



## **A Framework for Sustainable Development**

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Prepared by the Sustainable Development Solutions Network

The scale of the global sustainable development challenge is difficult to exaggerate. The fight against poverty has made great progress, but more than 1 billion people continue to live in extreme poverty. Inequality and social exclusion are widening within many countries, rich and poor alike. With the world at 7 billion people and an annual GDP of US\$70 trillion, human impacts on the environment have reached dangerous levels and are already exceeding some planetary boundaries. By 2050 there may be anywhere from 8.1 billion to 10.6 billion people and a global GDP of more than US\$250 trillion.

If this growth occurs on the business-as-usual trajectory, without drastically reducing the resource intensity as well as the pollution caused per dollar of economic output, the consequences will include catastrophic environmental threats. Current growth patterns are also not providing enough decent jobs, and are exacerbating inequalities within our societies. The bottom line is that we need a new global growth framework, one that is compatible with social and environmental objectives.

Even at today's global population and economic output, many key ecosystems are being threatened or destroyed. Climate change is not a distant threat but a stark reality in rich and poor countries alike. Global temperatures are rising; extreme weather events are becoming commonplace; the ocean is acidifying; fisheries are being fished to exhaustion; many fossil resources including oil and groundwater are being rapidly depleted; and the earth is in the midst of an unprecedented mass extinction of species. These problems will expand dangerously and rapidly unless the world changes course urgently.

Fortunately, rapid positive change has become eminently feasible thanks to rising incomes, unprecedented scientific and technological progress, a growing political awareness of the need for sustainable development pathways, and the recognition of the importance of strengthened global partnerships. The world has at its disposal the tools to end extreme poverty in all its forms, promote economic growth, and advance environmental sustainability. Where improved tools are needed, particularly to decouple economic progress from the use of environmental resources, these can be developed through concerted action and practical problem solving by governments, business, civil society, science and academia.

No country can tackle the sustainable development challenges alone. Integrated solutions must be developed at local, national, regional and global levels. Every country must rise to the challenge since the traditional distinctions between developed and developing countries or between donors and recipients no longer describe the complex world in which we live. Likewise, businesses and civil society must work towards achieving sustainable development. A compelling framework for sustainable development is needed to mobilize all stakeholders, explain the challenges, focus operational action at the right scale, and form a basis for a true international partnership.

The Sustainable Development Solutions Network (SDSN or the Solutions Network) has been commissioned by UN Secretary-General Ban Ki-Moon to engage scientists, engineers, business and civil society leaders, and development practitioners for practical, evidence-based problem solving. This draft document outlines an operational framework for sustainable development and a vision for the Solutions Network. Sections 1 and 2 describe the framework and possible elements of a goal framework as succinctly as possible. Section 3 highlights key questions that must be addressed in operationalizing the framework, and Section 4 summarizes the objectives of the Sustainable Development Solutions Network.

## **1. The framework for sustainable development**

We are moving from a development period defined by the Millennium Development Goals<sup>1</sup> (MDGs), which are to be attained by 2015, to one defined by goals that recognize the full economic, social and environmental dimensions of sustainable development. The Rio+20 Conference endorsed the concept of Sustainable Development Goals for this purpose.

The MDGs have successfully focused world attention on ending extreme poverty in all its forms and reducing gender inequality. They have accelerated progress towards these objectives and have become a normative framework for development. The discussion around a post-2015 framework must not detract attention away from achieving the MDGs by the end of 2015 or from the core priority of ending extreme poverty. Yet, today's challenges of sustainable development are broader than the scope of the MDGs. They affect all countries, and all countries must contribute to solutions. In addition to national and local governments, businesses and civil society organizations must also be called upon to contribute to meeting the challenges of sustainable development.

The framework for sustainable development describes society's commitment to four interconnected objectives: economic development (including the end of extreme poverty), social inclusion, environmental sustainability, and good governance (including security). Each of these four dimensions of sustainable development contributes to the other three, and all four are therefore necessary for individual and societal wellbeing. Sustainable development is sometimes described by the first three dimensions: economic, social, and environmental. We add good governance and personal security as a fourth dimension to highlight several enabling conditions for sustainable development, including transparency, effective institutions, the rule of law, participation and personal security, accountability, and adequate financing for public goods. These standards of good governance apply to the public sector, the private sector, and civil society.

### **Economic Development and Ending Poverty**

A central task of sustainable development is to complete the job of ending extreme poverty in all its forms and promoting economic development. A billion people or so remain in extreme poverty, lacking adequate incomes, food security, education, basic infrastructure, and access to

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<sup>1</sup> Many other internationally agreed goals exist that together cover much of sustainable development, but these goals have been far less successful than the MDGs in mobilizing public attention and stimulating action.

health care as well as being amongst the most vulnerable to disaster risk. Within the coming generation, i.e. by 2030, it should be possible to ensure that all households have access to basic needs through adequate household income, decent nutrition, food security, and universal access to primary health services including the prevention and treatment of certain non-communicable diseases. Likewise, they should have access to early childhood development, adequate education for professional life skills, and access to basic infrastructure services including, safe water and sanitation, clean energy, and broadband connectivity.

While most countries of the world have the domestic resource base to achieve sustainable development, some 50 or so low-income or otherwise fragile countries do not. They are too poor, too remote, too conflict-ridden, too bereft of natural resources, or too burdened by other challenges to meet the goals for sustainable development on their own. Often they experience insecurity and armed conflict. These countries, including many in the Horn of Africa, the Sahel, Central Asia, and many landlocked and small-island economies, need special international support to break the vicious cycle of lack of economic development, environmental degradation, insecurity, and conflict.

Population growth remains very high in some parts of the world. To enable sustainable development, countries where population growth is still high because of high fertility should accelerate the reduction of fertility rates by expanding access to voluntary family planning and reproductive healthcare, investing in child survival, promoting an understanding of the benefits of small families, investing in girls' education, and adopting a holistic approach to the empowerment of women. Accelerating the reduction of fertility has the potential of ushering in a period where the age distribution of the population is beneficial for economic growth, as the number of potential workers rises in relation to that of children and older persons. Many middle-income countries have benefitted from those changes. For low-income countries to have similar experiences, action to promote the voluntary reduction of fertility should be expanded.

Through broad-based and environmentally sustainable economic growth, all low-income countries can reach the per-capita income threshold of middle-income countries by 2030. Today's middle-income countries can end extreme poverty and become upper-middle-income or high-income countries, depending on their starting point.

### *Social Inclusion*

Labor markets around the world are undergoing unprecedented changes driven in large part by globalization and technical change. Workers with low educational attainments increasingly find themselves without marketable skills, left unemployed or with wages at poverty levels. Good jobs now require more schooling and more specialized training than before. Those with the skills, good education, and social connections, often enjoy huge gains in income. As a result, inequalities of earnings in many countries, rich and poor, have soared in the past two decades, undermining the fairness, justice, and even basic human rights in these societies. Of particular concern is the high youth unemployment in many countries, except in a few where targeted institutions of vocational training and apprenticeships seem to support the school-to-work transition.

Despite major progress, gender inequality persists in many societies and violence against women remains widespread. In addition, discrimination against ethnic minority groups, indigenous peoples and geographically isolated populations still exists in many contexts.

Gender inequality and other forms of discrimination rob societies of the full productive potential of large shares of their populations. Realizing the economic and social rights of all members of society and reducing inequalities are therefore important elements of a framework for sustainable development.

Another challenge of social inclusion is to maintain or enhance the quality of social interactions, which sociologists call “social capital.” This term has many interconnected meanings. It may signify the extent of trust in the society, a scarce resource that contributes to economic productivity and human wellbeing. Social capital may refer to cultural rights and practices that enable people to feel pride in their identities. It also refers to the honesty and accountability of governments and companies. Social capital also covers the ability of people to assert their points of view and pursue their interests in shared public decision-making processes, which are critical to poor people’s access to resources and opportunities and to the realization of their rights. Finally, social capital refers to the resiliency of civil-society organizations – such as charities, self-help groups, and not-for-profit “social companies” that address social needs beyond the profit motive. In many countries research suggests a decline in social capital. Trust is falling, corruption (or the perception of it) is on the rise vis-à-vis both the government and corporate sector, and civil-society organizations may be stymied.

To ensure sustainable development economic gains must be socially inclusive, and the quality of social interactions – culture, trust, honesty, voluntarism, and altruism – needs to be enhanced through the promotion of social ethics and the observance of human rights for all. Pathways towards addressing inequalities, overcoming discrimination, and improving other forms of social capital are complex and uncertain. Yet, there is strong evidence that policies and investments can play an important role in lowering inequalities and promoting equal opportunities for all. These include improved education and on-the-job-training, particularly for the poor; smart policies to promote new industries; administrative reforms and measures to combat corruption; affirmative action for the poor and marginalized; and social safety nets to better manage the risk of sickness and the consequences of old age.

### *Environmental Sustainability*

Sustainable development cannot be attained without ensuring environmental sustainability and pursuing a green economy, meaning a decoupling of economic progress from human-induced environmental damage. In spite of growing public awareness, the dire environmental challenges have worsened considerably during the twenty years between the Rio Earth Summit in 1992 and Rio+20 in 2012: climate change, pollution and unsound chemicals management, unsustainable water use, unsustainable agriculture, unhealthy cities, massive biodiversity loss, emerging diseases, deforestation, desertification, and the depletion and degradation of oceans. It is necessary and possible to reverse these trends, but countries lack long-term strategies to address these deep challenges, and there remains far too little environmental understanding and problem solving at local, national, and global scales.

The poor often depend heavily on natural resources for their livelihoods and survival and are most vulnerable to environmental change, so extreme poverty can only be ended if environmental degradation is halted and reversed. This will require *inter alia* a drastic reduction in key dimensions of primary resource intensity of production and consumption in high-income and middle-income countries.

Of particular urgency is the need to decarbonize the economy by 2050. The world economy is built on fossil fuels, which constitute over 80% of primary energy use globally. In order to safeguard the world from runaway climate change, we need to achieve a decarbonized energy and industrial system by 2050, meaning one that emits far less carbon dioxide, or that captures and sequesters the carbon dioxide that is emitted. Yet even with advances in renewable energy technology, fossil fuels remain cheaper on a market basis than most low-carbon energy sources, and carbon emissions have consequently continued to rise steeply. The crux of the problem is that the market prices of fossil fuels do not reflect their true social and environmental costs, including the costs of climate change and pollution. A “social price on carbon” must be added to the market cost to reflect the true costs of fossil fuels, and thereby induce a shift to low-carbon energy.

Even under the most optimistic scenarios, some severe climate change has by now become unavoidable. For example, in the coming decades the frequency and severity of extreme weather events will increase, putting pressure on agriculture, cities, and infrastructure; some coastal areas will likely be flooded and some fragile regions may become uninhabitable; many more coral reefs will bleach and biodiversity loss will accelerate. As a result, strategies to achieve economic, social, environmental, governance and personal security objectives must be “climate resilient” and promote adoption to climate change.

Another central challenge is sustainable agriculture and food security. Food production is often environmentally destructive, causing groundwater depletion, topsoil loss, greenhouse gas emissions, pollution from fertilizers and pesticides, loss of habitat, and declining biodiversity. While, on average, there is enough food today to feed all 7 billion people on Earth, under-nutrition among billions coexists with over-nutrition (excess caloric intake) of another billion or so. Too much food is wasted. Regions experiencing widespread malnutrition and growing food scarcity today will tend to expand and remain vulnerable to food insecurity over the foreseeable future, especially because of climate change, depletion of fresh water supplies, and land erosion. The rising world population and per capita food demands will exacerbate these problems. These challenges must be addressed by pursuing an environmentally sustainable intensification of agriculture – particularly among smallholder farmers, investments in the resilience to climate change, drastically reduced losses in the food production chain, and promoting the rapid, voluntary reduction of fertility.

Cities and urban development constitute another priority challenge. Cities are often growing at unmanageable rates; are unhealthy for their residents; comprise large and growing slum areas; rely on outmoded transportation and energy technologies; are threatened by severe environmental disasters; and fail to generate the number of jobs needed to employ their often young populations. Since urban infrastructure is very long-lived, investment decisions made today risk locking cities into unsustainable resource use and unhealthy environments for a long time. Yet, cities also offer tremendous potential for positive change and are often at the forefront of innovation in technologies and policies. Cities are increasingly the fulcrum of economic development and poverty eradication, social inclusion, environmental sustainability, and good governance.

Policymakers are generally not familiar enough with the scale of environmental challenges, are too focused on short-term objectives, and are excessively influenced by vested interests that resist the transition to sustainability. Often environmental policies are compromised by the belief that one should go for economic growth now, and may clean up later. But the experiences of many counties show that the cost of “cleaning up later” can be prohibitive. Even

more critically, the fact that the world is meeting or exceeding many planetary boundaries makes it impossible to sustain growth-first policies. Alternative development pathways are available, but governments in many parts of the world doubt their feasibility, overestimate costs, and lack trust in each other's real intention to address sustainability.

### *Good Governance and Personal Security*

Good governance is required of all sectors of society: governments, businesses, and civil-society organizations. National and local governments need to build effective institutions and pursue sustainable development with transparency, accountability, clear metrics, and openness to the participation of all key stakeholders. They should uphold and promote the rule of law as well as basic economic and social rights. Governments must design financing strategies, help mobilize the necessary resources, and provide the public goods needed for sustainable development. Public policy decisions must be made on the basis of scientific evidence.

The most important public good is peace and security, including personal security. Development cannot thrive without safety from personal and psychological violence. When conflict is flaring development becomes impossible and hard-fought gains are quickly reversed, as evidenced by fact that no conflict country is achieving the MDGs. Ending conflict often requires international support in the form of mediation, peacekeeping and assistance to address the underlying economic and social needs that drive conflict. Personal security, ending conflict and peacebuilding are therefore essential components of good governance for sustainable development.

The private sector is the principal engine for economic growth and job creation. It will develop and deliver many of the new technologies, organizational models, and management systems that are needed for sustainable development. Good corporate governance therefore calls for all companies, especially the major multinational companies, to adopt transparent goals for sustainable development, and to hold themselves accountable for those goals vis-à-vis their investors, customers, suppliers, and society at large. We should acknowledge that companies are often more powerful than governments in determining the fate of sustainable development and that they have unrivalled technologies, organizational skills and means. Yet their incentives are often not aligned with the public objectives of sustainable development. There can hence be no sustainable development without good corporate governance and accountability. In particular companies should work responsibly and constructively with governments to address market failures, help mobilize the needed resources and ensure that private incentives become more fully aligned with public objectives. They must be accountable for the environmental and social consequences of their actions, along the lines of the "polluter pays" principle. All of this may require fundamental changes to some business models.

There also can be no sustainable development without civil society doing its part. This includes voluntary organizations that hold both government and business to account in terms of performance and honesty, organize and mobilize communities, deliver services, keep neighborhoods pleasant and safe, and promote cultural activities. It includes philanthropies that support science, research, education, and help for the poor. It includes civil society organizations that defend the environment against pollution and other externalities arising from the economy. And it includes "social enterprises," often with distinct legal status, that work on a business model yet do not pursue profit as their sole or main motive.

A central challenge for governments at all levels, the private sector, and civil society is to fulfill the promise of new technologies for sustainable development. Substantial progress on any of the four dimensions of sustainable development will require the large-scale adoption of advanced technologies already available. Many more sustainable technologies will need to be developed. Universities and research institutions therefore play an important role in sustainable development. They are engines of basic scientific and technological research. They train future generations of leaders who will have to resolve many of the sustainable development challenges left by previous generations. They conduct much of the operational research that is needed to better understand the challenges, devise solutions, monitor and evaluate progress. And they can be an important partner in diagnosing local challenges and devising pathways towards sustainability.

*Synergies and trade-offs – integrating across the four dimensions of sustainable development*

Strategies for sustainable development must be integrated and address the interconnections across the four dimensions. For example, a food security strategy must address the special needs of the extreme poor in rural and urban areas and address gender disparities so that women and young girls have equal access to food. Just as importantly, it must ensure sustainable use of water resources, preserve soil nutrients, protect biodiversity hotspots, and promote resilience as well as adaptation to climate change. Likewise, such a strategy needs to develop effective institutions, ensure adequate financing in the context of limited resources, and much more.

The interdependencies across the four dimensions of sustainable development vary from country to country, from city to city, and from region to region. Therefore, public and private actors at local, national, and regional levels need to diagnose the interdependencies across sectors, identify strategies for exploiting synergies or “win-wins”, and determine how to manage trade-offs across policy areas.

## **2. Setting goals for sustainable development for 2030**

Addressing the challenges of sustainable development requires a shared focus on ending extreme poverty in all its forms and a fundamental transformation in the way our economies are organized. The necessary focus and collaboration across actors and countries can only be achieved through shared global objectives. For this reason the world needs effective and widely shared goals for sustainable development to follow-up on where the MDGs will leave off in 2015. Of course setting global goals will have little impact unless followed up by concerted action, but it is difficult to imagine a pathway towards global sustainability without an ambitious set of shared goals for sustainable development.

Well-crafted post-2015 goals will guide public understanding of complex long-term challenges, inspire public and private action, and promote accountability. Children will learn the goals at school as a short-hand definition of sustainable development. The goals will also promote integrated thinking and put to rest the futile debates that pit one dimension of sustainable development against another. They will mobilize governments and the international system to strengthen measurement and monitoring for sustainable development.

If our sustainable development framework is a good description of the challenges the world faces, then a new set of post-2015 goals till the year 2030 should apply to all countries – rich

and poor – for the four dimensions of sustainable development. This does not mean that every goal must be a “stretch goal” for every country. Rich countries, for instance, are likely to have met most goals relating to economic development, but many still lag behind on goals relating to social inclusion, environmental sustainability, and governance. Countries that cannot meet the goals on their own should receive international support to do so.

The General Assembly of the United Nations will adopt the post-2015 goals following an intergovernmental process of negotiation. While that process is just starting, there is a reasonable chance that the post-2015 goals might comprise the components below.

- Ending Extreme Poverty and Promoting Sustainable Growth
- Promoting Healthy Lives and Sustainable Fertility
- Promoting Quality Education, Job Skills, and Decent Work
- Promoting Gender Equality, Personal Security, and Wellbeing
- Averting Dangerous Climate Change and Industrial Pollution
- Ensuring Food Security and Sustainable Food Supplies
- Protecting Biodiversity and Ecosystem Services
- Building Smart, Healthy and Resilient Cities
- Fulfilling the Promise of Technologies for Sustainable Development
- Ensuring Good Governance and Accountability

These goals may seem utopian. They are not. Indeed the world has considerable wind in the sails to achieve them. Extreme poverty in developing countries was halved between 1990 and 2010, from 43% to around 22%. Child mortality rates have come down, from 97/1,000 to 63/1,000. Enrolment in primary education has risen from 82% to 90% of the number of children of primary-school age. Access to safe water has increased from 76% to 89% of the population. And the technological revolution is spreading everywhere, with mobile phone subscriptions worldwide exceeding 6 billion, including 250 million in sub-Saharan Africa. By 2017, more than 80% of the world will have access to wireless broadband internet. The impetus of technology, management, and global awareness all make it possible to be ambitious regarding sustainable development.

One of the lessons of the MDGs is the need for better data systems to track progress towards the international goals, and to support management efforts aimed at achieving the goals. Therefore, the new set of goals for sustainable development must be bolstered by a massive improvement in local, national, and global data collection and processing, using new tools (GIS, satellite, social networking, etc.) as well as existing tools. We will need real-time, complex, place-based and sub-national data to support the sustainable development efforts.

### **3. Applying the framework: Integrated pathways to sustainable development**

A framework for sustainable development must be applied at global, regional, national and local scales. Each region, each country, each city, and each rural locality will need to make its own situation analysis, asking questions such as: How can we end extreme poverty in all its forms? How can we reduce youth unemployment? How can we reduce disparities across gender and socio-economic groups? What are the locally and regionally available renewable energy resources? What are the local vulnerabilities of food production and food security? How do prevailing fertility rates and population trends affect prospects for sustainable development? And so forth.



Feasible pathways are of course highly complex, subject to great technological uncertainty, and likely to require substantial financial resources. They often require changes in behavior and involve complex interactions across objectives, across time and across actors. The sections below identify a few questions that will need to be addressed in applying the framework. This list is not complete and designed as a starting point to trigger discussion and elicit practical problem solving.

We can at this stage identify a number of key priorities, for example, the worldwide accelerated conversion to a low-carbon energy system and the upgrading of technologies of smallholder farmers. We present an incomplete list of such priorities in Annex 1. Many of these will become target areas for the SDSN.

*(i) The importance of decoupling*

Pathways to sustainable development need to “decouple” economic growth from the rising use of primary resources, thereby reducing the resource-intensity of production. At a time when high-income economies are looking to maintain living standards and re-start growth, and middle and low-income economies want to achieve economic convergence, decoupling is a fundamental condition of sustainable development.

Decoupling requires a holistic approach to the transformation of the entire economy in regard to the use of energy and to the use of resources and materials. Important areas of decoupling include:

- Energy efficiency measures and low-carbon energy systems (renewables, nuclear, carbon capture and storage) can decouple rising energy use from carbon dioxide emissions;
- Precision farming, improved crop varieties, efficient water management, and no-till farm practices can decouple rising food yields from unsustainable utilization of water, chemicals, fertilizers, and land;
- Green buildings, smart grids, and improved transportation systems can decouple urbanization from rising urban energy use and ensure effective land use;

Market signals are not currently adequate to achieve decoupling, since the market does not compel polluters<sup>2</sup> to bear the full cost of pollution and does not establish prices for ecosystem services. This is particularly the case when pollution is global or at long distances from impacted areas, since political systems then have great difficulty in internalizing externalities, either through laws, economic incentives, or social norms. For this reason, successful decoupling will require corrections to faulty market signals, increased political cooperation regionally and globally, strategies to promote research and development on sustainable technologies, and increased public awareness and understanding of the key challenges.

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<sup>2</sup> The term polluter includes *inter alia* low-efficiency producers and wasteful consumers that squander resources with detrimental spillover to society at large.

Investments in sustainable infrastructure will cost money and put a burden on low-income countries. At the core of sustainable development, therefore, must be a *financing strategy* that is deemed to be fair and practical. There will need to be at least three components of such a strategy. First, polluters should pay to clean up after themselves and compensate those bearing the burden of the pollution. Second, ecosystem services need to be priced. Third, rich countries should help poor countries to cover the incremental costs of investment.

Finally, decoupling requires clear strategies for managing non-sustainable “stranded assets” such as fossil fuel deposits that should not be exploited or coal-fired power plants that become uneconomical once the price for carbon emissions rises. Such strategies need to address deep political, legal and financial issues, which would otherwise delay or hinder the decoupling of economic growth from resource use and pollution.

(ii) The need to change behavior and articulate the business case for sustainable development

Putting the world rapidly onto a long-term path towards sustainable development requires very large numbers of individuals to change behavior and make different choices with regards to business management, ethics, politics, healthy life styles and personal consumption, resource use, fertility, education, and so forth. In some instances public policies create the incentives that guide behavior (through corrective pricing for example). Often the behavior is conditioned by factors outside the direct control of public policies and economic incentives. When government leaders are accountable to their people, changing people’s understanding and even behaviors becomes a necessary prerequisite for changing policies.

Operationalizing the framework for sustainable development therefore requires clear diagnoses of the needed changes in professional and personal behavior as well as explicit strategies for bringing about such changes. Such strategies can draw on successful examples from public health, education, politics, and other fields. Changing the behavior of private corporations requires *inter alia* a clear articulation of the business case for sustainable development. In some instances companies are beholden to “old ways of doing things” and fail to explore new business opportunities that increase profitability by reducing material use, lowering pollution, and increasing acceptance by their customers. The Sustainable Development Solutions Network will work with private sector networks to help articulate the business case for sustainable development with a particular focus on overcoming the perceived first-mover disadvantage.

(iii) Quantifying the challenges of sustainable development

Sustainable development requires quantification. At what pace should de-carbonization occur? How much water use for agriculture is feasible in a particular location? How should fertilizer use be moderated to protect crops and waterways at the same time? What are the implications of the growth of cities? What do different demographic pathways imply for countries’ sustainable development prospects? Which are the most effective techniques for reducing and managing disaster risks? These questions, and many others like them, require a quantitative assessment that combines Earth systems with human systems, and does so at many scales, from local to global.

By way of illustration, this section outlines some examples for quantitative issues that the Solutions Network may address. Others will no doubt be identified and tackled by the network’s Thematic Groups.

Economic growth. Using the World Bank’s definitions of income groups, the world is divided between low-income, middle-income, and high-income categories as follows:

Category	Population 2011 (billion)	Mean Income 2011 (\$US PPP)	Total Income (\$US PPP trillions)
Low-Income	0.8	1,383	1.1
Lower Middle-Income	2.5	3,833	9.7
Upper Middle-Income	2.5	10,705	26.6
High-Income	1.1	38,572	43.8
<b>World</b>	<b>7.0</b>	<b>11,574</b>	<b>81.3</b>

As this table shows, raising the low-income countries to at least lower-middle-income status would not by itself lead to a large increase in global income. If today’s low-income countries, with average incomes per capita of \$1,383, were to become lower-middle-income countries at \$3,833 per capita, the increment of income would be \$2 trillion, or just 2.5% of today’s world’s income. If today’s lower-middle-income countries were to become upper-middle income countries, the increment to world income would be 21% of the world income. If today’s upper-middle-income countries were to achieve high-income status, the increment would be 85% of today’s world’s income.

Since resource use remains directly related to income, the main conclusion is that raising average incomes in the poorest countries is not by itself a major resource challenge or burden on the planet. The much greater resource challenge is accommodating the rise of today’s middle-income countries to high-income conditions. The latter can only be accomplished sustainably if the world succeeds in decoupling economic growth, primary resource use, and environmental degradation.

Energy Use and Carbon Emissions. Over 80% of total primary energy supply (TPES) today comes from fossil fuels. Expressed in units of oil equivalent, the world uses 0.19 tons of oil equivalent energy for each \$US-PPP 1,000 of output. On average, these energy sources emit 2.4 tons of CO<sub>2</sub> for every 1 ton of oil equivalent. With world GDP in 2008 on the order of \$US-PPP 64 trillion in 2000 prices, total global emissions of CO<sub>2</sub> in 2008 as a result of primary energy use amounted to emissions of some 29 billion tons CO<sub>2</sub> equivalent in 2008.

This level of emissions (estimated at 32 billion tCO<sub>2</sub>e in 2012), is far too high for safety. At this rate, the carbon-dioxide concentration of the atmosphere is increasing by more than 2-3 parts per million (ppm) each year, thereby surpassing safe planetary boundaries for greenhouse gas concentrations in decades. This is clearly unsustainable. Many studies have shown that the world will need to cut its current emission levels by much more than half by 2050 to avoid the most severe impacts of climate change.

The two ways to decouple are to reduce CO<sub>2</sub> per unit of energy, known as de-carbonization of primary energy, and to reduce energy use per unit of GDP, known as energy efficiency. Energy sustainability will therefore require a combination of deep de-carbonization and energy efficiency.

Here is an illustration of what might be needed. Suppose that the world aims to cut current emissions by half as of 2050 in order to reduce human-induced climate change, recognizing

that an even tougher target might be needed. Suppose also that economic growth (both population and income per person) will raise world GDP by a factor of at least four. Then, CO<sub>2</sub> per unit of GDP will have to decline by a factor of eight. If energy efficiency can be doubled in the period, then CO<sub>2</sub> per unit of energy would only need to decline by a factor of four over the next three decades. Higher increases in energy efficiency would lower the de-carbonization needed per unit of GDP, but even so, the challenge is formidable.

How can this be accomplished? One broad solution might be to electrify most final uses of energy (e.g. electric vehicles rather than internal combustion vehicles, and electric heating rather than boilers), and to generate electricity with very low carbon emissions. The latter goal – decarbonizing the electricity production – can be accomplished by shifting to low-carbon energy sources and by capturing and sequestering the carbon dioxide produced at fossil-fuel-burning power plants (a process known as carbon capture and storage, or CCS). Perhaps decarbonization can one day also be accomplished by removing CO<sub>2</sub> directly from the atmosphere. This approach would have the advantage that it can be applied to any type of emission in any location and even after the CO<sub>2</sub> has escaped. The deep challenge will be to accomplish this de-carbonization at low cost and in all regions of the world. That will require a combination of R&D (to develop new technologies), public acceptability (to shift to new forms of energy), and public policies to shift production from current technologies to low-carbon technologies.

Sustainable food supply. The global food supply is less sustainable and food insecurity is higher than commonly appreciated. About 870 million people have inadequate access to calories and protein (caloric-protein insufficiency), the basic definition of chronic hunger. Another 1 billion or so people have caloric-protein sufficiency but lack access to vital micronutrients such as Vitamin A, folate, omega-3 fatty acids, iodine, and iron.

Yet the situation is more precarious than these numbers suggest. Demand for food and feed is growing rapidly because of population growth and rising meat consumption in developing countries. Yet, the food supply is already under major stress, and this stress is likely to increase as a result of climate change. Supply-side stresses include groundwater depletion (e.g. in China and India); rising temperatures and crop heat stress in much of the world, especially in the tropics; declining and more volatile rainfall and rising evapotranspiration in many regions, especially in the world's drylands; rising prices of fertilizer and other inputs; increasing frequency of extreme weather events (storms, droughts, floods, heat waves, etc.); and the loss of key biodiversity (such as pollinators or native crop varieties). In some regions, the productivity of rainfed agriculture may fall by as much as half over the next decades.

It is sometimes argued that global trade in food and feed grains will solve these problems, providing food security to food-deficit regions. Trade can certainly help, but it is not enough for the poorest countries. These countries are generally agricultural economies, which do not have the foreign exchange earnings to import large quantities of food and animal feed. Moreover, the global grain market is thin, volatile, and prices tend to be high compared with local production using best practices. Finally, the supplier countries are themselves highly vulnerable to climate change and other ecosystem stresses, so the volatility in international agricultural markets is likely to increase.

The world must therefore address major long-term demand-supply imbalances in all regions. This includes increasing agricultural yields in some of the most fragile regions, such as the Horn of Africa, the Sahel, and the dryland regions of Central Asia, where water stress is multiplying. It

also means confronting and solving the growing problem of groundwater depletion, excessive surface water extraction, topsoil loss, pollution in major producing regions (e.g. Australia, China, India, United States), as well as post-harvest losses. All of this will require the deployment of new agricultural technologies, such as improved traits (e.g. drought and flood resistance, saline resistance, , nutritional fortification), micro-dosing, low-till farming, precision farming, improved water management, soil mapping, improved food storage and processing, and more.

Sustainable cities. The world is increasingly urban, and the urban agglomerations are becoming progressively larger. In 1950, 29% of the world lived in cities. As of 2010, the estimate is 52%. The projection for 2030 is 58% and for 2050, a further rise to 67%. Most of this urban growth will take place in developing countries. The sheer magnitude of increase is staggering. The world's urban population is projected to rise from 3.6 billion in 2010 to around 5 billion in 2030 and 6.3 billion in 2050. Creating viable, healthy, safe, and sustainable urban environments for another 2.7 billion people by 2050 is obviously a Herculean task.

Cities will increasingly determine human wellbeing: the quality of daily life, public health, the human impact on the environment, and resilience in the face of climate change. Cities, of course, have some huge advantages over rural areas in the provision of services, infrastructure, and knowledge. Yet they are also vulnerable, especially since so many cities are located near coasts and rivers, and therefore exposed to extreme hydro-meteorological events and rising sea levels.

The main challenge for cities is to be productive, sustainable, and resilient at a time of rapid urban population growth coupled with dynamic economic, social, and environmental change. Cities must be able to attract internationally mobile industries, upgrade their infrastructure, train their young people for a fast-changing labor market, reduce human-induced environmental harms, and be resilient in the face of climate change. It is an extremely tall order. Many of the world's largest cities have not yet begun to design or implement sustainable development strategies. They often lack effective governance mechanisms to plan and anticipate their development. In particular, many lack the capacity to effectively manage land use and to finance the public services that are essential for economic efficiency and social inclusion.

Sustainable population. The world population in 1960 was 3 billion, and it took 14 years to add another billion, reaching 4 billion in 1974. By 1999 the world had reached 6 billion, and it only took 12 years to add another billion, reaching 7 billion in 2011. According to the UN's medium-fertility projection, the global population will reach 10 billion in 2084. This growth represents a major challenge for sustainable development.

Average population growth is slowing. The world's average total fertility rate (TFR) has declined markedly during the past 60 years, from 4.95 children during 1950-55 to 2.45 children during 2010-15. Yet 58 countries still have high fertility, 39 of them located in sub-Saharan Africa, 9 in Asia, 6 in Oceania and 4 in Latin America and the Caribbean. As a group, they have an average fertility of nearly 5 children per woman and, even if their fertility declines to 2.8 children per woman by 2050, they will account for most of the population growth expected in the coming decades. According to the UN's medium-fertility forecast, sub-Saharan Africa's population is on track to soar from 856 million in 2010 to 2 billion by 2050 and 3.4 billion by 2100. The region's share of world population would rise from 7% in 1950 to 33% in 2100.

Such demographic trends could cripple the long-term development prospects in high-fertility countries in at least four ways: First, the parental investments per child in health, nutrition, and education would likely be severely inadequate. Second, women who have many children will have less opportunities to engage in other activities, be it education or gainful employment, and they will be more likely to die in childbirth. Third, government budgets would be strained or unable to keep up with the needs to build more schools, clinics, and infrastructure for a rising population. Fourth, the soaring population could devastate the environment, in the rising demand for arable land, pastures, forest products, and water.

Fortunately, the pathways to accelerating the reduction of fertility are well known. There is plenty of evidence that the combination of women's empowerment, voluntary access to culturally sensitive family planning and reproductive health services, as well as investments in child survival and girls' education can lead to rapid, voluntary reductions in fertility rates. With focused public policies and household awareness efforts, high-fertility countries could reduce the TFR to below 3 by 2030, and perhaps even below 2.5. This would slow population increase and enable much higher levels of human capital investments per child, thereby giving a powerful push to economic development.

The evidence suggests that high-fertility countries, particularly in sub-Saharan Africa, must urgently make a serious commitment to them, especially because they have the most to gain in the economic and environmental spheres by slowing down their population growth sooner rather than later. Other countries with lower average fertility rates need to focus attention on providing low-income women the family planning and reproductive healthcare they need to improve their status and lower high fertility rates.

*(iv) Thinking through some of the hot-button issues regarding sustainable development*

Of course many sustainable development topics are very controversial and unresolved. There are no easy solutions to complex issues, and often difficult trade-offs are involved that need to be carefully studied and discussed.

Some particular hot-button issues require careful analysis and deliberation. The highly charged emotions that surround these issues often prevent thoughtful and informed decision-making. The Solutions Network will seek to provide a forum where these issues can be discussed and debated thoroughly, and on the basis of scientific evidence.

Some of the tough questions that must be addressed include the following:

1. Can nuclear power plants be safe and cost effective? Should nuclear power play a role in decarbonizing the energy system?
2. Are genetically modified organisms (GMOs) a useful component of future global food security or a menace to it? Can GMOs be licensed without jeopardizing the economic needs of the poor?
3. How should the world limit overfishing when very powerful countries are at both the supply and demand ends of the industry?
4. Should poor countries make an effort towards de-carbonizing the energy system, or should they simply adopt the lowest-cost technologies, even if those are high carbon emitters and may lock-in infrastructure for decades to come?

5. Do developing countries have the necessary know-how, technological capacities and financial resources to pursue those efforts? If not, what should the international community do to help them do so?
6. Should countries with high rates of total fertility have targets for fertility reduction?
7. Can large multinational corporations be a major positive force for environmental sustainability?
8. Is globalization invariably contributing to massive inequality of income and high unemployment, and if so, should globalization be rolled back?
9. What role, if any, should geo-engineering play in mitigating human-induced climate change?
10. Should the wealthy countries abandon their goal of economic growth? What do they need to do to make room for the poorer countries?
11. Is there still a role for official development assistance, and if so, how should that role be defined and what should be done to get countries to live up to their commitments?

#### **4. Organizing the work of the Sustainable Development Solutions Network**

The United Nations Sustainable Development Solutions Network has four objectives:

- I. To provide expert advice and support to the various international processes working on the post-2015 development policy agenda, including the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda.
- II. To organize Thematic Groups mobilizing global expertise to identify critical pathways to sustainable development in twelve priority areas:
  1. **Macroeconomics, Population Dynamics, and Planetary Boundaries**  
(interrelations of the global economy (growth, jobs, trade), population dynamics, and the planetary boundaries)
  2. **Poverty Eradication and Sustainable Development in Fragile Regions** (focus on the unfinished business of the MDGs, with special attention to major regions that are lagging behind and facing threats of conflict and environmental distress)
  3. **Challenges of Social Inclusion: Gender, Inequalities, and Human Rights**  
(empowerment of all, irrespective of gender, ethnicity, or class; tools of community participation, civil-society voice, and human rights)
  4. **Early childhood development, education and learning, and transition to work**  
(challenges of early childhood development, primary and secondary education, access to higher education, and the transition from school to work)
  5. **Health For All** (universal access to healthcare, the scope of primary health, the challenge of malnutrition, healthy behavior, and the unmet needs of reproductive health)
  6. **Low-Carbon Energy and Sustainable Industry** (reducing CO<sub>2</sub> emissions from energy and industry; sustainable materials processing, waste management, and recycling of primary resources)

7. **Sustainable Agriculture and Food Production** (global food supply; opportunities for an environmentally sound intensification of agriculture and animal husbandry; threats from climate change; upgrading of smallholder farming as a livelihood)
  8. **Forests, Oceans, Biodiversity and Ecosystem Services** (ecosystem services and the sustainability of the world's forests, oceans, and biodiversity in close coordination with Thematic Group 7 given the importance of agriculture in ecosystem functions)
  9. **Smart, Sustainable and Resilient Cities** (pathways for promoting equitable access to sustainable urban services (e.g. transport, energy, water, sanitation, waste management); reduced pollution and high efficiency in resource use; adequate housing; public voice and participation; resilience to climate change and other environmental hazards)
  10. **Good Governance of Extractive and Land Resources** (sustainable management of a country's natural resource base, including its mineral wealth and land resources with particular attention on the interaction of foreign investors, local communities, and national-scale development strategies)
  11. **Global Governance and Norms for Sustainable Development** (global rules of the game regarding technology, trade, foreign investment, tax havens, and global responsibilities for the environment with particular attention to ways that current rules may impede sustainable development and an equitable allocation of global rights and responsibilities regarding the global commons)
  12. **Redefining the Role of Business for Sustainable Development** (synthesis of ideas, including from the other Thematic Groups, on how business in key sectors can contribute to sustainable development; ways for business and financial markets to internalize externalities such as environmental damage and support a shift towards the polluter pays principle; management of non-sustainable "stranded assets" as part of a shift to a socially and environmentally sustainable economy)
- III. To identify, vet, and promote solutions that can drastically accelerate progress towards sustainable development but are not being deployed at the required scale, such as early stage, pre-commercial development, demonstration, and testing of innovative policies, promising new technologies, institutional innovations, business models or combinations thereof. This work will be predicated on the idea that innovations are taking place in every country and that these innovations can generate learning elsewhere.
- IV. To build a global Knowledge Center Network involving universities, research centers, civil society organizations, and companies around the world to accelerate practical problem solving for sustainable development at the local, national, regional, and global level.

The Solutions Network will be action-oriented. We will therefore not prepare lengthy reports or draw up detailed strategies for sustainable development. Nor will we endeavor to address



every issue pertaining to sustainable development. Instead the network will focus on the areas that are of interest to its members and where it has the greatest comparative advantage.

The Solutions Network's Leadership Council acts as the board of the Solutions Network. It comprises roughly 60 leaders from academia, the research community, business and civil society. The Leadership Council will review solutions and pathways to sustainability. It will also help make the linkages across different priority areas and adopt the network's strategy, including terms of reference for the Thematic Groups as well as by-laws for the Knowledge Center Network.

The SDSN Thematic Groups will be *solution oriented* rather than research oriented. Their goal is to spur governments, UN agencies, and the public towards practical solutions to the greatest challenges of sustainable development. They will map out long-term pathways to sustainability, highlight priority actions, and suggest early-stage demonstration projects.

Each Thematic Group, in its respective field, will address five main questions:

1. What are the main risks in Business As Usual (BAU), particularly with regards to the four dimensions of sustainable development?
2. What are critical pathways to sustainable development? What are the main linkages, synergies, and trade-offs with other areas? Which obstacles must be overcome? Are there examples where such obstacles have been surmounted and what lessons can be learned?
3. Which tough and controversial questions need to be resolved?
4. What are the "solutions" available to the public and private sectors for early action? Which solutions are needed, but not yet on track for rapid deployment? How can such solutions be implemented or scaled-up?
5. What are the key metrics of sustainable development that should be developed and monitored? To what extent have the MDGs provided us with the necessary data to support decision making for sustainable development?

Each Thematic Group will determine its priorities and three-year work agenda in the coming six months, partly in response to questions put to it by the High-Level Panel on Post-2015 and by governments around the world. Some of the specific questions likely to confront each Thematic Group are summarized in Annex 2.

Starting in 2013, the Knowledge Center Network will be established around one or more regional centers for each major region. Each regional center will focus on regional pathways towards sustainable development and help promote solution initiatives in the region.

One of the core goals of the SDSN Knowledge Center Network is to strengthen local and national problem solving for sustainable development by empowering universities and research centers to play more active and effective roles. To this end the network aims to ensure that every SDSN member university and research center in any part of the world can access the knowledge needed to stay up to date and be an effective support to government, civil society, and the business sector in local and national problem solving.

## **Annex 1: Some priority areas for the Solutions Network**

The SDSN will help accelerate joint learning across the research community, academia, the private sector, and civil society to find practical answers to sustainable development challenges. Core priority areas may include the following:

- A major effort to upgrade education and skills for the 21<sup>st</sup> century so that all countries can participate fully in the knowledge economy and the information revolution;
- A holistic approach and sustained push to ensure universal access to health services and healthier life styles (healthier diets, reduced tobacco use, more exercise, and so forth);
- Expanded use of modern communication and information technologies to help address the special challenges of the extreme poor, improve government service delivery, and increase the transparency and accountability of commitments towards sustainable development;
- A massive, targeted, sustained investment in all regions of the world in low-carbon energy systems, with high-income countries helping the low-income countries to cover the incremental costs;
- A major effort in the vulnerable dryland regions to tap solar power, where the potential is high and potentially game changing for economic development;
- A major effort to empower poor families in poor countries to reduce total fertility rates through women's empowerment, access to girls' education, reproductive health services including voluntary family planning, and investments in child survival;
- A major effort to upgrade smallholder agriculture through a new "triple-green revolution," that is, a rise in sustainable farm productivity that improves yields; raises household incomes and nutrition; and becomes more environmentally sustainable, through climate-proofing and better environmental practices;
- A new era of urban development, in which every metropolitan area has a sustainable development strategy, using the best of advanced technologies in mobility (e.g. bus rapid transit systems, self-driving light electric vehicles), green buildings, local participation in decision-making, urban design for healthy urban lifestyles, and resilience to climate change;
- A major collaborative effort to bring more of the world's forests under sustainable management regimes, delivering ecological services, social benefits and economic development on an ongoing and renewable basis.
- A clear articulation of the business case for sustainable development and clear metrics beyond GDP to track the relative performance of countries, cities and the private sector;
- Improved communications to the public, particularly youth, about the importance of transformative change to assure a sustainable future.

## **Annex 2: Likely questions to be confronted by the Thematic Groups**

### **Thematic Group 1: Macroeconomics, Population Dynamics, and Planetary Boundaries**

- What are the prospects for global economic growth and convergence in light of the environmental planetary boundaries? What are the implications for economic policies?
- Which regions face the greatest challenges, in potential violent conflict, energy needs, population dynamics, climate change, environmental hazards, isolation, or other obstacles?
- Which regional biomes of planetary importance require improved stewardship? How can such stewardship be organized and maintained?
- Can wasteful consumption and production practices be identified in order to conserve resources, reduce pollution, and raise wellbeing? How should governments, the private sector, and civil society respond?
- Are today's high fertility rates in some low-income countries compatible with sustainable development? What lessons (if any) can be drawn for national policies?
- What are the social, economic, environmental, security, and political implications of aging, low-fertility, and rising immigration for the high-income and middle-income countries?
- How vulnerable is the world to disaster events at local, national, and global levels?
- How do globalization, population dynamics, migration, and technological change alter the job prospects for youth today in various parts of the world? How should governments respond?
- How will societies in the future ensure high-employment economies?

### **Thematic Group 2: Poverty Eradication and Sustainable Development in Fragile Regions**

- What are the particular challenges and opportunities facing the poorest countries?
- What are the most promising strategies for promoting sustainable development and peace-building in vulnerable regions, including the Sahel, the Horn of Africa, Central Asia, and the small island economies?
- What are the most innovative strategies for ending conflict and building peace in fragile regions or where violence is entrenched?
- How can business and the international community contribute to stabilizing fragile regions?
- What are the links between low development, desertification, water stress, other environmental constraints, disaster events, and political instability and conflict?
- How will these challenges change as climate change and other environmental changes continue to intensify? How can fragile countries adapt to climate change and what are the limits to such adaptation?

### **Thematic Group 3: Challenges of Social Inclusion: Gender Equality, Inequalities, and Human Rights**

- How can gender equality be advanced in regions where it currently lags?
- How can countries strengthen social inclusion, particularly of minorities, indigenous populations, and other marginalized groups?
- How can basic human rights (civil, political, economic, social, and cultural) support the transition to sustainable development?

- What is the role of civil society in promoting sustainable development, and can that role be fostered through specific policies?
- What human rights institutions at the national and global level can be strengthened?
- What administrative, legislative and constitutional models are available in support of gender equality, social inclusion, and human rights?
- Which new metrics are available for happiness and human well-being? What are their implications for sustainable development strategies?

#### **Thematic Group 4: Early childhood development, education, and transition to work**

- How can countries achieve universal access to high-quality early-childhood, primary and secondary education?
- What skills, training, and labor market practices are needed for the future?
- How should education systems be reformed in order to ensure universal access, social equity, gender equality, lifelong learning, and affordability?
- How can new information and communication technologies (ICT) be used to promote greater access to formal education and to lifelong learning, particularly in poor countries?
- Which tools exist to promote life-long behavior change programs for sustainable development?

#### **Thematic Group 5: Health For All**

- What are the financial, organizational, and technological pathways to providing health for all in each country?
- How should countries identify the “basic package” of services to which all citizens are entitled?
- How can access to reproductive health services be improved?
- How can health for all be financed?
- How should the world prepare effectively for the control of emerging infectious diseases?
- How should countries adjust to the changing epidemiological risks, such as aging, obesity, and other chronic non-communicable diseases?
- How can new information technologies, genomics, and other cutting-edge advances, improve the delivery of public health and healthcare services?

#### **Thematic Group 6: Low-Carbon Energy and Sustainable Industry**

- What should be the pace of de-carbonizing the global energy and industrial system through increased efficiency and low-carbon technologies in order to come as close as possible to the internationally agreed target to limit temperature change to 2°C?
- What should be the key elements of a national low-carbon strategy promoting energy efficiency and low-carbon technologies?
- What energy endowments and choices are available in different parts of the world for solar, wind, geothermal, ocean, nuclear, or other low-carbon fossil-fuel-based strategies?
- Which pre-commercial technologies need to be developed and improved in order to permit the necessary de-carbonization? How can the testing and possible deployment of these new low-carbon technologies be accelerated?

- How can resource use efficiency and recycling of primary resources be improved? How can waste management be improved?
- Which strategies exist to manage and contain pollution from industry?

### **Thematic Group 7: Sustainable Agriculture and Food Production**

- How can the planet and each major region of the world achieve food security in the face of population change, rising demand for food and animal feed, deforestation, water stress, climate change, and other environmental threats? In particular, how can agriculture increase climate resilience and adapt to climate change?
- What are the metrics for sustainable land use in forests, pasturelands, and farmlands?
- How can countries best ensure that their populations have access to adequate nutrition?
- How can the special needs of smallholder farmers best be met?
- How can livestock management and animal husbandry become sustainable?
- What should be the role of genetic improvement of crops and animals, precision farming, and other advanced technologies in achieving food security and better nutrition? How should the intellectual properties and risks related to these technologies be managed?
- How can we ensure sound management of agrochemicals and fertilizer to reduce negative effects on human health and the environment?
- What are the prospects and the limitations for agro-ecological approaches and organic farming?
- What new organizational forms of agriculture will be required to overcome constraints associated with small landholdings in developing countries?
- How should current global, regional, and national policies on subsidies and trade be changed to enable more sustainable agricultural development?
- What steps should be taken to reduce food waste?

### **Thematic Group 8: Forests, Oceans, Biodiversity and Ecosystem Services**

- How can forests, wetlands, and other land-based ecosystems be managed sustainably in the light of climate change?
- What strategies exist to enhance sustainable water management in light of the needed expansion in agricultural output?
- What code of conduct should apply to sustainable development of currently untapped land and water resources? How can deforestation be curtailed?
- How to put a value on ecosystem services and institute a polluter pays principle to ensure the alignment of private and public interests in a sustainable management of ecosystem services?
- Which are the best metrics to quantify the role of forests in protecting watersheds and rainfall regimes?
- How can the world better manage key global commons, such as ocean fisheries, planetary biodiversity, trans-boundary pollution, trade in endangered species, and deep-ocean resources?

### **Thematic Group 9: Smart, Sustainable and Resilient Cities**

- How can cities promote gainful employment (especially for youth), adequate housing and equitable access to infrastructure services (including transport, energy, water, sanitation, and other infrastructure)?
- How can cities ensure a higher efficiency of resource use (energy, water, material flows)?
- What new forms of transport, power, buildings, and governance can make future cities more livable, productive, resilient, and politically accountable?
- How can cities strengthen resilience to climate change and other environmental hazards?

### **Thematic Group 10: Good Governance of Extractive and Land Resources**

- What rules should govern the extraction of non-renewable resources (minerals, fossil fuels) and renewable resources (timber, fisheries, agricultural products), in order to ensure social fairness, economic efficiency, and environmental sustainability?
- How can these rules be promoted and enforced by industry standards, national regulation, market-based incentives, and global rules?
- How can vulnerable poor countries and global companies strike win-win agreements on the sustainable development of natural resources? How can natural resource extraction promote sustainable development?

### **Thematic Group 11: Global Governance and Norms for Sustainable Development**

- What standards of global fairness, resource use, cost sharing, and efficiency should be employed in managing the global commons?
- How can the world ensure that international rules for trade, foreign direct investment, intellectual property rights, taxation of cross-border flows, and so forth be consistent with long-term pathways towards sustainable development and an equitable allocation of global rights and responsibilities regarding the global commons?
- How should the world govern and regulate the deployment of major new technologies such as geo-engineering that have planetary-scale implications?
- Which financing mechanisms are available for sustainable development and how can they be developed?

### **Thematic Group 12: Redefining the Role of Business for Sustainable Development**

- What are some the most effective ways for business to contribute to sustainable development? Which policy reforms are available to accelerate the uptake of new private sector solutions?
- How do policies and regulation need to change to better mobilize business for sustainable development?
- How will business practices, incentives and approaches to company valuation need to change to better align private interests with the social objectives of sustainable development? How can this be achieved?
- Which public-private strategies are available to manage non-sustainable “stranded assets” as part of a shift towards a socially and environmentally sustainable economy?