Environmental Sustainability
for Human Well-being in the Post-2015 Development Agenda

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Foreword

As the world prepares to commit to a set of goals that will help determine the well-being of our planet, we must remain resolute in the conviction that the only future to deliver an inclusive and equitable form of prosperity will be an environmentally, socially and economically sustainable one. Ecosystems pushed to the brink of their capacity to serve us, the fast depletion of life-sustaining natural resources, the escalating threat of climate change, and rising inequality make the shift towards a global green economy a post-2015 priority.

The costs of resisting this transition are increasingly well-documented. Estimates show that 8 per cent of the world's population earns half the world's income, while two thirds of the world's people live in countries where income inequality has risen since 1980. These and other inequalities are likely to intensify as the world's available natural capital is exhausted and the global population continues to climb. For example, the International Resource Panel estimates that the consumption of natural resources will triple by 2050, threatening an already degraded ecological foundation of food and nutrition security.

The economic consequences of inaction are just as alarming. Trucost puts the annual cost in natural capital degradation and negative environment externalities at US $7.3 trillion a year, almost six times the cost of greening our economies. These and other forecasts are making the economic and social benefits of responsibly managing our natural assets increasingly compelling. For instance, restoring the 2 billion hectares of the world's degraded agricultural land could boost food production by up to 79 per cent – or feed up to 2.25 billion people.

The good news is that momentum is now building for a shift

in policy and fiscal reform that takes greater account of the environmental risks and opportunities inherent in social and economic development. This shift is marked by the worldwide spread of green economy policies, with more than 65 countries now actively pursuing them, and 48 of those taking steps to develop national green economy plans. This publication was first presented to UN Member States and Civil Society as a background document to the First Session of the United Nations Environment Assembly in July 2014. As this publication and the Rio+20 outcomes make clear, the post-2015 development agenda demands a new vision and a responsive framework with sustainable development at its core, and one in which the "business as usual" model of development is replaced with an ambitious, integrated and transformational agenda for action. In the run-up to the formal political negotiations on the post-2015 agenda that will take place between Member States at the General Assembly, we hope that this publication will encourage the balanced integration of sustainable economic growth, social protection and justice, and environmental stewardship in the Sustainable Development Goals.

By building on the achievements of the Millennium Development Goals, addressing the gaps, and responding to the new challenges of the 21st Century we can ensure a life of dignity for all, where each of us can thrive within the Earth's safe operating space, and leave behind life-sustaining assets for future generations. UNEP is committed, with the support of all partners and stakeholders, to making this vision a reality.

Achim Steiner
UN Under Secretary General and
UNEP Executive Director

'UNEP is committed with the support of all partners and stakeholders, to making this vision a reality.'

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'... we can ensure a life of dignity for all.'

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Executive summary

Heads of State and Government and high-level representatives, having met at the United Nations Conference on Sustainable Development in June 2012, renewed their commitment to sustainable development and to ensuring the promotion of an economically, socially and environmentally sustainable future for our planet and for present and future generations. The follow-up to that historic moment has seen an intense period of multi-stakeholder consultation and analysis, which is to culminate in the achievement of international consensus on the post-2015 development agenda with sustainable development goals at its core.

A new development agenda should carry forward the achievements of the Millennium Development Goals, build on their lessons and respond to the challenges of the twenty-first century. Development cannot be met ambitiously and irreversibly without integrating environmental risks and opportunities. Integration – and not aggregation or prioritization – will be essential to the post-2015 development agenda. An integrated approach can generate multiple benefits and minimize or manage trade-offs, and would comprise three interlinked principles:

(a) **Leave no one behind** by ensuring sustainability, meeting a basic level of environmental and social standards;
(b) **Live within the Earth's safe operating space**, while ensuring equitable prosperity and sustainable growth;
(c) **Leave assets behind for future generations** by building social, economic and environmental capital.

Environmental sustainability is a prerequisite for sustained and irreversible socioeconomic development and poverty eradication. The present

information note focuses on the interlinkages between the environmental, social and economic dimensions. Five key transformational issues can be synthesized from a review of these interlinkages:

- Recognizing the **aspiration of every citizen to a clean, healthy and productive environment** as an essential standard for leaving no one behind and eradicating poverty. This suggests the need for the redefinition of poverty as a multidimensional issue but would require the development of a global consensus to define it in all its forms.

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- Improving **socioeconomic and environmental benefits** by making major investments in **green, decent and meaningful jobs**, such as in **renewable energy, energy efficiency, ecological restoration and waste management.** Investing in improving the sustainability of agriculture, fisheries, forestry and animal husbandry **protects existing rural jobs and the ecological foundation of our societies** and reduces rural-to-urban migration. The public and private sectors could work towards suitable education policies, strengthening vocational training for rural and urban job markets, and reskilling and retooling the workforce.
- Ensuring long-term human well-being without depleting the finite resources of the planet: living within the global safe operating space and doing more and better with less. This can be achieved through **inclusive and green economic development,** by reducing the material, energy and pollution intensity of current economic activities, while maintaining and sustainably increasing the productivity of those activities.
- **Shifting consumption patterns to consume better and in a safer manner** without slowing down sustainable growth. Sustainable consumption is not about reducing consumption; it is about consuming better. Shifting consumption patterns should generate new jobs and markets, stimulate innovation in sustainability, transfer savings and resources to productive enterprises, and address malnutrition and obesity.
- Leveraging major investments to **restore natural capital** and transform infrastructure to secure services for current and future generations. **Long-lasting infrastructure,** buildings and consumer products increase resource efficiency, and reduce material intensity. A major effort would be needed over the coming decades to repair and restore the Earth's life-support systems by developing policy and fiscal incentives, innovative technologies and community-led campaigns.

AN INTEGRATED FRAMEWORK FOR THE SUSTAINABLE DEVELOPMENT GOALS AND THE POST-2015 DEVELOPMENT AGENDA

Introduction

Extensive consultations undertaken by Member States, the United Nations system and a wide range of civil society stakeholders have identified key challenges that should be addressed in the post-2015 development agenda. Priorities in the social, economic and governance areas include: access to basic services and resources, social protection, health, education, poverty eradication, employment, food security, inclusive prosperity, technology, peace and security, rule of law, human rights, the combating of corruption, and transparency. A new development agenda should carry forward the achievements of the Millennium Development Goals. However, it has also been recognized that the Millennium Development Goals fell short by not integrating the economic, social and environmental aspects of sustainable development as envisaged in the Millennium Declaration, and by not addressing the need to promote sustainable patterns of consumption and production[1].

Development ambitions cannot be met without integrating the environmental risks and opportunities.

Integration will be essential to the post-2015 development agenda as a key reference point not only in terms of the three dimensions of sustainable development, but also in terms of the integration of the Millennium Development Goals in the sustainable development goals framework. A compelling new vision would integrate – in a balanced way – the economic, social and environmental dimensions. Integrated solutions can generate structural and transformative change, and will help to ensure that the post-2015 development agenda will be aspirational, inclusive and universal in nature, as agreed at the United Nations Conference on Sustainable Development.

Development ambitions cannot be met without integrating the environmental risks and opportunities

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Three interlinked principles for sustainable development

An integrated approach can be defined through three interlinked principles, which simply put are:

(a) Leave no one behind;

(b) Live within the Earth's safe operating space;

(c) Leave assets behind for future generations.

These multiple ambitions of sustainable development are interdependent. They can be transformed into three conceptual "filters" to assess whether the sustainable development goals and the post-2015 development agenda are comprehensive, complete, coherent and cohesive[2]. Essential solutions can be defined under each (see paras. 5–14) and are further elaborated in section II.

The poor, vulnerable, and marginalized should be assured of a minimum level of social and environmental protection, and a basic standard of living

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LEAVE NO ONE BEHIND AND PROVIDE A LIFE OF DIGNITY FOR ALL THROUGH SUSTAINABLE ACTIONS

The approximately 1.2 billion people living in extreme poverty must be enabled to achieve a life of dignity. Groups such as small-scale producers, indigenous people and women face increasing difficulties in accessing natural resources as these become scarcer and more costly. Environmental sustainability is a prerequisite for sustained and irreversible socioeconomic development and poverty eradication. It has been recognized that human rights and the environment are linked through the aspiration of every citizen to a clean, healthy and productive environment[3]. This is an essential ingredient for ensuring that no one is left behind, and more work could be done to better define and safeguard that aspiration.

Ensuring equitable access to basic goods and services derived from natural resources such as energy, water, sanitation, waste management, shelter and food, is high on the world agenda, but achieving such access through current models of scaling up and replication will further degrade the environment. A shift to more efficient and less polluting practices can be made by investing in innovative and green technologies for more equitable delivery of basic services.

Growing demand for sustainable nature-based products also creates new jobs and market opportunities for poor communities and small-scale producers in remote rural areas that conventional service providers cannot reach. Governments and civil society could aim to achieve this objective through policy and fiscal reforms, efficient management practices, new and innovative investments, and informed consumer choice.

We can do more and better with less

ACHIEVE GREATER AND INCLUSIVE PROSPERITY WITHIN THE EARTH'S LIFE-SUPPORT SYSTEM

The Earth's human population is expected to rise to 9.5 billion by 2050, and the pressure this will place on planetary resources means that ensuring sustainability of our global life-support system is of universal concern. The well-being of humanity and the functioning of the economy and society ultimately depend upon responsible management of the planet's finite natural resources. Ecological thresholds are different at different scales, but crossing cumulative thresholds at the global level, with climate change acting as a "threat multiplier"[4], will affect everyone on the planet whether in developed or

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developing countries. Ultimately, the poorest will suffer the most as they generally have the least capacity to deal with negative impacts. Ensuring prosperity today and in the future will require that economic growth no longer degrades the environment. Growth can be delinked (decoupled) from increasing material and resource use, and from the environmental and social impacts of unsustainable consumption and production, through a shift towards an inclusive and resilient green economy.[1]

Moving towards living within the global safe operating space, and doing more and better with less, can fuel innovation and local-level solutions. It will also need accompanying behavioural changes that influence consumption and bring about more societal cohesion. Transitioning to a green economy and sustainable consumption and production can strengthen economic growth in countries by shifting from traditional consumption-led growth models with overdependency on imports and consumer expenditure, and an entrenched reliance on unsustainable patterns of consumption and production, towards more sustainable economic growth strategies.

Sustainable consumption is not about reducing consumption, but about consuming better

Sustainable consumption is not about reducing consumption, it is about consuming better – about what we buy and how we live in an intelligent and environmentally sustainable way. Shifting consumption patterns should not slow down growth, but rather should generate new jobs and markets, stimulate sustainable innovation, transfer savings and resources to productive enterprises, and address hunger and reduce obesity.

Country responses are likely to be differentiated depending on the current and projected economic circumstances and lifestyles of individuals and communities. With “relative decoupling”, production and consumption increases, but overall resource use and pollution increase at a slower rate than that at which the economy expands. With “absolute decoupling”, production and consumption increase, while resource use and pollution actually decrease in absolute terms. While absolute decoupling

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is possible, it is generally harder to achieve in technological terms, and often requires more financial investment and better institutional frameworks. As such, absolute decoupling is more immediately achievable for wealthier societies, which are expected to lead the way to achieving sustainable consumption and production, as enshrined in the 10-year framework of programmes on sustainable consumption and production patterns.

INVEST TO ACHIEVE GREATER RESILIENCE AND SECURE FUTURE GENERATIONS' LIVELIHOODS

Investment to produce more and better natural capital, social capital and economic capital (e.g., infrastructure and the built environment) provides the means to achieve the multiple aspirations of sustainable development. Building more capital secures the assets of future generations and, if done with longevity in mind, can also ensure intergenerational equity and resilience to social, economic, political and environmental shocks and disruptive change.

Healthy, educated and self-determining human populations provide the workforce for vibrant economies. Knowledge, skills and culture together represent social capital. Investing in education and knowledge for sustainable development, including traditional knowledge, expands our ability to adapt and find new solutions.

Investing in long-lasting infrastructure, buildings and consumer products increases resource efficiency, reduces material intensity and secures services for future generations.

Ecological restoration has multiple benefits including in many cases a net profit for public and private sector investment. Currently, 60 per cent of the Earth's ecosystems are degrading, augmenting the impact of natural disasters, and lowering the productivity of land and marine ecosystems.[6] In some scenarios, loss of ecosystem services is projected to result in

a 25 per cent loss in the world's food production by 2050.[7] Investment in restoration can range from hundreds to hundreds of thousands of United States dollars per hectare, and has therefore been daunting for public or private entities to undertake. However, the world can no longer afford to ignore the destruction of its ecological infrastructure or to leave it as a legacy for future generations. Evidence is mounting that the cost of restoration is much lower than the long-term costs of the alternatives, and can generate profit. For example, in South Africa, investment in restoring wetlands has led to increased employment, higher crop and reed productivity, more grazing for livestock and more water for domestic use. [8] The cost of reducing thermal pollution in the Tualatin River of Oregon, United States of America, by means of mechanical chillers was 15 to 30 times higher than the cost of establishing riparian forests to shade the water and augmenting stream flows with releases from upstream reservoirs.[9]

A major effort is needed over the coming decades to repair and restore the Earth's life-support systems for today's needs and for future generations

Building on existing internationally agreed environmental goals and targets

At the United Nations Conference on Sustainable Development, Heads of State and Government recognized the significant contributions to sustainable development made by the multilateral environmental agreements[10] and requested that the future sustainable development goals build upon commitments already made. [11] There are many globally agreed goals contained in both binding and non-binding multilateral instruments, especially in the environmental sector.[12] Since 2012, governments, through their participation in the multilateral environmental agreements, have encouraged all partners to consider existing goals as the basis for future goals.

The future goals and targets should be at least as ambitious as those that already exist, and preferably more so. The inclusion of selected existing targets would underscore the urgency of existing commitments.

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The future goals and targets should be at least as ambitious as those that already exist, and preferably more so

Sustainable development goal targets on renewable energy, energy efficiency and low-carbon development trajectories would reinforce the objectives of the United Nations Framework Convention on Climate Change without duplicating its processes. Integrating biodiversity and ecosystem values into indices of poverty, prosperity and wealth, would support the Aichi Biodiversity Targets as they address the drivers of unsustainability. The new goals and targets could highlight emerging issues, and they could set a vision for renewing commitments to agreements whose terms will expire in the coming decades.

Universal concerns, differentiated responses

The post-2015 development agenda cannot be a zero-sum game; benefits or gains to one group or sector should not translate into losses for another.[13] Goals should be complementary and consistent; no goal should be achieved at the expense of another goal. Universality can be defined in several ways:

(a) Issues that are of common concern (e.g., the global commons, or the global financial system) that require common action;

(b) Issues that do not affect countries and peoples in the same way or to the same degree, but require common action to address them in a globalized interdependent world (e.g., food security, the illicit trade in wildlife, managing chemical waste, unsustainable lifestyles or regional dust storms);

(c) Issues that may not be significant everywhere, but are recognized as requiring widespread support (e.g., eradicating extreme poverty).

It is also important to recognize that even countries that have achieved certain goals are vulnerable to reversal of such gains from future environmental, economic and social shocks. Responses can be differentiated through choice of development pathways and according to national circumstances and priorities. Some countries are able to leapfrog the usual development trajectory by adopting a more resource-efficient and less polluting pathway, which avoids future costs. Countries' pathways will depend on their reconciliation of short-term versus long-term priorities.

Some countries are able to leapfrog the usual development trajectory

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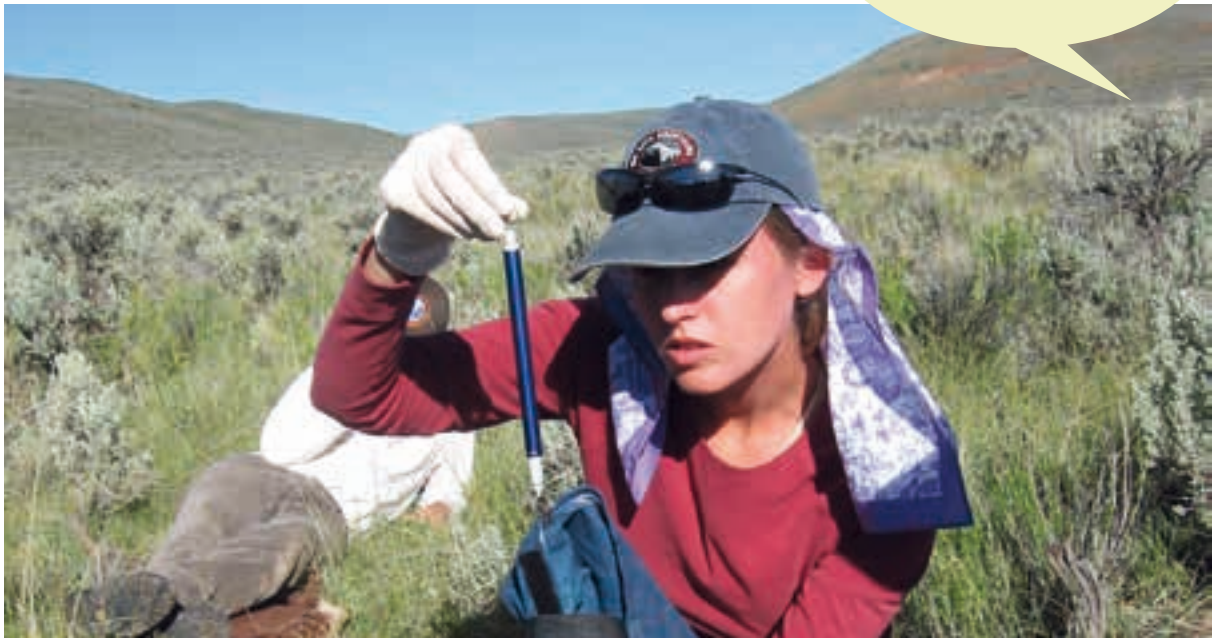
Targets and indicators

Solution-oriented targets represent the best means of capturing an integrated vision while at the same time being actionable. For example, a target on reducing poverty may not be as effective in fostering an integrated approach to implementation as a target on increasing access to green and decent unskilled jobs, which aims to reduce poverty.

The nature and scale of means of implementation (e.g., finance, policies and institutions) is better assessed and committed when targets and indicators are actionable.[14]

Capacities should be built for new forms of measurement, such as integrated indices, that can become an incentive for greater cross-sectoral collaboration. Indicators could be direct or proxy, and could be disaggregated to capture gender, equity, age, disability status and regional differentiation.

Targets and their associated indicators should be scientifically credible



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EVIDENCE FROM INTEGRATED SOLUTIONS

Eradicating extreme poverty and inequality and providing decent employment through an inclusive green economy

An overwhelming majority of the 3 billion poorest people in the world live on smallholder farms, around forests or in coastal area and depend on the productive capacity of nature (such as soil, forests, fish, and water).

It is estimated that ecosystem services and other non-marketed environmental goods account for between 47 and 89 per cent of the "GDP of the poor". Current policies and investment choices have resulted in the degradation of resources, extreme poverty for some and inequality for others.

Estimates show that 8 per cent of the world's population earns half the world's income, and the richest 85 people in the world own as much as the poorest half of the world's population.[15] More than two thirds of the world's people live in countries where income disparities have risen since 1980.

Redefining poverty and economic growth will provide the transformation required for sustainable development. When national savings are adjusted for the depletion of natural resources, they show a decline since the late 1990s, almost to zero in 2008. The degradation of the productive assets of the poor, compounded by a lack of access to modern sustainably built infrastructure, financing and markets, creates a poverty trap, which leads to a reinforcing loop of further degradation and worsening poverty.

Redefining poverty and economic growth would show the true state of a nation's wealth and the sustainability of its growth.[16]

Income-based poverty measures are too narrow in focus. Poverty is made of many other assets, including education and skills, health, sanitation, water, shelter, security, natural capital, energy, and formal or informal means of production. Similarly, measures of wealth and growth focus only on a few economic indices, whereas recent indices, such as the Inclusive Wealth Index measure a full range of assets such as manufactured, human and natural capital.

Public and private investments in green and decent jobs will provide the foundation for sustainability.[17] Redefining poverty and economic growth would show the true state of a nation's wealth and the sustainability of its growth.

These include jobs related to nature-based activities, environmental technologies for sanitation, energy, ecological restoration and waste-recycling activities that provide good working conditions, are meaningful and socially protected. But it is also necessary to invest






Integrated solutions









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in improving the sustainability of agriculture, fisheries, forestry and animal husbandry so as to protect existing jobs, reduce rural-to-urban migration, and protect the ecological foundation of our societies. Innovations in resource productivity, resource substitution, biomimicry and green chemistry are generating a huge potential for reducing wastes and environmental impacts from material-intensive processes and hazardous chemicals. A severe shortage of skills has, however, been evident in some fast-growing sectors such as renewable energy and energy efficiency. There is a need for better defining education policies, strengthening vocational training suitable for the rural and urban job markets, reskilling and retooling the workforce, and training teachers. Public-private partnerships could be encouraged to include sustainability commitments and build necessary skills and capacities.

Innovations will be needed, e.g. resource substitution, biomimicry and green chemistry

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A combination of nationally appropriate green economy measures at macro, meso and microeconomic levels (e.g., macroeconomic reforms, correcting misallocation of capital, increasing trade opportunities for the poor through appropriate policy measures, use of economic instruments, triple bottom line reporting for corporations, use of sustainability standards for supply chains, investing in natural capital, and use of sustainability principles for other investments and insurance) and social policy tools (e.g., safety nets, access to productive assets, to justice and security, and investing in skill-building, education, health and other social sectors) offers a viable pathway for reducing extreme poverty, increasing inclusiveness and addressing environmental and economic risks.

Sustainable water and energy services

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An integrated approach to the development, management and use of water is needed. Today, 2.5 billion people, including almost 1 billion children, live without even basic sanitation. Every 20 seconds, a child dies as a result of poor sanitation.

The world's water resources are in crisis, with strong competition for limited resources for different uses. Access to clean and safe drinking water, sanitation and hygiene is a basic human need, which would prevent 1.5 million deaths each year.[18]

Water is also required for food and energy production, as well as for the functioning of ecosystems, which in turn are important for maintaining supply. Water pollution compounds water scarcity, and scarcity feeds inequality. Approximately 90 per

cent of all disasters are water-related and their economic cost extends well beyond immediate losses, hindering development over decades. Floods and droughts are becoming more severe due to climate change, which is compounded by emissions of methane and nitrous oxide from untreated wastewater discharge. An integrated approach to the development, management and use of water would therefore address all the dimensions of the water cycle, connecting access, use, development, pollution and risks associated with water. The issue concerns not only access to water, but also sustainable and equitable water services that serve today's needs and those of future generations. This will require capacity development and investment in technologies and tools that improve resource efficiency, equitable resource allocation and resilience to climate variability and change.

Universal access to modern sustainable energy services for cooking and productive use will provide multiple benefits. Energy is an enabler of socioeconomic development for all countries and all people, needed in sectors such as water, sanitation, agriculture, construction and transportation. "Business as usual", with 85 per cent of primary energy being fossil-fuel based, generates pollution, increases energy insecurity and is too costly for remote and marginalized communities. Universal access to modern sustainable energy services for cooking and productive use will provide important benefits for health, local economic development and climate change mitigation, and reduce a special burden placed on women. For example, the World Health Organization estimates that if half of the global households that still use traditional fuels and stoves switched to cleaner cooking sources, families would save $34 billion per year over a 10-year period and generate an economic return of $105 billion per year.

Renewable energy resources still remain largely unexploited, supplying only 19 per cent of global energy use, especially in developing countries where infrastructure is being developed. Important technological advances have taken place in recent years that have enabled better harnessing of these renewable energy resources and made them more accessible for electricity, cooking, heating and cooling, and as transportation fuel. In 2012, the renewable energy sector worldwide employed 5.7 million people. Improving energy efficiency is a proven, cost-effective near-term option to reduce projected primary energy supply requirements in all countries, representing 70 per cent of the reduction in projected global energy demands by 2035.[19] Buildings present a huge potential for energy efficiency, which saves money and resources, and the use of local building materials spurs local economic development. Urgent reforms of wasteful fossil fuel subsidies are needed to provide a level playing field for transformative improvement of global energy systems.

Renewable energy will allow universal access to water, electricity and basic services

Health, chemicals and the environment

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Clearner, alternative, more efficient fuels will reduce air pollution exposure

A clean and healthy environment, through effective environmental management, will provide multiple benefits to society and the economy.

Air pollution, inadequate management of chemicals and wastes, poor water quality, ecosystem degradation, climate change and ozone layer depletion all pose significant threats to human health, both individually and combined.[20] An integrated approach to the sound management of chemicals and waste, in support of the implementation of the relevant multilateral environmental agreements, will ensure that the direct contributions of ecosystems to better health and a cleaner environment are captured in the decision-making process at all levels of national governance.

Switching to cleaner fuels and alternative sources of energy, and more efficient production and use of fuels and energy, are effective ways to address air pollution exposure and thereby improve health, and derive other benefits, such as reduced deforestation, increased access to modern energy services and a reduction in black carbon.

Sustainable land, water and forest management, along with conservation and restoration, will protect and enhance biodiversity and ecosystem services, and result in greater food security, thus reducing malnutrition, and providing a clean and healthy environment to nurture cultural, social and recreational activities that are

important to our mental health, and economic growth for local populations and businesses. Reducing water-related diseases and protecting water quality from all sources of wastewater pollution – domestic, industrial or agricultural – is essential for sustainable development.

Measures to reduce the impact of climate change can address threats to public health. These include measures to cool large urban centres, sustainable wetlands management to control vector-borne diseases such as malaria, and the effective use of climate information. The phase out of the remaining ozone-depleting substances, technology choices that are climate friendly, and the sound management of existing ozone-depleting substances captured in buildings and equipment will prevent millions of cancer-related deaths.

Food security through maintaining and repairing our life-support system

Food security can be increased irreversibly by promoting a major shift to eco-based production, optimizing food energy efficiency, ensuring equitable access and rights to land and resources, and encouraging a major shift towards nutritious and balanced diets.

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The world produces enough calories to feed all its population, yet 842 million people go hungry, 2 billion are malnourished and 1.4 billion are considered overweight or obese. Food prices continue to fluctuate, leading to food insecurity, with the possibility of future crises similar to the one that took place in 2008, which was due to a combined effect of speculation in food stocks, extreme weather events, growth in biofuels competing for land, and expansion of cropland into areas less suited for farming.[21] The global food demand at current consumption levels is expected to increase by 60 per cent by 2050.[22] The International Resource Panel estimates that the consumption of natural resources will triple by 2050.[23] However, over the past quarter century, 24 per cent of the global land area is estimated to have suffered declines in quality and productivity, which is undermining the future ecological foundation of food and nutrition security.[24] The extinction of species continues unabated and we face a potential collapse of oceanic and coastal systems. World food production has risen substantially in the past century, primarily as a result of expansion of cropland, increasingly wasteful practices and the use of harmful chemical substances at the expense of the environment.

It is estimated that one third of all food produced for human consumption is lost or wasted – around 1.3 billion tons every year. If just one quarter of the food currently lost or wasted globally could be saved, it would be enough to feed the hungry in the world.[25] Reducing post-harvest crop losses (harvesting, processing and distributing) and food waste along the retailer and consumer end of the food supply chains, would reduce the environmental and economic impact of producing 1.3 billion tons of food that go to waste annually.[26] In industrialized regions, almost half the total food waste – around 300 million tons annually – occurs because producers, retailers and consumers discard food that is still fit for consumption. Significantly reducing food loss and waste can also help to avoid further conversion of sensitive land, rangelands and forests, thereby reducing conflicts over land and the use of water, insecticides and pesticides.

Food security can be increased through a four-pronged approach:

- By enhancing supply through optimizing food energy efficiency (minimizing the loss of energy in food from harvest through processing to actual consumption and recycling);
- By a major shift towards eco-based production, water-use efficiency, reversing and restoring degraded lands to their natural potential, and recognizing the value of ecosystem services and natural capital;
- By addressing unequal access and rights to natural resources and empowering smallholders and rural women as critical agents for food security and protection of agro-biodiversity;
- By a major shift towards diets (or sustainable diets) that minimize environmental impacts, increase nutritional value and ensure sustainable livelihoods for farmers.

If just one quarter of the food currently lost or wasted globally could be saved, it would be enough to feed the hungry in the world.

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Pastoralism is an ecologically viable extensive production system that produces healthy meat, milk, fibres and hides, but is generally impeded by privatization of communal grazing lands, obstruction of livestock movement corridors, and loss of natural, social and economic infrastructure; reversing these trends would increase the rate of return from the livestock industry while decoupling it from environmental degradation.[27]

Biodiversity and ecosystem services directly support major economic activity and jobs in such diverse sectors as agriculture, fisheries, and forestry. Many ecosystem services also directly underpin agricultural productivity. For example, pollinator services are estimated to provide a value of $353.6 billion to agriculture annually, but they are severely threatened due to habitat loss.[28] Increasing agricultural productivity, including through the efficient use of water, diversity of species and varieties, and healthy ecosystem services, is possible while in parallel halting and reversing land degradation, drought and desertification.

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Restoring the 2 billion hectares of degraded agricultural land could boost food production by up to 79 per cent – or feed up to 2.25 billion people

Theoretically, restoring the 2 billion hectares of degraded agricultural land could boost food production by up to 79 per cent – or feed up to 2.25 billion people.[29]

Deforestation and forest degradation cause an estimated 17.4 per cent of global greenhouse gas emissions, but sustainably managed forests are important carbon sinks and provide essential services such as water supply and water quality control, soil conservation, local climate regulation, and the production of timber and non-timber products. Sustainable forest management will require good governance and other enabling conditions together with practical measures such as protection, conservation, restoration and afforestation, agroforestry, sustainable harvesting of timber and utilization of forest products. For example, farmer-managed natural

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regeneration of land, including the replanting of trees and fire protection, has enabled increased food production, greater financial savings and improved well-being of children in the Talensi area of Ghana.[30]

Oceans are crucial for food security as they provide food and nutrition directly through fishing and marine aquaculture and indirectly through animal feed.[31] There is a need for policy reforms to address issues such as access regimes, fiscal structures and perverse subsidies, innovative public/private sector partnerships, innovative management and financing mechanisms, and enforcement of measures to improve the state of the oceans and their resources. This will contribute to the effective management and, where needed, the restoration of degraded marine ecosystems, bringing more areas under scientifically credible ecosystem management approaches and transparent and participatory stewardship.

Since some of these issues originate from land use, policies for improving oceans will have multiple benefits for upstream systems.

Smallholder producers and women are frequently cited as powerful resource stewards. Ensuring tenure for smallholder farmers and women allows them to invest in their land and protect it from degradation.

Many countries have clarified the relationship between customary and statutory rights on land and natural resources and have established mechanisms for dispute resolution and access to justice.

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Sustainable consumption and production and economic growth

Future prosperity will require that economic growth no longer degrades the environment. Achieving sustainable consumption and production patterns is not just an environmental issue; it concerns natural capital and hence the productivity and capacity of our planet to meet human needs and sustain economic activities in the light of increasing populations and a growing consumer middle class. The shift to sustainable consumption and production patterns through valuing, maintaining and increasing natural capital, sustainable innovation and dematerialization processes, such as industrial ecology, resource substitution, and biomimicry, are already creating new opportunities for poverty eradication, green jobs and business, and enhancing prosperity for current and future generations.

More sustainable, clean and efficient production of goods and services is central to sustainable development. The supply side

Technology choices and investments must deliver more output per unit of input

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of the sustainable consumption and production challenge requires attention to the following objectives:

- Sustained provision of natural resources that are key to human survival, such as water, food, energy and productive and habitable land;
- Sustained provision of factors of production for economic development, which implies measuring and sustainably managing key renewable and non-renewable resources (such as timber, fibre, metals and minerals);
- Reducing pollution associated with human and economic activity – such as greenhouse gas emissions, toxic chemicals, particulates and excess nutrient releases – that can harm human health and degrade ecosystems.

Stronger emphasis is required on resource efficiency in government policies, public and private sector management practices, technology choices, and

By 2030 the growing global middle class is likely to comprise three billion consumers

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investments so as to deliver more output per unit of input, as well as less associated environmental damage. A key means of achieving this through improved government policies and public-private partnerships is sustainable public procurement, since governments are the largest consumer in many national economies.[32]

A shift towards sustainable production can contribute to green, inclusive and decent employment, as well as enhanced labour markets. For example, sustainable agricultural systems tend to be more labour intensive than as this input replaces often-toxic or polluting chemical inputs. However, creating more decent jobs in sustainable production will require policies to redirect investment, transfer technologies and establish measures to retrain workers.

Societies should move to better and safer consumption. Current consumption patterns are drivers for unsustainable production and resource degradation. Demographic trends show that by 2030 the growing global middle class is likely to comprise three billion consumers, placing increasing pressures on resources. It must be emphasized that sustainable consumption is not about consuming less; it is about consuming better and more responsibly – i.e., more efficiently, with less risk to our health, environment and society. Sustainable consumption affects purchasing behaviours, as well as all types of interactions between individuals and infrastructures (mobility, leisure, housing), which together make up lifestyles and livelihoods. It can be promoted through a mix of policy, economic and voluntary instruments, including formal and informal education. Sustainable consumption can generate economic benefits, social well-being and social inclusion (access to markets, innovation, job creation and healthier livelihoods and lifestyles) in addition to reducing environmental risks and capitalizing on environmental opportunities.

Achieving sustainable consumption patterns is more technically and politically complex than changing production patterns because it raises important issues to do with human values, equity and lifestyle choices, among other things. There are, however, some large-scale initiatives aimed at improving and spreading the use of energy-efficient appliances and on promoting access to cleaner, affordable forms of energy and related energy services (e.g., "Sustainable Energy for All") or reducing food loss and waste. Elevating the issue of sustainable consumption to the necessary level of policymaking and decision-making will require work on education and awareness-raising among consumers, civil society, the private sector and policymakers. At the United Nations Conference on Sustainable Development in June 2012, world leaders adopted the 10-year framework of programmes on sustainable consumption and production patterns. **At the international level, it may also require negotiations which, in an inclusive and objective manner, take account of current imbalances in and the impacts of unsustainable consumption patterns.** They also recognized that sustainable consumption and production is a universal concern, and that developed countries should provide leadership in promoting a shift to sustainable consumption and production patterns.

The rural-urban continuum, sustainable cities and infrastructure

Strong urban-rural linkages for regional infrastructure and ecosystem services, smart and low-carbon cities and balanced territorial development will ensure sustainable economic growth. For the first time in history more than half the world's population live in urban areas and this is expected to rise to nearly 70 per cent by 2050.[33] The majority of population growth in cities is the result of natural increase, rural-to-urban migration and the reclassification of formerly non-urban areas. Significant future urban growth is expected in developing countries, most notably in African and Asian cities.[34] Many cities are struggling to secure basic resources such as food, energy and water needed to support current and future residents. Urban areas currently account for 60–80 per cent of global energy consumption, 75 per cent of carbon emissions, and more than 75 per cent of the world's natural resources. They have insufficient or aged infrastructure, and lack the capacity to manage the waste generated by their industries and residents. [35]

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Infrastructure choices made today will have critical implications for the future sustainability of cities across the world

Furthermore, wealth and poverty are increasingly segregated in cities, especially in the spatial trap of slums. There are now roughly one billion slum dwellers worldwide, including one third of the population of the developing world. Slum dwellers' lack of durable housing, secure tenure and access to basic services – including health services, adequate food, education and employment opportunities, decent transport, credit and the rule of law – often further entrench them in poverty.[36]

The urban future could provide inclusive, sustainable economic growth, strengthened social cohesion and improved environmental outcomes. Well-planned, compact cities that offer a mix of land uses, building typologies, transport and jobs generally also offer higher levels of well-being at lower rates of resource use and emissions.[37] Urban centres provide opportunities for a range of social and cultural activities, and are critical for innovations in science, technology and education.[38]

Cities draw widely upon the resources – material, human and environmental – in their hinterlands and offer much – employment, services, infrastructure – in return. Poverty in rural areas is fuelling rapid migration to cities, with many of the jobless ending up in slums. The improvement of slums is not keeping up with this trend. Experience from countries across all income levels suggests that strong urban-rural linkages, especially around economic development, employment, and regional infrastructure and ecosystem services, are important to achieving sustainable

development outcomes that promote local-level sustainability and resilience, and ending extreme poverty. Addressing the rural-urban continuum for a balanced territorial development is possible. Integrated solutions include sustainable rural development; using land in a resource-efficient manner; minimizing sprawl and landscape fragmentation and maximizing the conservation of peri-urban agricultural land and rural habitat; promoting land tenure and strengthening the rights and livelihoods of rural and urban tenants alike; and promoting national policies that support the balanced development of territories.[39]

Infrastructure choices made today will have critical implications for the future sustainability of cities across the world. Investing in the development of low-carbon, climate-resilient infrastructure entails constructing, or renovating, infrastructure systems (power, road, rail, water, buildings, etc.) to substantially reduce global greenhouse gas emissions, while simultaneously making these systems, and the societies they serve, more adaptable to extreme weather conditions and rising sea levels.[40] The infrastructure for basic services such as roads, water, shelter and electric grids must also become more durable and long-lasting, and its material intensity must be reduced. For example, sand and gravel, which are used in construction, land reclamation, pavements, concrete roads and embankments and shoreline development, among other things, are now being extracted at a rate far greater than their rate of renewal. This is having a major impact on rivers, deltas, coastal and marine biodiversity and ecosystems, resulting in the loss of productive land through erosion, and the lowering of the water table. To reduce the consumption of sand, recycled building materials, quarry dust and recycled glass can be used as substitutes, and alternatives can be found for building houses, including wood, straw and other recycled materials.[41]

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Furthermore, the digital age allows for smarter cities where information technology can be used to coordinate and share data in a single view, creating a “big picture” for decision makers and providing real-time information to both providers and users to help improve the provision of water, transport and energy, among other things.[42]

Environment for resilient and peaceful societies

Sound stewardship of natural assets, sustainable ecosystem management and improved environmental governance are critical to the development of peaceful societies that are resilient to social, economic and environmental shocks.

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At least 40 per cent of all violent conflicts in the last 60 years have been linked to natural resources

At least 40 per cent of all violent conflicts in the last 60 years have been linked to natural resources. Climate change and more frequent natural disasters are expected to increase the risk of such conflicts by degrading the available resource base. Sound stewardship of resources, access to information, inclusive decision-making, equitable access to and sharing of benefits arising from the use of natural resources, and the rule of law are essential to mitigate these risks and help create resilient and peaceful societies.[43]

Environmental factors, while often not the sole cause of violent conflict, can spark violence and contribute to chronic instability and unrest if not properly managed. Low-income economies, largely dependent on natural resources, are 10 times more likely than other developing countries to experience civil war and significantly slower economic growth than similar countries without major natural resources. Increasing climate stresses and disaster risk may further compound local tensions and instability by eroding critical resources such as water, on which livelihoods depend.

Other compounding effects result from unequal access to information and unclear regulatory frameworks or a confusing overlap of access rights to renewable resources. Prolonged insecurity

may also discourage the local and international private investment that is critical for job creation, poverty eradication and economic growth.

Sound stewardship of natural assets, sustainable ecosystem management and improved environmental governance are critical to sustaining the key regulating and provisioning services essential to human development and building resilient, stable societies. Customary and statutory processes should be accessible to all, and the relationship between the two should be clear. Governments and businesses need to commit to sustainable and transparent practices and accountability frameworks.

Peace agreements and peace-building interventions should address grievances related to the environment and natural resources, including about access, use or ownership of land and water. Preventing illegal and illicit exploitation, including trafficking in wildlife, timber or minerals, reduces conflict drivers and improves the chances for sustainable development. Inclusive decision-making processes should ensure fair representation and participation of those who are affected by natural resource overexploitation. The environment and natural resources can also form a good platform for building confidence and a tangible basis for cooperation between social groups and between countries and regions. Access to accurate and reliable information is a building block for informing expectations and establishing a realistic and equitable national vision of and appropriate policies to safeguard the natural wealth of societies.

Peace agreements should address grievances related to natural resources access and ownership

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BUILDING THE SUSTAINABILITY FOUNDATION FOR THE POST-2015 DEVELOPMENT AGENDA

Governance and means of implementation

The implementation of the post-2015 development agenda will require States and other relevant actors, acting individually and collectively, to adopt policies and mobilize resources to advance equitable, human-rights-based and sustainable development.

A renewed and strengthened global partnership to mobilize the means of implementation for sustainable development needs to:

- Address the social, economic and environmental dimensions of sustainable development in an integrated manner;
- Build on existing commitments and governance structures, ensuring that new initiatives reinforce previous successes;
- Reinforce coherence in the implementation of a universal post-2015 development agenda, leveraging resources across diverse funding mechanisms;
- Strengthen governance and accountability frameworks, providing for multi-stakeholder engagement, including for financing, technology innovation and diffusion and capacity-building for people and institutions.

Integrated solutions require appropriate enabling environments in order to flourish. Where the public sector has committed to strong local government, effectiveness and broad coverage of public services, transparency in public finance management, and open and equitable access to information, solutions have been successful and replicated. This needs to be complemented by a private sector commitment to corporate social and environmental responsibility and to sustainable procurement. All sectors need to work together on curbing illicit flows of financial and natural resources and

Sustainable development needs a curbing of illicit flows of financial and natural resources and eliminating corruption

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reducing corruption. Sustainable development is underpinned by open, rule-based, non-discriminatory and equitable multilateral trading systems, and the phasing out of inefficient and distortive subsidies that encourage wasteful production and consumption.

Many nations may need to undertake policy reforms and establish new institutional arrangements, especially to enable cross-sectoral and integrated actions towards achieving common goals and targets, and to promote collective decision-making to generate multiple benefits and protect global public and environmental goods. Multi-stakeholder initiatives and partnerships at all levels can discourage a silo mentality and tackle integrated solutions.

Public and private sources of sustainable development finance should be seen as complements, not substitutes. Public policies that enable action are critical to address market and policy failures that prevent investment from both domestic and international private sectors. Investments in green infrastructure can be mobilized through pricing policies, policy support such as tariffs and standards, project support and public financing instruments. Innovative tools exist for mobilizing public revenue and domestic savings and leveraging remittances for the public benefit and to raise resources for financing investments in high risk and less lucrative areas, such as long-lasting infrastructure and ecological restoration, new technologies, social protection, health and basic education, and global public goods. Innovative finance can jointly leverage public and private funds. More transparent and effective philanthropy is needed, with greater coherence at the national level with other public and private efforts. Enhancing accountability and coordination in development cooperation, such as through the International Aid Transparency Initiative[44] should also include incentives for integrating the three dimensions of sustainable development.

United Nations commitments over the past 20 years have facilitated technology transfer and capacity-building across the world. However, progress in technology transfer, including clean technologies, has fallen short of the ambitious goals laid out in Agenda 21 and subsequent sustainable development outcomes, and technological progress has sometimes failed to produce envisaged development results. This is often due to the absence of a favourable enabling policy framework for the transfer of knowledge guided by justice and equality, and for encouraging home-grown solutions based on local or traditional knowledge. South-South and triangular cooperation, research and development networks, an increasingly mobile and skilled workforce, and regional integration, are trends that can support technology transfer and capacity-building efforts. In the outcome document of the United Nations Conference on Sustainable Development, "The future we want", Heads of State and Government also called for the continued and focused implementation of the Bali Strategic Plan for Technology Support and Capacity-building, as endorsed by the United Nations General Assembly.

In addition, there are good practices and strong standards that can be applied to ensure social and environmental safeguards in all activities. Although these have been formalized in "environmental and social impact assessments" and similar tools, there is a need to update and better apply these standards in all situations. There is also a need to build capacity for results-based management and learning.

Environmental and social safeguards are effective tools to implement sustainable development

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Innovation for monitoring, accountability, reporting and access to information

The post-2015 development agenda will require a robust, transparent and multi-stakeholder monitoring and reporting framework to ensure that progress towards meeting goals is effectively tracked and that stakeholders are mutually held accountable for action and delivery. Relevant and timely information would increase efforts to meet goals for which slower progress is being made, thereby fostering the achievement of sustainable development in a balanced and mutually reinforcing way.

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The data revolution captures opportunites of open access and real-time information

Better, comparable baseline data and statistics will be required to measure a broader range of indicators, requiring new and disaggregated data. Innovation and new technologies need to be embraced for data collection, monitoring, analysis, quality control and verification and to empower and enable a wider range of stakeholders, beyond governments and the United Nations system, including international organizations, foundations, citizens and responsible businesses, to play an important role. Capacity – technical and financial – will need to be strengthened, especially in developing countries, to build solid statistical systems to undertake monitoring. These efforts need to be reinforced by new global partnerships for monitoring progress and strengthening accountability.

The ongoing data revolution is based on the social and economic opportunities that arise from moving to an open access to information model of governance

Big data approaches can anticipate the spread of a virus in a few housrs

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embracing the ideas of using big data and near real-time information that supports a transformation in societal behaviour. Massive increases in the volume and speed of data gathering are providing us with unique and unparalleled opportunities to detect changes in the environment and human populations. The trend towards using large data streams has always been present in the Earth's observation, and in climatology and meteorology, but the analytical paradigm has remained rooted largely in the use of causal models and statistical sampling. Other fields of endeavour, such as epidemiology and security, have already begun to shift away from the traditional statistical approach of identifying causality in anticipating probable events

towards big-data approaches. For example, by using vast data gathering and search procedures combined with fuzzy logic and new algorithms, disease control centres can anticipate the spread of a flu virus in a matter of hours rather than weeks.

The experiences of other multilateral environmental processes in monitoring, accountability, reporting and access to information can provide input in the form of lessons learned to the sustainable development goals and post-2015 development agenda.

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The Montreal Protocol on Substances that Deplete the Ozone Layer is one of the most successful environmental treaties, including in terms of policymaking and enforcement, and its success was based on, inter alia, its ability to be strengthened (adjustments and amendments to the Protocol) and to be high on the policy agendas of all countries. Assessment panels provide independent, authoritative and up-to-date assessments, and the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol looks into cases of non-compliance and facilitates solutions. In a similar vein, the implementation of the Kyoto Protocol to the United Nations Framework on Climate Change is monitored by its Compliance Committee, supported by expert review teams that trigger the assessment and validation of information.

Another progressive mechanism is provided by the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention). In addition to the secretariat's efforts,

members of the public are able to submit information concerning a party's compliance with the Convention complementing the usual trigger through parties with respect to their own or other parties' compliance. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity, adopted in 2010, takes the matter one step further in that a mechanism is being discussed that would enable indigenous peoples, their communities and other local communities to monitor the implementation of the Nagoya Protocol by bringing cases of non-compliance to the attention of the secretariat and the Conference of the Parties to the Convention.

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UNEP Live is capitalizing on the data revolution and will incorporate data and information from varied sources including governments, research networks, communities of practice, major groups, indigenous peoples and civil society to facilitate the exchange and sharing of up-to-date data, information, assessments and knowledge in order to keep the environment and emerging issues under review. These transparent and inclusive characteristics make it an ideal platform for monitoring and reporting on progress towards meeting the sustainable development goals and other objectives of the post-2015 development agenda. Modelled on these principles, an "SDG Live" platform, supported by the United Nations system and its various statistical and monitoring or reporting networks and mechanisms, could be used to measure progress towards the targets and indicators of the post-2015 development agenda and the sustainable development goals.

CONCLUSIONS

A new post-2015 development agenda demands a new vision and a responsive framework with sustainable development at its core. The "business as usual" scenario is not affordable, either socially or environmentally, or, in the long run, economically. The integration of economic growth, social protection and justice, and environmental stewardship should be at the core of the sustainable development goals and the post-2015 development agenda.

Addressing issues in silos will not lead humankind along a pathway towards sustainable development. In order to fully integrate the three dimensions of sustainable development, the interlinked problems need to be understood and responses developed that provide multiple benefits across the three dimensions. The discussion no longer needs to focus on trade-offs but on the most intelligent choices in order to maximize multiple benefits. The present background paper provides a solid evidence base to demonstrate that integrated solutions do exist and are being practised around the world today.

Innovative, affordable and sustainable technologies and integrated solutions that generate green and decent jobs can achieve the objective of leaving no one behind. The needs of a growing population could be reconciled with a resource base that is shrinking through inefficient and wasteful use if political commitment, economic incentives, and social accountability are brought to bear to leverage a shift towards sustainable consumption and production. Sustaining growth will not be enough to solve the multiple social, economic and environmental challenges; instead, sustainable and inclusive growth must replace it.

Solutions need an enabling environment. Efforts therefore also need to focus on changing, reforming and retooling governance structures at all levels for greater integration, transparency and accountability, and leveraging multiple stakeholders into action.

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