilled.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
12.1	Target relevant but not clear and not quantified. How can the developed countries take the lead? No specific criteria.	Long-term program for action needed.
12.2	Target not quantified. Very ambitious, but not clear how to achieve it. Relationship with other relevant goals must be clarified.	It would be better to set up a specific target for resource use efficiency, for example, how much can it be increased.
12.3	Target good.	Base year should be given.
12.4	Target not quantified. Not feasible to achieve it by 2020, and major Conventions and Agreements should be presented.	By 2030 achieve environmentally...
12.5	Target not quantified. Too general, and not easy to measure. Overlapping with 12.4.	Please use an estimated value to replace "substantially reduce"
12.6	Target well developed but not quantified. This should be a requirement for companies, and an environmental management system for the whole life cycle should be implemented.	companies, especially large and trans-national companies, <i>are required</i> to adopt sustainable practices and to integrate sustainability information into their reporting cycle
12.7	Target not quantified. Is public procurement a useful and effective instrument? Not universal, tax rebate or other incentives may be instrumental for some countries.	promote public procurement, <i>tax rebate or other incentive</i> practices that are sustainable...
12.8	Target not quantified. Information and awareness are not enough, the people should have knowledge and capacity, and take actions.	By 2030 ensure that people everywhere have the relevant <i>knowledge, information, awareness and capacity</i> for sustainable development and lifestyles in harmony with nature
12.a	Strongly relevant to SDG 9 and SDG 10 for innovation and inequality reduction among countries. Not clear how to achieve it.	Highlight the need for scientific and technological capacities of developing countries under SDG 17
12.b	Monitoring tools are needed for not only sustainable tourism but all SCP impacts.	develop and implement tools to monitor sustainable development impacts, <i>especially</i> for sustainable tourism which creates jobs, promotes local culture and products
12.c	Target not quantified. To develop and implement tax rebate and other incentive policies instead of harmful subsidies.	to reflect their environmental <i>and health</i> impacts, taking fully into account the specific needs...

## LINKAGE WITH OTHER SDGs

Sustainable consumption and production respond to basic needs and bring about a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the lifecycle of the service or product, as such this goal is closely linked with other goals relevant to basic needs and improving quality of life.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→1	Direct links with living standards, shelter, equal rights to economic resources.	1.1, 1.3, 1.4
→2	Direct links with food availability, nutrition, agricultural productivity, food production and production patterns.	2.1, 2.2, 2.3, 2.4, 2.5
→3	Indirect links with health standards and pollution risk.	3.7, 3.8, 3.9
→4	Direct links with knowledge and awareness of sustainable development.	4.7
→5	Indirect links with access of women to resources.	5.a, 5.b
→6	Direct links: Water is a basic element for sustainable consumption and production.	6.1, 6.3, 6.4, 6.5, 6.6
→7	Direct links: Energy availability and efficiency are key elements for sustainable consumption and production.	7.1, 7.2, 7.3
→8	Direct links: Economic growth and employment form the basis of production and consumption.	<b>8.1</b> , 8.2, 8.3, 8.4, 8.5
→9	Direct links with the provision of goods and services.	9.1, 9.2, 9.4, 9.5
→10	Indirect links.	10.1
→11	Direct links: Housing and transportation are important components of sustainable consumption and production.	11.1, 11.2, 11.3, 11.6
→13	Indirect links: Impacts on resource availability for production and consumption.	13.a, 13.b
→14	Direct links with marine resources for fishery, aquaculture, and tourism.	14.4, 14.7
→15	Direct links: Land and biodiversity are basic materials for primary production.	15.1, 15.2, 15.3, 15.4, 15.5
→16	Indirect links with equal access to justice, decision-making, institution for governance.	16.3, 16.7, 16.8
→17	Implementation.	All

## **MONITORING AND EVALUATING PROGRESS**

Key relevant indicators for monitoring progress include decoupling impacts (greenhouse gas emission target, e.g., emissions by industrial and domestic users, public and service sectors), resource use (materials, water, land, and biodiversity), and other contextual indicators (economic output: GDP; productivity: output per worker, and investment; demography: population and population of working age, households and dwellings).

New metrics for monitoring progress include innovative approaches for closing the resource loop to promote product re-use, re-manufacturing and recycling. For instance, carbon labels, power consumption monitoring, carbon offsets and climate credit cards, which may provide opportunities as well as environmental benefits. Better regulation aiming for more streamlined systems will deliver a better environment and economic efficiencies.

## **SUMMARY**

While too ambitious in many respects, goal 12 gives more focus to the economic and environmental dimensions than the social dimension. The targets need better quantification, clearer wording, and improved connection with other goals, and they are mostly based on developed country patterns of consumption and production which cannot be replicated by developing countries. New metrics for monitoring progress include innovative approaches for closing the resource loop to promote product re-use, re-manufacturing and recycling.

GOAL

# 13

## TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

*Franck Lecocq*

### PREAMBLE

The current state of science behind SDG 13 is thoroughly summarized in the recently published IPCC 5<sup>th</sup> Assessment Report (AR5). AR5 notes that the impacts of climate change constitute a major risk for all dimensions of sustainable development. Also, actions to mitigate and adapt to climate change are likely to have significant implications for most dimensions of sustainable development – as illustrated by the growing literature on so-called “cobenefits” and “adverse side effects” of climate policies [see e.g., IPCC AR5 WG2 Ch.20, IPCC AR5 WG3 Ch.4, 6].

In addition, policies that are not traditionally considered among the list of “climate” policies have strong implications for both mitigative and adaptive capacity. For example, urban policies or fiscal policies impact the shape of cities; which, in turn, is a key driver of households demand for transport services, and of the viability of different modes of transport [see e.g., IPCC AR5 Ch.12]. Streamlining climate change concerns into decisions is thus especially relevant.

Acknowledging that the UNFCCC is the primary forum for negotiating the global response to climate change, this goal does not include quantitative objectives, apart from Target 13.a.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
13.1.	Target 13.1 is relevant. However, it focuses only on extreme events ("hazards and natural disasters"), whereas developing resilience and adaptative capacity to gradual changes in the climate system is necessary.	Suggest to add "capacity to the impacts of climate change, including related..." .
13.2.	Given the point made above on streamlining climate change concerns into decisions, Target 13.2 is critical. The focus on the national level, however, appears too narrow as many adaptation and mitigation decisions are taken at different scales (cross-national or sub-national).	suggest to delete "national" and add "at all geographic scales" in the end.
13.3.	Target 13.3 partly overlaps with 13.2, but does point at critical pre-conditions for a response to climate change (human and institutional capacity).	
13.a.	Target 13.a reiterates an objective agreed by the COP in 2010 [Decision 1/CP.16, Article 95]. I do not have legal expertise to assess the consistency between this statement, and the introductory statement stating that the UNFCCC is the forum in which the global response to climate change is negotiated.	
13.b.	No specific comments	

## RELATIONSHIP WITH OTHER GOALS

Climate change constitutes a risk to many dimensions of sustainable development. Lack of adaptation and mitigation may make targets related to many SDGs (notably 2, 3, 6, 8, 9, 11, 14, 15) more difficult to achieve, and more difficult to sustain over time beyond 2030. Climate change mitigation and adaptation also impact, albeit in a more indirect fashion, on the capacity of humanity to achieve other goals such as 1, 10 and 16.

Conversely, some of the targets relevant to other goals can be read as component to the response to climate change. In particular, targets 7.2 (increase share of renewable energy by 2030) and 7.3 (double the rate of improvement in energy efficiency by 2030) are consistent with global mitigation scenarios outlined in AR5. Target 8.4 (improve global resource efficiency and decouple economic growth from environmental degradation), and in general the targets included in SDG 12 are elements of mitigation, to the extent that pollution via the emission of greenhouse gases emissions is concerned. Targets 12.3 (halve per capita global food waste) or 12c (rationalize subsidies to fossil-fuels) even point to specific mitigation measures discussed in the AR5. Similarly, targets 1.5 (by 2030 build the resilience of the poor), 6.4 (increase water use efficiency), 6.5 (integrated water resource management), 6.6 (protect water related ecosystems), 9.1 (develop resilient infrastructure) or 11.5 (reduce number of deaths linked to disasters) can be read as adaptation targets (though they also address other, non-climate risks). Finally, target 10.6 (ensure enhanced representation of developing countries) and global governance targets (in particular 17.13 onward) are elements that would facilitate international agreement on climate change.

GOAL	LINKAGE	TARGET
→1	Climate change impacts on economic growth, with potentially disproportionate impact on the poor (WG2 Ch.13)..	1.1, 1.2, 1.3, 1.5
→2	Climate change has discernible impacts already on food productivity in many regions (WG2 Ch.7).	2.3, 2.4
→3	Climate change has direct implications for health. Many mitigation actions have significant health co-benefits (WG2 Ch.11 ; WG3 Ch.6).	3.1, 3.2, 3.3
→4	Indirect links	
→5	Indirect links	
→6	Climate change impacts water availability. Improving water use efficiency and water management has adaptation benefits.	6.1, 6.4, 6.5, 6.6
→7	Energy efficiency and increase use of renewables contribute to climate mitigation (WG3 Ch.6,7).	7.1, 7.2, 7.3
→8	Climate change impacts on economic growth. Resource efficiency contributes to mitigation. Availability of finance is critical for mitigation and adaptation (WG2 Ch.10 ; WG3 Ch.6,16)	8.1, 8.4, 8.10
→9	Climate change impacts on infrastructure. Making infrastructure more resilient contributes to adaptation (WG7 Ch.7).	9.1, 9.4
→10	Indirect link, with potentially disproportionate impacts of climate change across and within countries (WG2 Ch.13).	10.1, 10.6
→11	Climate change impacts on cities via e.g. heat island effects. Improving public transport and reducing local air pollution may often have mitigation co-benefits. Improving planning and reducing impact of disasters contributes to adaptation (WG2 Ch.9 ; WG3 Ch.12).	11.2, 11.3, 11.5, 11.6, 11.7
→12	Ensuring sustainable consumption contributes to mitigation, to the extent that pollution via the emission of greenhouse gases emissions is concerned.	12.2, 12.3, 12.4, 12.5, 12.6, 12.c
→14	Climate change impacts on marine ecosystems. Improving their management contributes to adaptation (WG2 Ch.6).	14.2, 14.3
→15	Climate change impacts on terrestrial ecosystems. Improving their management contributes to adaptation (WG2, Ch.4).	15.1, 15.2, 15.3, 15.4, 15.5, 15.8, 15.9
→16	Indirect link, notably via security risks associated with climate change (WG2 Ch.12).	16.1
→17	Additional resources, improved governance and cooperation across countries would contribute to mitigation and adaptation (WG3 Ch.13).	17.3, 17.6, 17.7, 17.9, 17.13, 17.14

## **MONITORING AND EVALUATION**

Progress in the mitigation of climate change is already being measured via global GHG emissions. On the other hand, measuring progress in adaptation to climate change requires further development of metrics. Except for target 13.a, all targets in SDG 13 do not have a simple monitoring mechanism. As a way to inform progress on target 13.2, it would be useful to establish a system that records

- (I) climate policies at all scales, and
- (II) how climate considerations are taken into account in the design of other (non-climate) policies.

## **SUMMARY**

Acknowledging that the UNFCCC is the primary forum for negotiating the global response to climate, it is essential that SDG 13 remains part of the SDGs framework. Stressing the urgency to take action is fully backed by the latest science as presented in the IPCC 5<sup>th</sup> Assessment Report (2014). AR5 notes that the impacts of climate change constitute a major risk for all dimensions of sustainable development. While it makes sense that the goal does not include quantitative targets as these are part of the UNFCCC negotiations, several qualitative improvements of the targets are suggested.

GOAL



## CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

*Beth Fulton, Martin Visbeck, Katherine Houghton*

### PREAMBLE

The ocean plays a vital role with regard to the three dimensions of sustainable development – social, economic and environmental – and is an essential component of the post-2015 development agenda. Given that the ocean and seas cover 70% of the Earth's surface area, host the largest connected ecosystem and play a central role in climate stability, oxygen generation, nutrient cycling, food production and coastal protection, SDG 14 is ambitious, timely and backed by a significant body of natural and social science. Oceans and coasts partially support about 75% of the global population, which resides in the wider coastal margins. This fraction is growing, with the majority of the world's mega-cities located coastally. Thus there is a growing dependency on the significant ecosystem services provided by these systems – including the transportation of goods; food through fisheries and aquaculture; and new uses such as the generation of renewable energy, mining of materials and tourism. Many of these (and other services) rely on healthy levels of biological diversity.

### REFINING TARGETS

The targets are all relevant and support sustainable development of the ocean in terms of currently dominant industries (e.g. fisheries, resource extraction). However, because the targets focus on existing stressors and industries the goal is much weaker on future challenges and opportunities. There are few direct references to new technologies such as blue carbon and bioprospecting which could have future consequences – particularly if they are woven into livelihoods as a means of supporting development. Several targets would benefit from clearer wording and better quantification. Targets 14.1, 14.2 and 14.4 are arguably the most important for this goal and have the strongest science base. The current set of targets could be enhanced by including a specific social goal on equity or fair access, marine spatial planning efforts and improved governance/institutions. Some of these additional aspects could be covered by including ocean indicators in the targets of other goals. Finally, the means of implementation could be more specific on financial means.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
<b>14.1</b>	While ‘pollution of all kinds’ is inclusive the details are not specific enough. While complete reduction is ideal for minimising impacts, it is not realistic. So the level of change that will see significant system improvements has been recommended instead.	by 2025, prevent new and reduce existing marine pollution of all kinds <i>by 30 per cent</i> , particularly from land-based activities, including <i>toxicants, plastics, marine debris and nutrient pollution</i> .
<b>14.2</b>	No changes proposed.	
<b>14.3</b>	Make the wording clear that emission reduction is needed for mitigation. Action must be as clear as for climate change, and must be tackled simultaneously.	<i>By 2025 develop a full understanding of the impact of ocean acidification on the ocean ecosystem services and plausible adaptation strategies by promoting internationally coordinated science. Reduce carbon emission by full implementation of agreed targets in the new UNFCCC climate framework.</i>
<b>14.4</b>	Very ambitious; builds on MDG; quantified through the Maximum Sustainable Yield (MSY) which is debated. The recommendation updates the wording in line with currently accepted science and certification standards around acceptable biological targets. Maximum economic yield may be preferable, but has not been included in the target as yet as it cannot always be easily determined.	By 2020, effectively regulate harvesting, and end overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices <i>as agreed to in the Aiichi Targets</i> .
<b>14.5</b>	Stated quantity (10%) is insufficient (according to scientific understanding); not clear whether conserve equates with spatial management (MPAs); related to 14.2 but should be kept distinct. The recommended change increases the target to the more scientifically credible 30% and makes it clear that this could be achieved via spatial as well as other management measures (the exact mix likely to be context dependent). It also extends the target in line with what is being expected for terrestrial ecosystems.	By 2020, conserve <i>at least 30 per cent</i> of coastal and marine areas, <i>taking urgent and significant action to reduce degradation of natural habitat, halt the loss of biodiversity, using both spatial management and other appropriate regulatory tools, recognising the fluid nature of ecosystems under range shifting climate change</i> , and consistent with national and international law and based on best available scientific information.
<b>14.6</b>	Insufficient by itself; removing specific subsidies restructures some incentives, but need other economic responses (similar to those in goal 15) to be effective – thus the expanded wording.	By 2020, <i>mobilize and significantly increase from all sources financial resources aimed at improving ocean health and reducing economic and social incentives for its misuse, including the prohibition of fisheries subsidies that contribute to overcapacity and overfishing, eliminate subsidies that contribute to IUU fishing, and refrain from introducing new such subsidies</i> , recognizing that appropriate differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation.
<b>14.7</b>	Unclear what action is expected; not universal; not specified what ‘marine resources’ encompasses so the recommended change points out more explicitly the different kinds of resources intended and the more comprehensive set of development options associated with this.	By 2030 increase the economic benefits to SIDS and LDCs from the sustainable use of marine resources ( <i>living, genetic, renewable and finite</i> ), including through sustainable management of fisheries, tourism, energy, mining, shipping and other marine and coastal industries.
<b>14.a</b>	Not sufficiently developed to give rise to specific activities.	
<b>14.b</b>	Relationship to 14.7 should be clarified; improve language as artisanal fisheries also have tremendous impacts. The recommendation in this case is to broaden the wording to make it more inclusive and thus more socially balanced while also explicitly stating it must remain sustainable or be self defeating.	<i>By 2030 provide equitable and sustainable access for all to marine resources and relevant markets, while promoting local culture, sustainable products and employment at a level consistent with conservation and sustainable use targets.</i>
<b>14.c</b>	It is not framed as a target.	

Some additional aspects that could be considered in a comprehensive set of targets are:

- By 2020 effectively and sustainably regulate all marine and coastal industries, using an integrated ecosystem based framework, such that the cumulative impacts of all ocean and coastal uses do not detrimentally undermine sustainable use and ocean health
- By 2020, integrate ecosystems and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts
- By 2020 introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species, in particular those spreading via artificial means rather than undergoing climate induced range shifts

#### LINKAGE WITH OTHER SDGs

There is strong interlinkage between many of the SDGs; some links are positive but there is also potential for goals to undermine each other (with action to achieve one goal resulting in other goals becoming harder to achieve). To achieve all SDGs would require a systems approach and new ways of thinking since experience already suggests that tackling the goals individually would not result in an overall success.

This goal has strong synergies with SDGs 6 and 15 around system restoration and quality, but equally there are potential trade-offs with SDG 2. In acting to deliver on target 2.3 there could be downstream effects of land use on marine ecosystems, but also potential tension between the call for a doubling of incomes for small-scale producers and the desire for sustainable oceans. Artisanal and small-scale producers are not footprint free and could undermine sustainable oceans. Similarly, addressing poverty, access to water and energy, and promoting sustainable urban and industrial development risks unintended cumulative and downstream effects, particularly if the goals are not handled from a systems perspective.

Linkage between goals can be identified according to the ecosystem services provided by the ocean (such as food provision and climate stability, i.e. SDGs 2, 3, 6, 7, 11, 12, 13 and 15) or through societal transformation processes (such as institutions, financing, capacity-building and transparency, i.e. SDGs 1, 8, 9, 12, 16 and 17) which integrate the ocean into sustainable development trajectories.

#### SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGS

GOAL	LINKAGE	TARGET
→1	Synergistic links	1.4, 1.5
→2	Synergistic and close links with the potential for trade-offs if action to promote terrestrial production has adverse effects (e.g. pollutant run-off or clearing of coastal habitats) for marine ecosystems.	2.1, 2.3, 2.4, 2.5
→3	Synergistic links	3.9
→4	Indirect links	
→5	Indirect links	
→6	Synergistic links	6.3, 6.6, 6.a
→7	Synergistic and close links with the potential for trade-offs if action to access ocean renewables is not done sustainably (i.e. in such a way as to minimise marine ecosystem impacts) or equitably.	7.2, 7.a, 7.b
→8	Synergistic and close links with the potential for trade-offs if action to promote these economic developments does not sufficiently constrain unsustainable practices or cumulative impacts.	8.1, 8.2, 8.3, 8.4, 8.9
→9	Synergistic links	9.1, 9.4, 9.5
→10	Indirect links	
→11	Synergistic and close links with the potential for trade-offs if action to promote sustainable cities has adverse effects on marine ecosystems.	11.3, 11.4, 11.5, 11.6, 11.7, 11.a, 11.b, 11.c
→12	Synergistic links	12.2, 12.3, 12.4, 12.6, 12.8, 12.a, 12.b
→13	Synergistic and close links, however it is important they should not be held separate to action on ocean acidification (i.e. action on one should act on both, ocean acidification should not be ignored with climate change dominating thinking alone).	13.1, 13.2, 13.3
→15	Synergistic and close links with the potential for trade-offs if action to promote these terrestrial ecosystem actions undermines the status of marine ecosystems (e.g. if action to reduce illegal trafficking of protected terrestrial species leads to increased pressure on marine species).	15.1, 15.3, 15.5, 15.6, 15.7, 15.8, 15.9, 15.a, 15.c
→16	Synergistic and close links	16.3, 16.6, 16.7, 16.8
→17	Synergistic links	All

## **MONITORING AND EVALUATING PROGRESS**

The indicator framework for SDG 14 is currently unclear but should include a combination of policy relevant indicators (e.g. percentage of area protected), pressure indicators (e.g. percentage of IUU fisheries of the total global fish catch or amount of nutrients entering the ocean and seas from land-based sources), and environmental status indicators (e.g. change in ocean heat content, ocean acidification or area of coastal mangroves). Existing marine and coastal data reporting processes could provide a useful basis for indicators, with additional datasets beneficial but not essential. The Sustainable Development Solutions Network have suggested that Ocean Health Index could serve as a highly integrative indicator.

It could be helpful for negotiators to agree on guiding principles for the selection and modification of indicators for all SDGs to establish a common methodological denominator. Seven such principles have been proposed by the Sustainable Development Solutions Network (clear, consensus-based, consistent with systems-based information, constructed from well-established data sources, disaggregated, universal and managed by a designated organization). To ensure scientific quality, a further principle should be included to address transparency and peer-review.

## **SUMMARY**

Goal 14 is ambitious, timely and backed by a significant body of natural and social science. The targets are all relevant and support sustainable development of the ocean in terms of currently dominant industries. The goal is much weaker in terms of the challenges and opportunities of the future. Several targets need clearer wording and better quantification.

# PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

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## PREAMBLE

The sustainable management and conservation of terrestrial and inland freshwater ecosystems and their biodiversity is essential for fulfilling the environmental, socio-cultural and economic needs of present and future generations and, therefore, plays a vital role in the international agenda for achieving a better life for all human societies. Biodiversity and terrestrial ecosystems are essential for providing ecosystem services and benefits to society that support different dimensions of human wellbeing, such as basic material for a good life (e.g. food, freshwater, energy), physical and mental health, security, cultural diversity, freedom of choice and action and good social relationships. Furthermore, preserving biodiversity and ecological processes positively influences the Earth's capacity to buffer and respond to disturbances and environmental change, such as land degradation, desertification, habitat loss and fragmentation, pollution, biological invasions, climate change or over-exploitation. Biological diversity allows human societies to adapt and respond to environmental change in sustainable ways. Besides species and ecosystem diversity, the genetic diversity within species also provides benefits to society, such as protection from pests and pathogens and for food security. In addition, the evolutionary perspective of biodiversity provides an important insurance function for providing ecosystem services to humans that have yet to be identified (e.g. medicines and biotechnology). Consequently, biodiversity conservation entails preserving resilient ecosystems, ensuring the current and future provision of ecosystem services, promoting social and ecological resilience, contributing to poverty alleviation and, therefore, preserving options for current and future generations. Biodiversity also has an intrinsic value which is independent of its usefulness (e.g. species' inherent right to exist) and holds other multiple values associated with desirable relationships between people and nature established in different cultures, such as spiritual, educational, aesthetic and inspirational values.

## REFINING TARGETS

The targets for this goal show a clear link with other UN environmental agreements, such as the Aichi Biodiversity Targets (Convention on Biological Diversity) and the Intergovernmental Platform on Biodiversity and Ecosystem Services, and it is important to retain these links. However, the targets appear to prioritize certain issues relative to others. For example, particular mention of forests and mountains and poaching and genetic resources, creates an imbalance relative to other ecosystems (e.g. agro-ecosystems, freshwater inland ecosystems, arid or semi-arid systems, coastal systems) or drivers of change (e.g. habitat loss and fragmentation, over-exploitation, biological invasions, pollution). Proposals are made to correct this imbalance and ensure and facilitate a cross-cutting perspective for terrestrial ecosystems and biodiversity conservation integration. Five targets could be merged. A new target is proposed to provide better coherence with other international initiatives, which stress the need to address the role of indigenous, local and traditional knowledge in biodiversity use and management (Tengö et al. 2013; Díaz et al. 2015). Finally, it is important to add 'freshwater' to SDG 15. It would then read: "... *sustainable use of terrestrial and freshwater ecosystems, sustainably manage forests, combat ...*".

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
15.1	The target overlooks important ecosystems, such as agro-ecosystems and river systems.	... in particular forests, wetlands, river systems, mountains, drylands and agro-ecosystems, in line with ...
15.2	The target is not clear about the surface to be restored and reforested.	Merge Targets 15.2 and 15.3 into a single target; one that is consistent with Aichi Target 15. Possible wording: to conserve and restore degraded ecosystems, particularly forests, by 15% in order to globally combat desertification, drought and floods, and thereby contribute to climate change mitigation and adaptation
15.3	This target is strongly linked with Target 15.2. Achieving Target 15.2 entails achieving Target 15.3. The Aichi targets considered both (15.2 and 15.3) in only one target (i.e. target 15).	
15.4	This target aims to enhance the capacity of mountains to provide benefits. The term 'benefits' could be narrowly understood, resulting in the multiple ecosystem services which are not direct benefits being ignored.	... to enhance their capacity to provide ecosystem services and benefits, which are essential ...
15.5	Besides the degradation of natural habitats, this target should incorporate the idea of facing the multiple drivers of change behind biodiversity erosion in order to be consistent with the Millennium Ecosystem Assessment.	... halt the loss of biodiversity and address the drivers behind this loss, and by 2020...
15.6	The scope of this target should be widened to include not just genetic resources but all biological resources.	...the utilization of genetic and other biological resources, and promote...
15.7	None	
15.8	None	
15.9	Clarification about the scope of this target beyond monetary values and accounting is needed, otherwise there is a risk of promoting nature commodification schemes.	... integrate the multiple values of ecosystems and biodiversity into national and local planning, accounts, sustainable management and poverty reduction strategies.
15.a	In terms of the tools and means to achieve this goal, it is recommended that the three targets are merged into one to avoid giving preference to certain aspects.	Merged target: mobilize and significantly increase human and financial resources from all sources to conserve, restore and sustainably use biodiversity and ecosystems, and provide adequate incentives to both developed and developing countries to attain sustainable livelihoods.
15.b		
15.c		

Some additional aspects that could be considered in a comprehensive set of targets are:

- By 2020, recognize and integrate into conservation management strategies and planning, the indigenous and traditional knowledge and practices relevant for sustainable management of biodiversity, ecosystems and ecosystem services

## LINKAGE WITH OTHER SDGs

Biodiversity is a cross-cutting issue of all dimensions of human well-being and so this goal is strongly linked to all other SDGs. Therefore, sound ecological management is required, not just to prevent all SDGs from being achieved at the same or a higher environmental cost than previously, but to increase persistent and better-quality flows of ecosystem services to humanity. As a result, all SDGs receive benefits from the protection, restoration and promotion of sustainable use of terrestrial and freshwater ecosystems but are also threatened if management for sustainability is not reached.

## SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

*These are the most important links between the SDG reviewed in this chapter and other goals and targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome.*

GOAL	LINKAGE	TARGET
→ 1	Biodiversity and ecosystem services provision broaden the options to reduce poverty and help to offer equitable and fair access to natural resources. <i>Enabling factors:</i> Landscape management with ecological criteria; Environmental justice: fair distribution of environmental change effects.	1.4, 1.5
→ 2	To maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species contributes to food security. Preservation of indigenous and local practices and knowledge can also ensure sustainable management of food and equitable access. <i>Enabling factors:</i> Broadening food diversity; Soil health and genetic resources preservation; Landscape management with ecological criteria.	2.3, 2.4, 2.5
→ 3	Agrobiodiversity and fishery products provide diversified and healthy diets. Biodiversity loss can also increase infectious disease risk. <i>Enabling factors:</i> Preserve the flow of ecosystem services that contributes to physical and mental health; Consider sense of belonging as basic for maintaining mental health.	3.9
→ 4	Environmental education and education for sustainable development can entail raising social awareness about the importance of biodiversity. <i>Enabling factor:</i> Environmental education and awareness.	4.7
→ 5	Women, their knowledge and practices, have ensured the preservation of key ecological process and biodiversity, such as agrobiodiversity or seed preservation. <i>Enabling factor:</i> Consider the role of women in environmental decision-making.	5.5
→ 6	To protect and restore water-related ecosystems and their biodiversity can ensure water purification and water quality standards. <i>Enabling factors:</i> Preserving hydrological cycles; Landscape management for preserving water-related ecosystem services flow; Pollution control from growth related activities.	6.3, 6.6
→ 7	To increase the share of renewable energy entails a decline in the negative effect of certain drivers of change (i.e. climate change or pollution) on biodiversity. <i>Enabling factors:</i> Fuel wood replacement; Reduction of environmental impacts; Foster renewable and environmental friendly energy.	7.2
→ 8	To promote sustainable economic growth necessarily entails the consideration of management inside the safe biophysical planetary boundaries. <i>Enabling factors:</i> Respect of safe operating biophysical limits for all economic activities; Integrated landscape planning; Innovation for getting sustainable development.	8.4

→ 9	Resilient infrastructure and sustainable industrialization necessarily entails the consideration of management inside the safe biophysical planetary boundaries. <i>Enabling factors:</i> Respect of safe operating biophysical limits for industrialization; Ecosystem inspired innovation, i.e. biomimetics; Risk management.	9.4
→ 10	To consider social equity within and among countries entails to consider equity issues with regards to the access to ecosystem services provided by biodiversity and ecosystems. <i>Enabling factors:</i> Fair trade; Transformation of agricultural subsidies for better practices.	10.3
→ 11	To consider biodiversity issues in urban and cities planning may foster to greening cities and protect their natural capital. <i>Enabling factors:</i> Greening cities; Widening urban planning scales; Fostering ecological connectivity.	11.4, 11.5, 11.6, 11.7
→ 12	To ensure sustainable consumption and production practices necessarily entails to respect the biophysical boundaries of the planet and to reduce current global consumption rates in order to fit with the biophysical capacity to produce ecosystem services and benefits. <i>Enabling factors:</i> Reducing ecological footprint within safe operating biophysical limits; Foster people's awareness about their consumption; Access to information.	12.2, 12.8
→ 13	Preservation of natural forests and other ecosystems may enhance the natural capacity for sequestering carbon and, in turn, reducing the risks of specific societies. <i>Enabling factor:</i> Promote carbon sequestration.	13.1, 13.3
→ 14	There is an explicit connectivity between terrestrial and marine ecological processes. <i>Enabling factor:</i> Promote global ecological connectivity between marine and terrestrial ecosystems.	14.1, 14.2
→ 16	Broadening and strengthening the participation in decision-making processes for biodiversity and terrestrial ecosystems conservation is required. <i>Enabling factors:</i> Fostering diverse livelihoods and ecological knowledge systems; Participatory ecological monitoring; Co-management of ecosystems.	16.7, 16.8
→ 17	A global partnership and stewardship for biodiversity and terrestrial ecosystems conservation is required in order to respect the biophysical planet boundaries. <i>Enabling factor:</i> Strengthening of biodiversity global partnerships: CBD, IPBES. Increasing ecological management concerns in other international programs FAO, UNESCO, etc.	All

## MONITORING AND EVALUATING PROGRESS

Several international initiatives facilitate monitoring and evaluating the progress of this goal. These include the *Indicators for the Strategic Plan of Biodiversity*, *Biodiversity Indicators Partnership (BIP)* and the *Essential Biodiversity Variables* developed under the auspices of the Group on Earth Observations Biodiversity Observation Network. Although some indicators under the *Strategic Plan of Biodiversity* address indigenous and traditional knowledge (e.g. 'trends in linguistic diversity and numbers of speakers of indigenous languages'), new metrics are needed to support the additional target proposed. These are needed to identify trends in local traditional practices and trends in the rate of transmission of local and traditional knowledge through generations. More effort is needed on indicators that make sense at the local scale and this could be achieved through engaging local stakeholders, citizen groups and indigenous communities.

## SUMMARY

All SDGs receive benefits from the protection, restoration and promotion of sustainable use of terrestrial and freshwater ecosystems and would be threatened if goal 15 is not reached. The targets show a clear link with other UN environmental agreements. However, several prioritize certain issues relative to others; changes are proposed to correct this imbalance. Five targets could be merged into two. A new target is proposed on the role of indigenous, local and traditional knowledge in biodiversity use and management. New metrics would be needed to support this additional target. The word 'Freshwater' must be added to the Goal 15 title.

## REFERENCES

Díaz S, Demissew S, Carabias J, Joly C, Lonsdale M, Ash N, Larigauderie A, Ram Adhikari J, Arico S, Baldi A, Bartuska A, Baste IA, Bilgin A, Brondizio E, Chan KMA, Figueira VE, Duraiappah A, Fischer M, Hill R, Koetz T, Leadley P, Lyver P, Mace G, Martín-López B, Okumura M, Pacheco D, Pascual U, Selvin Pérez E, Reyers B, Roth E, Saito O, Scholes RJ, Sharma N, Taliis H, Thaman R, Watson R, Yahara T, Abdul Hamid Z, Akosim C, Al-Hafedh Y, Allahverdiyev R, Amankwah E, Stanley Asah T, Asfaw Z, Bartus G, Brooks L A, Caillaux J, Dalle G, Darnaedi D, Driver A, Erpuls G, Escobar-Eyzaguirre P, Failler P, Mokhtar Fouda AM, Fu B, Gundimeda H, Hashimoto S, Homer F, Lavorel S, Lichtenstein G, Mala WA, Mandivenyi W, Matczak P, Mbizvo C, Mehrdadi M, Metzger JP, Mikissa JB, Moller H, Mooney HA, Mumby P, Nagendra H, Nesshöver C, Oteng-Yeboah AA, Pataky G, Roué M, Rubis J, Schultz M, Smith P, Sumaila R, Takeuchi K, Thomas S, Verma M, Yeo-Chang Y, Zlatanova D. (2015) The IPBES Conceptual Framework - connecting nature and people. Current Opinion in Environmental Sustainability 14: 1-16..

Tengo M., E.S. Brondizio, T. Elmquist, P. Malmer, M. Spierenburg, 2014. Connecting diverse knowledge systems for enhanced ecosystem governance: the multiple evidence base approach. Ambio 43:549-591.

# PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS

*Marc A. Levy, Michelle Scobie*

## PREAMBLE

Goal 16 concerns three elements: peace; just and inclusive societies; and effective, accountable and inclusive institutions. We can ask two questions of each element – whether they enhance human wellbeing and make sustainable development more achievable, and whether concerted efforts to enhance these elements are likely to generate benefits sufficient to justify the effort.

Regarding peace, there is no doubt that both armed conflict and broader forms of violence undermine human wellbeing and reduce the ability of societies to achieve development (Collier et al 2003, Gates et al 2012, Brinkman 2013, Hoeffler and Fearon 2014). At a country level, justice and inclusion have a less clear relationship to development outcomes. Many countries that made rapid progress on the MDGs have poor provisions for justice and inclusion. The evidence that justice and inclusion matter for wellbeing directly is stronger than the evidence linking it to macro development outcomes – almost universally people report that not having justice and inclusion makes them suffer, regardless of the macro development consequences. Effective, accountable and inclusive institutions are hard to identify objectively. To say that effective institutions make a difference is simply a tautology. Whether or not accountable and inclusive institutions make a difference is more interesting. At a macro level the evidence is mixed. Countries with highly accountable and inclusive institutions are at the top of the Human Development Index rankings; while those with extremely unaccountable and exclusive institutions are at the bottom. In the middle, where most countries lie, it is less clear. Some countries in this group with weak accountability and inclusion mechanisms are doing well at achieving development outcomes. Nonetheless, along with justice, people value accountability and inclusion as direct components of their wellbeing.

On balance, then, this goal rests on reliable science that the goal matters for wellbeing and for the ability to achieve sustainable development; the evi-

dence is strongest for peace. Does investing in such elements pay off? At the international level, there is clear evidence that investment in peacekeeping and peacebuilding pays off. Failure is common, because this is one of the most challenging things the international community does, but the successes are highly significant. For access to justice and inclusive institutions, there is not much evidence that concerted international action is clearly constructive.

However, the evidence is much stronger for action at the national and local levels. Countries and communities that engage in sustained, thoughtful, deliberate efforts to maintain peace, promote justice and inclusion, and build accountable and inclusive institutions, do well by such actions. There are scholars who go so far as to argue that such action constitutes the core of the development process. While this view is not universally held, even its detractors accept that such investments at the country level pay off. In the end, research suggests that differential and coordinated roles for governance reform at the domestic and international level will be required.

Given the above, SDG 16 is overly timid. The peace goal is particularly vapid, especially in contrast to the more vigorous language calling for justice, inclusion and accountability to be achieved as opposed to being merely promoted.

Peace and governance are strongly implicated in prospects for success across the full range of the SDG framework. However, the way the SDG is formulated, narrowly emphasizing justice, accountability and inclusion, is arbitrary and disconnected from research on how governance affects sustainable development. The following research findings are not reflected in SDG 16:

If governance cannot provide better means of linking science to policy-making, sustainable development will be hard to achieve.

If governance cannot provide better means of managing shocks and other acute risk, sustainable development will be hard to achieve.

If governance cannot provide better means of making trade-offs across issues, regions, groups, and time horizons, sustainable development will be hard to achieve.

Because these elements are absent from SDG 16, it falls short of what the evidence suggests is needed. Moreover, because the SDG 16 elements point a spotlight overwhelmingly on poor countries, whereas the broader set of governance targets require action universally, the choice of targets undermines the overarching ambitions of the goal.

#### REFINING TARGETS

The draft targets are poorly specified. Only one of twelve has a numerical target (16.2), only one has available data (16.8), only one could be measured without significant difficulty (16.9). Three of the targets are not susceptible to quantification at all (16.3, 16.6, 16.9).

The ostensible target linked to peace, calling for reducing “all forms of violence” is not actually a tar-

get but rather a restatement of the goal. It cannot be measured in theory or practice. SDG 16 should have specific targets concerning reduction in armed conflict, murder, assault, suicide, and intimidation.

There is no target having to do with the special challenge of addressing sustainable development within crisis and post-crisis situations. Most of the time in such settings concerted efforts to achieve international sustainable development goals are set on the back burner. Yet mounting evidence suggests that such an approach undermines both stabilization and sustainable development objectives (Bruch, Muffett and Nichols 2015). There could be a target calling for SDG strategies to be embedded in all peacekeeping and other major humanitarian responses.

Finally, the targets are imbalanced. A large number concern the traditional “good governance” agenda in spite of the low evidence linking such matters to sustainable development outcomes. Far fewer concern peace, which is bizarre given the magnitude of the violence problem.

#### SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
16.1	Not specific enough. Consider merging with 16.a	Support national and international efforts to build resilient families to foster more balanced individuals as a way to promote values that will lead to building peaceful societies and lead to a reduction in societal violence. Develop specific national targets by 2018 and support implementation and monitoring of efforts to significantly reduce all forms of violence and related death rates everywhere by 2030.
16.2	Modus of implementation unclear.	Create/strengthen the role of international and national agencies to prevent and bring to justice agents involved in the abuse, exploitation, trafficking and all forms of violence and torture against children by 2020.
16.3	Promoting rule of law is worth doing and can be done in concert with feasible indicators. However, ensuring equal access to justice is simply a reformulation of goal 16 -- it is not a practical target and there are no feasible indicators.	Limit 16.3 to promotion of rule of law. Be sensitive to different national contexts and the complexities of formulating national measures that must engage wide variety of national approaches.
16.4	Modus of implementation unclear. A strong national legislative and executive implementation framework and backing are needed and it is unclear how this will be universally available.	by 2030 reduce illicit financial and arms flows by X%, strengthen recovery and return of stolen assets, and combat all forms of organized crime
16.5	This target is very close to other governance targets above and below.	
16.6	Canons of effectiveness in governance are unclear (how can causality be proved, impact measured etc)- making this hard to measure and monitor.	Consider amending as follows: Support states in implementing context and agency specific good governance best practices in national and regional institutions by 2020
16.7	This target provides no guidance as to how to make this a practical goal.	Merge with 16.6
16.8	Needs to be more specific.	Consider amending as follows: Mandate international institutions to remove barriers/difficulties and to facilitate effective participation of developing countries in the institutions of global governance by 2020

## 16.9

No comment.

## 16.10

Vague. Set a date for this target and mechanisms to provide resources.

Consider amending as follows: Mandate international institutions to provide support for national legislative reform and executive implementation of measures to promote public access to information and protect fundamental freedoms by 2020.

## 16.a

Set time target. Also, Crime is mentioned here as well as in 16.1.

Strengthen relevant national institutions, including through international cooperation, for building capacities at all levels, in particular in developing countries, for preventing violence and combating terrorism and crime by 2020.

## 16.b

Too broad, policies for sustainable development apply to almost every area of public policy.

Reduce this goal to:  
Support national policies to discover and remove discriminatory laws.

### LINKAGE WITH OTHER SDGs

This goal is strongly linked to all the other goals, because peace, justice, inclusion and accountability, fit-for purpose institutions, strongly influence everything else and are in turn influenced by everything else, and because governance is the process meant to steer the entire collection of goals toward effective outcomes. The goal is especially strongly linked to SDG 1 (poverty reduction), SDG 4 (equitable education), SDG 5 (gender equality), SDG 9 (resilient infrastructure), and SDG 17 (means of implementation).

### SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

GOAL	LINKAGE	TARGET
→ 1	Positive/ enabling factor/ synergies: Extreme poverty hinders prospects for peace and good governance.	1.1, 1.3
→ 2		
→ 3		
→ 4	Positive/enabling factor/synergies with: access to Justice and inclusive societies.	4.5, 4.7
→ 5	Positive/synergies with promoting peaceful and inclusive societies.	5.3, 5.1, 5.5, 5.2, 5.a, 5.c,
→ 6		
→ 7		
→ 8		
→ 9	Positive/enabling factor, Resilient infrastructure reduces the likelihood of disaster which has a more devastating impact on the marginalized and can create discontent, strife and detract from the peaceful and inclusive society goal.	9.a
→ 10		
→ 11		

→12	
→13	
→14	
→15	
→17	Positive/ enabling factor Important for building effective, accountable and inclusive institutions at all levels.

## MONITORING AND EVALUATING PROGRESS

The targets ought to provide guidance on how to measure progress toward SDG 16, but they do not. Peace, measured most straightforwardly as absence of armed conflict, is measured in a disorganized manner by a variety of research and advocacy organizations. Their measurements are good, but they need to be coordinated and to be made in a more timely, operational manner. Broader forms of violence are not measured systematically. Justice and inclusivity of societies are very hard to measure, so crisp proxies will need to be developed. The targets mention a few candidates but in a disjointed, unfocused manner that leads astray more than guides. Finally measuring whether institutions are effective, accountable, and inclusive is equally difficult and therefore clear proxies are also in order. The institutional measurement landscape is dominated by qualitative metrics directed at peak national institutions such as parliaments and courts. The institutional fabric of sustainable development has many more strands (families, civic organizations, enterprises, religion, regional bodies) yet these other strands are not being monitored with respect to their accountability and inclusivity (De Jong 2010). There is much lost ground to catch up.

## SUMMARY

The scientific case for including a goal on peace and governance is overwhelming, and its presence among the SDGs constitutes a major improvement on the MDGs. These are not easy goals to advance, and progress will require multifaceted efforts and willingness to experiment and learn. Yet SDG 16 is not formulated in a manner conducive to such innovation. The peace goal and its associated targets should be made more clear and specific, and the governance targets should extend beyond the traditional “good governance” agenda and tackle head-on the institutional requirements for sustainable development.

## REFERENCES

- Brinkman, Henk-Jan, 2013. “Peace, Justice and Governance in the Post-2015 Development Framework,” *Journal of Peacebuilding & Development* 8:3, 92-101, DOI 10.1080/15423166.2013.864939.
- Bruch, Carl, Carroll Muffett, Sandra S. Nichols, 2015 (forthcoming), “Natural Resources and Post-Conflict Governance: Building a Sustainable Peace,” chapter 2 in *Governance, Natural Resources, and Post-Conflict Peacebuilding* ed. C. Bruch, C. Muffett and S. Nichols. London: Earthscan.
- Collier, Paul, V. L. Elliott, Håvard Hegre, Anke Hoeffler, Marta Reynal-Querol, and Nicholas Sambanis, 2003. “Breaking the Conflict Trap: Civil War and Policy Development.” Washington, DC: The World Bank.
- Gates, Scott, Håvard Hegre, Håvard Mokleiv Nygård and Håvard Strand, 2012. “Development Consequences of Armed Conflict,” *World Development* 40:9: 1713-1722, DOI 10.1016/j.worlddev.2012.04.031.
- Hoeffler, Anke and James Fearon, 2014. “Conflict and Violence Assessment Paper: Benefits and Costs of the Conflict and Violence Targets for the Post-2015 Development Agenda,” Copenhagen Consensus Center, available at [http://www.copenhagenconsensus.com/sites/default/files/conflict\\_assessment\\_-\\_hoeffler\\_and\\_fearon\\_0.pdf](http://www.copenhagenconsensus.com/sites/default/files/conflict_assessment_-_hoeffler_and_fearon_0.pdf).

# STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

*Simon Hoiberg Olsen, Claudia Emerson*

## PREAMBLE

This goal contains key enablers for action across the entire SDG framework. To avoid the SDGs becoming a ‘wish list’ with little prospect of implementation, it is important that this goal matches the level of ambition of the overall SDG framework. Debate on this goal must be closely aligned with the post-2020 climate change regime, the Doha Development Agenda of the World Trade Organization (WTO), and financing for development processes. It must also articulate targets that align with universal principles for human rights, so that trade, financing and other processes promote rather than erode advances in this area.

The review of targets across the SDG framework, especially the ‘means’ or enabling targets, should focus on increasing the extent to which they are SMART – specific, measurable, attainable (and ambitious), relevant, and time-bound. The targets should also be coherent with existing national and international agreements and standards. Although finance and technology will remain core elements, this agenda must also focus on the ‘software’, that is, the different capacities, know-how and knowledge necessary to enable the most effective use of finance and technology. Implementing the SDGs will require various types of partnerships, not just a generic one. Thus, in revising the targets there is a need for more detail on the engagement of stakeholders, including civil society, citizens, the scientific and technological community and the private sector and especially in terms of the action to be taken by national and local governments.

## REFINING TARGETS

The proposed targets comprising the SDG framework are generally SMARTER and better developed than for the Millennium Development Goals (specifically the corresponding goal to SDG17, MDG8). They refer to systemic issues and stakeholder engagement. The SDGs are characterised by the realisation that sustainable development must be the result of a co-designed vision and narrative and must be complemented by coherent action among all groups in society. Targets that involve other stakeholders and targets that countries will reinterpret and undertake nationally will be especially important.

Data availability represents a critical tool for sustainable development at the local, national, and global levels. Data are central to designing, monitoring, and evaluating effec-

tive policies and programs, and measuring impact. They are a fundamental asset in the knowledge economy and play a critical role in bridging the knowledge and digital divide between high income countries (HICs) and low-and-middle income countries (LMICs).

Data gaps currently exist for inputs, outputs, and impact indicators for health and development, and there is massive inequity in the availability, accessibility, and usability of quality data between HICs and LMICs. While target 17.18 aims to “increase significantly the availability of high-quality” data, it does not specify how ‘quality’ is to be achieved or the standard to which it aspires. The importance of analytic capacity for use of data is not considered, but is a key element for ensuring that LMICs benefit from data they generate.

## SCIENCE-BASED RECOMMENDATIONS FOR REFINING TARGETS

TARGET	COMMENTS	RECOMMENDATIONS
17.1	Domestic resource mobilization should be quantified and include a percentage of levied tax to GDP, and can vary depending on countries' baseline.	
17.2	Target is time-bound and detailed. However, emerging economies should gradually be encouraged to provide ODA for SD, as emphasized in the recent UN Secretary General's report.	
17.3	This target must link up with financing for development processes. Since <i>risk</i> is one of the main limiting factors to tap into investment for development in developing countries, the success of this target depends on whether other targets in the SDGs can address stronger regulatory framework, macroeconomic policy, government competence and anti-corruption mechanisms at national levels.	
17.4	No comments	
17.5	Needs a target date and potentially a proportion as percentage of total investment.	
17.6	Depends on agreement on technology. This target is of greatest importance for the global scientific and technological community.	Action to achieve the target should incorporate making all academic journals freely available to developing countries.
17.7	Needs a target date. An indicator for measuring progress could be the percentage of total technology transfer that is environmentally sound.	
17.8	No comments	
17.9	Needs to be quantified.	
17.10	Needs to link up with WTO regime to be transformational.	
17.11	No comments	
17.12	Could include reference to other non-tariff barriers, for instance national subsidies for certain sectors, which also hamper developing country market access.	
17.13	This is a potentially important target but without more detail it is unlikely to happen.	
17.14	This is a potentially important target but without more detail it is unlikely to happen.	
17.15	No comments	
17.16	Needs a reference to countries committing to start setting up these partnerships at national and subnational level. Also should consider using partnerships, as there will be multiple and not one panacea partnership.	
17.17	No comments	

## 17.18

The target is time-bound (2020) and specifies the data needed to build capacity in developing countries, but does not go far enough. For example, there is no target to develop non-existent or weak civil registration and public health surveillance systems that capture data critical for achieving and measuring progress on SDGs 1 to 5. Counting a person through civil registry confirms their citizenship and is a critical first step in assuring property rights and access to services, important elements for achieving SDGs 1-5, 7 and 8, in particular. Functioning vital registration and public health surveillance systems are essential for generating the data needed to act on many of the SDGs and their targets, and setting an explicit target to capture these data is recommended.

## 17.19

This target lacks specificity and so is at risk of failing to motivate and achieve anything concrete. While it sets a timeline (2030), it does not give sufficient direction on what measurements of progress that complement GDP are appropriate indicators. At least one lesson learned from the MDGs is that indicators of progress should be feasibly and cost-effectively monitored. The target is also vague about what 'support for statistical capacity building in developing countries' entails. Herein lies an opportunity to set more specific direction about what i) 'support' demands, and ii) what 'statistics' are required, i.e. morbidity, mortality, immunization coverage, etc.

### LINKAGE WITH OTHER SDGs

This is the 'how' goal, which must contain the required enablers for implementing the entire SDG framework. However, there are also key MOI (means of implementation) targets under each of the goals, which – if sufficiently specific – can provide more targeted enablers to the implementation of the specific goals.

### SCIENCE-BASED COMMENTS ON CONNECTIVITY WITH OTHER SDGs

GOAL	LINKAGE	TARGET
→ All	Goal 17 is key for the successful implementation and monitoring of all the other SDGs. Further analysis would be needed to assess whether the targets a, b, c, etc. under each goal are fully consistent and complimentary to goal 17.	

## **MONITORING AND EVALUATING PROGRESS**

Rio+20 mandated the establishment of the High-Level Political Forum, but the functions of this body, especially those that relate to monitoring and progress reporting by all stakeholders, have not yet been determined nor sufficiently linked with the SDGs and the post-2015 development agenda. HLPF decisions on monitoring and accountability could be relevant to the proposed SDG targets, and this link must be made.

## **SUMMARY**

SDG 17 contains key enablers for action across the entire SDG framework. Data availability represents a critical tool for sustainable development at the local, national, and global levels. This goal could also further stress the importance of stakeholder engagement in implementing the SDGs through partnerships. Strengthening institutional, financial, scientific, technological capacities will be key to the success of the SDGs. The targets would greatly benefit from further specification and quantification.

## **REFERENCES**

Caliari, A. 2013. Analysis of MDG8: A Global Partnership for Development, in *The Power of Numbers: A Critical Review Targets for Human Development and Human Rights*. Harvard FXB Center for Health and Human Rights.

Manning, R. 2010. *The Impact and Design of the MDGs: Some Reflections*. IDS Bulletin 41. Institute for Development Studies. Oxford: Blackwell Publishing.

MDG Gap Task Force (2014). Millennium Development Goal 8: The State of the Global partnership for Development. New York: United Nations. [http://www.un.org/millenniumgoals/2014\\_Gap\\_Report/\\_MDG%20Gap%20Task%20Force%20Report%202014\\_full%20report\\_English.pdf](http://www.un.org/millenniumgoals/2014_Gap_Report/_MDG%20Gap%20Task%20Force%20Report%202014_full%20report_English.pdf)

United Nations 2014. *The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet*. Synthesis Report of the Secretary-General on the Post-2015 Agenda. New York December 2014. [http://www.un.org/disabilities/documents/reports/ SG\\_Synthesis\\_Report\\_Road\\_to\\_Dignity\\_by\\_2030.pdf](http://www.un.org/disabilities/documents/reports/ SG_Synthesis_Report_Road_to_Dignity_by_2030.pdf)





# MONITORING AND REVIEW

Marianne Beisheim, Robert S. Chen, László Pintér

Monitoring and review mechanisms are essential for effective and accountable governance and should be integrated into implementation mechanisms for the sustainable development goals (SDGs) from an early stage. Although efforts to track progress towards global goals and targets should build only on existing capacities, the SDG's broader context and changing social and technological circumstances require and allow a more systematic and ambitious approach. Innovation and determined action are needed on the technical front and in terms of institution building, with important contributions from the natural, social, and health sciences. From a technical perspective there is a need to strengthen Earth Observation and ground-based monitoring and statistical capacities to address critical and persistent data gaps. From an institutional perspective the need is to make sure that monitoring, review and reporting mechanisms are integrated into policymaking processes at all levels and that information is effectively used for improving decisions. While the importance of data collection and monitoring is recognized in the Open Working Group (OWG) proposal for SDGs, more attention is needed to the institutional dimensions of monitoring, reporting and review. An enabling environment is vital to help ensure that ambitious national commitments to implement the post-2015 goals are made.

The expanded set of SDGs and targets cover a wide range of topics for which current, detailed, and trustworthy data may not yet exist and for which traditional data collection and integration methods may be technically difficult – or very expensive – to implement. While the role of statistical and remote sensing agencies will continue to be critical, data will come in more diverse formats and from more diverse sources. Recent attention to the 'data revolution' has inspired new thinking about the opportunities provided by new data and information technologies as well as the new or stronger challenges that may result (UN IEAG 2014). There will also be a need for shared web-based reporting platforms that can accept and provide quality control services for data from different sources and serve as assessment and reporting platforms for multiple audiences. Moving beyond traditional paper-based reports will also allow more creative combining of statistical and geospatial data with qualitative stories that help interpret, contextualize and communicate information to a wide range of audiences.

One of the key challenges likely to emerge is the large volume and complexity of a diverse set of socioeconomic and environmental data and indicators, which may sometimes provide inconsistent or even conflicting perspectives on progress. Making sense of this complex set of information will require significant efforts to ensure information quality, transparency, traceability, and realistic assessment of uncertainties and limitations. There will also be a need for better understanding of the dynamics and linkages across sectors and scales including human behavior and motivations, and for pointing out interlinkages, emerging trade-offs and synergies between goals. Establishing scientifically consistent and transparent protocols, common ontologies and conceptual frameworks for indicators that reflect systemic perspectives and principles for best measurement and assessment practices will be needed (Iyttimäki and Rosentström 2008; Pintér et al. 2012).

The growing emphasis on a wider range of quantitative – and in some cases time-bound – targets calls not only for reporting on status and trends, but also progress with regard to targets. This goes beyond statistical reporting of facts and evidence and requires a more analytic approach. Both global and sub-global reporting – including the global sustainable development progress report to be prepared under the auspices of the High-level Political Forum on Sustainable Development (HLPF) – can build on recent advances in integrated assessment reports and outlooks. These often combine status reporting with the analysis of policy drivers of change and alternative transition pathways that compare present directions with agreed future goals and targets.

As the OWG document points out, significant and sustained investment in capacity building will be essential for improving data collection, monitoring, and assessment. Given the universal applicability of the SDGs and the need for all social actors to be involved in implementation, capacity building is also needed to improve visualization approaches and to educate stakeholders and the public about the interpretation and use of indicators and statistics.

Besides monitoring, the OWG document also calls for a robust mechanism of implementation review. A review process builds on but goes beyond monitoring as it attempts to determine the causes of successes or failures and to develop recommendations on the measures needed to improve goal attainment in the future. According to its mandate, the HLPF, under the auspices of the Economic and Social Council (ECOSOC), is to “follow up and review progress in the implementation of sustainable development commitments.” A voluntary review, starting in 2016, is to build on and subsequently replace the existing Annual Ministerial Review (AMR). The Synthesis Report of the Secretary General released on 4 December 2014 suggests a voluntary, multi-tiered universal review process, based on facts, data, scientific findings, and evidence-based solutions.

Research shows that compliance with norms and their implementation depends either on the political will of decision makers and/or on the capacities of local actors and institutions (Chayes and Chayes 1993). Thus, to make voluntary review attractive and effective, it should provide both incentives and capacity building. Moreover, the review process could encourage countries to honor their commitments by fostering transparency, applying peer pressure, and involving civil society and other stakeholders in holding governments to account.

As suggested in the OWG document, member states would set their own national targets for the implementation of the global SDGs at the national level. Since national governments are mainly accountable to their own citizens, governments should be urged to formulate these national targets and to report on their implementation with the broadest possible participation of civil society and other stakeholders in order to foster local ownership. To avoid cherry-picking and business-as-usual, a first round of reviews could assess the alignment of global and national targets and – as the HLPF resolution demands – also the commitments related to the means of implementation.

Evaluations of the AMR suggest that national reports and presentations should not only describe what progress has been achieved and why, but also discuss gaps and barriers (Beisheim 2015). Hence, these should follow a standardized reporting template, however allowing for a focus on selected targets and indicators. As in other reviews, information collected from both UN entities and Major Groups and other stakeholders could complement national reports. During an interactive dialogue at the global level, HLPF-meeting states would share lessons learned and best practices and could make recommendations. In order for such a review to be feasible and successful, institutional capabilities need to be strengthened.

## REFERENCES

- Beisheim M., 2015. Reviewing the Post-2015 Sustainable Development Goals and Partnerships. A Proposal for a Multi-level Review at the High-level Political Forum. SWP Research Paper 2015/RP1. Stiftung Wissenschaft und Politik, German Institute for International and Security Affairs, Berlin.
- Chayes A. and A.H. Chayes, 1993. On compliance. *International Organization*, 47:175-205.
- Lyytimäki J. and U. Rosenström, 2008. Skeletons out of the closet: effectiveness of conceptual frameworks for communicating sustainable development indicators. *Sustainable Development*, 16:301-313.
- Pintér L., P. Hardi, A. Martinuzzi and J. Hall, 2012. Bellagio STAMP: Principles for sustainability assessment and measurement. *Ecological Indicators*, 17:20-28.
- UN IEAG, 2014. A World That Counts: Mobilising the Data Revolution for Sustainable Development. United Nations Independent Expert Advisory Group on the Data Revolution for Sustainable Development. [www.undatarevolution.org/report](http://www.undatarevolution.org/report).

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