



Back to Our Common Future

Sustainable Development in the 21st century (SD21) project

Summary for policymakers



About SD21

This is a summary of the main findings “*Sustainable Development in the 21st Century*” (SD21) project. It draws on a series of studies that were prepared under a United Nations project, co-funded by the European Commission. The project also intended to prepare a substantive contribution to the debate at the United Nations Conference on Sustainable Development (UNCSD or “Rio+20”) in 2012, which takes stock of the changes having occurred since the Earth Summit in 1992, and provides a clear vision and way forward for the international community, national governments, partnerships and other stakeholders in implementing the sustainable development agenda in an integrated manner.

This summary takes a step back from the many initiatives of the past 20 years in terms of sectoral assessments, scenario exercises, strategies and reports linked with sustainable development, green economy and green growth, in order to analyze them under the twin imperatives of long-term sustainability and development imperatives. Throughout, it provides an entry point to more detailed analysis and findings contained in the technical reports produced under the project. Those reports are available from the UN website.¹

The approach to SD21 is based on the idea that for sustainable development to progress, its political nature has to be recognized. Decisions and courses of actions that are chosen every day by governments and international institutions are ultimately the outcomes of confrontations of different “world views” – reflecting different visions and interpretations of principles such as economic efficiency, equity, solidarity, empowerment, and justice, different views regarding how sustainable development should be pursued, and different views on the means through which specific issues (e.g. food security, climate change mitigation) should be addressed. Often, agreed courses of actions reflect a “mix” of different world views, sometimes resulting in inconsistencies and incoherence. Difficult issues are typically left “under the rug” for the benefit of reaching politically palatable consensus, resulting in watered-down blueprints that do not address systemic issues.

In order to reflect a broad range of views on sustainable development issues, the SD21 project instituted an expert process to support informed policy discussions. The working tracks created under the project mobilized individual experts and institutions from a broad range of perspectives and backgrounds. More than 70 leading experts participated in the discussion on food and

agriculture. The analysis of sustainable development scenarios was a collaborative effort of 49 global modellers and scenario analysts. The studies on energy systems, land use and cities were based on inputs from large and diverse groups of experts.

SD21 has also encouraged a range of studies undertaken outside of the project by leading researchers, analysts, think-tanks, and other international organizations, in support of UNCSD. Those studies provide particular perspectives and specialized information on a wide range of important issues. The present summary will help policy makers, analysts and the interested public alike to better understand the context of these other reports, including the ways in which their recommendations can or cannot be combined for informed decision-making.

This summary does not seek to be normative or prescriptive. Instead, it brings together salient scientific and political facts and illustrates important issues that would need to be addressed going forward. In other words, it provides a frame of analysis against which other, more normative or prescriptive reports can be read. This will hopefully help forge a better understanding and help overcoming the current gridlock on most divisive issues.

This summary also illustrates how identifying commonalities and differences and working on ways to address them may not only be a necessary condition for progress in some cases, but also a promising way for concerted action.

This summary presents selected findings from the SD21 study reports.

Food and agriculture: the challenge of sustainability

Assessment of implementation of Agenda 21

Assessment of implementation of the Rio Principles

Challenges and ways forward in the urban sector

Building a sustainable and desirable Economy-in-Society-in-Nature

Perspectives on sustainable energy systems for the 21st century

Lessons learned from sustainable development scenarios

Sustainable land management for the 21st century

All the reports are accessible at http://www.un.org/esa/dsd/dsd_sd21st/21_reports.shtml

1 http://www.un.org/esa/dsd/dsd_sd21st/21_reports.shtml

In summary: We need a renewed political deal

Humanity has not progressed on the road to sustainability as far as hoped in 1992. We can celebrate some notable successes, in particular the fact that hundreds of millions of people have been lifted from poverty during the last two decades. Yet, many of the global problems we are facing today are more acute or larger in scale than they were in 1992.

Science and scenario modelling make it clear that if we do not change course, the next 40 to 80 years promise a future that may be deeply unpalatable for most of us. Even if we succeeded in pushing our technological capabilities to the utmost, without doing something else, in a few decades we are likely to end up in a world that would offer reduced opportunities for our children and grandchildren to flourish.

Many of the outcomes that matter for sustainability – from poverty to access to education to carbon emissions to air pollution – happen at the national and local levels and are influenced by rules, processes, happening at those levels. However, increasingly more of these outcomes are determined by the rules that govern the global economic engine, from investment of capital to trade to financial markets; by the mechanisms of international assistance among countries and the resources related to them; and by the way our global commons are managed.

Many resources on which we depend for survival and flourishing – oceans, atmosphere, climate regulation systems – are, whether we like it or not, common resources. We all lose when they are degraded or disappear. All our individual actions and national actions add up to determine what happens to our common planet.

Hence, as foreseen by the Brundtland report 25 years ago, many of our problems are common: no party can solve them in independence from the others. Therefore, **common action is needed.**

The political deal that emerged from the Earth Summit in 1992 has, for various reasons, never been fulfilled. Neither the expected outcomes – elimination of poverty, reduction in disparities in standard of living, patterns of consumption and production that are compatible with the carrying capacity of ecosystems, sustainable management of renewable resources – nor the agreed means to achieve them, have materialized.

To many, the deal from 1992 does not adequately reflect the changed geo-political realities of

today's world. In the last two decades, the world has changed. New economic powers have emerged, while the interdependence of national economies has grown. We have become increasingly dependent on growing energy consumption and international trade. The importance of the private sector in influencing sustainability outcomes globally has grown. We have largely failed in adjusting international rules and institutional structures to these old but mounting challenges and to this new situation.

Opinions may differ on whether our current framework for action was never fully put to the test due to lack of political will or whether it was insufficient to succeed. The fact is that we have not succeeded.

For these reasons, **a new political deal is needed,** which provides a clear vision and way forward for the international community, national governments, the private sector, civil society and other stakeholders for advancing the sustainable development agenda in an integrated manner.

A renewed political deal would need to address at least the following critical elements:

- What critical thresholds must not be passed in terms of poverty, global inequalities, global environmental limits, and global stocks of common-use renewable resources?
- What do we need to develop and what do we need to sustain?
- What necessarily needs to be done in common, and what is best left for countries and lower levels of governments to decide?
- How do we adjust institutions, decision-making processes, and the mechanisms of management of our global commons to more fairly reflect the new economic and geopolitical order?
- What common goals do we set for accomplishment by the global community? What solidarity mechanisms must be put in place to achieve those common goals?
- How to coordinate and enforce actions and commitments at all levels so that they not only “add up” to keep humanity on a safe track, but also ensure the renewed deal can be trusted by all more than the original Rio deal?

When a deal that is commensurate with the problems we face today and those even greater that we will face tomorrow will materialize is unclear. What is certain is that a deal will be needed at some point in the future. In the long term, the alternative is conflict over scarce resources in an impoverished world – one none of us should want to see materialize.

Where are we today?

At the highest level, a yardstick by which to judge the success of sustainable development since Rio is a broad examination of the main trends having affected environment and development at the global level since 1992. These issues have been the subject of an enormous amount of literature coming from all circles, from academia to civil society organizations to think tanks and national and international development institutions. Broad assessments such as the Millennium Ecosystem assessment, IPCC reports, and yearly reports on the status of the Millennium Development Goals provide ample data allowing one to assess what has happened on these two fronts during the last decades.

The record on development since 1992 has been mixed

Since 1992, human development has seen progress on a global level. Some countries have developed rapidly. Progress has been registered in access to education, on the health front, and in access to basic services such as water and sanitation. Areas of progress also include increased access of citizens to information and increased participation in decision-making, human rights, indigenous peoples, and gender equality.

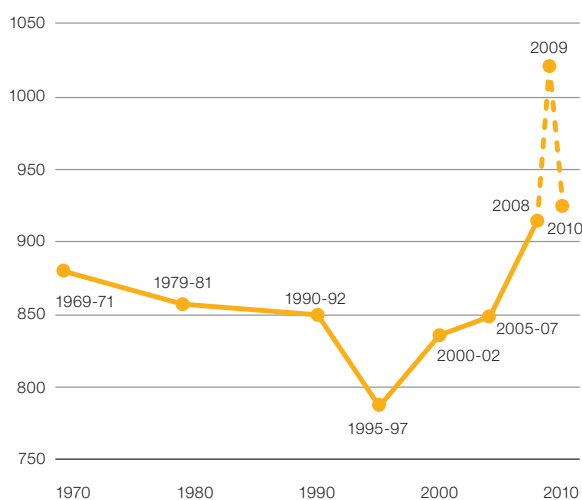
However, numerous gaps remain on the development agenda. Poverty has not been eradicated. Indeed, if China is taken out of the statistics, the absolute number of poor

(whatever definition is used) has remained more or less stable since 1990, with marked regional differences. Basic food insecurity concerns as many people, about 1 billion, as it did in 1970. Income inequality is growing, both across and within countries. Close to 43 million people worldwide are displaced because of conflict or persecution. Overall, the Millennium Development Goals (MDGs), a set of goals that the international community set for itself in 2000, are not on track to be achieved in 2015 as contemplated.

Global environmental problems have become more acute

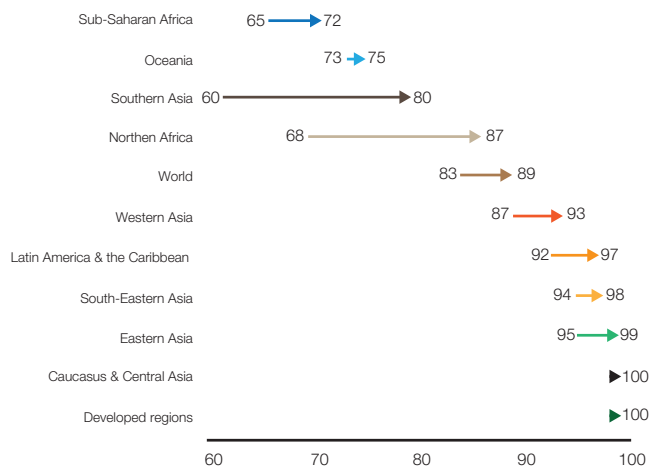
At the same time, at the global level, the impacts of the human enterprise on the environment have been increasing. Many resources on which humanity depends for survival are witnessing trends that, if continued, would lead to depletion or collapse. 80 percent of fish stocks are estimated to be used at or beyond capacity, and the figure has been increasing since four decades at least. Deforestation, although curbed during the past decade, has continued. What is known of the loss of biodiversity points to our current inability to limit it, with the current rate of species extinction being estimated by some to be 100 to 1000 times higher than in pre-industrial times and two orders of magnitude above a safe level for humans in the long term. Some of the major ecosystems such as oceans are thought by scientist to be approaching dangerous thresholds that could trigger massive collapse. Current rates of ocean acidification in the Atlantic and Pacific oceans exceed those experienced in the last glacial termination by a factor of 100.

Figure 1 – Trend in number of undernourished people, 1970-2010



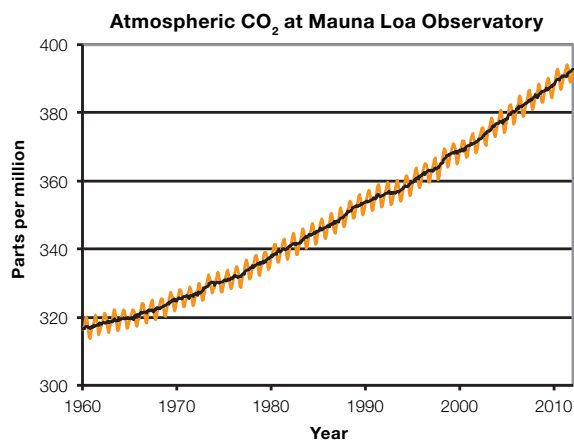
Source: FAO, 2011.

Progress on improving literacy, 1990-2009



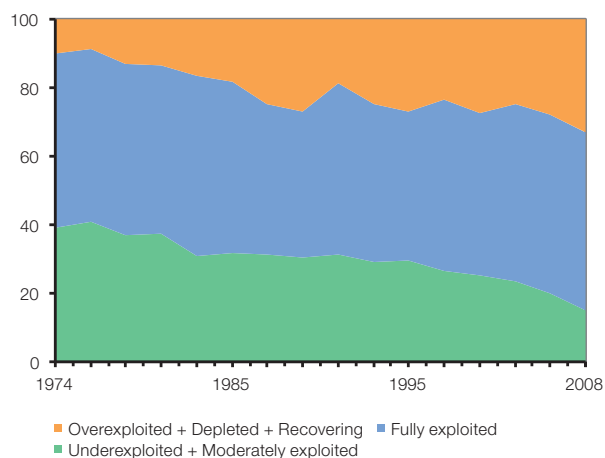
Source: UNDESA, Millennium Development Goals Report 2011

Figure 2 – Long-term trends in CO₂ concentrations, and state of marine fisheries

CO₂ concentrations

Source: NOAA, 2012.

Fish stocks



Source: UNDESA, Millennium Development Goals Report 2011.

In summary, while the “development transition” is still to be achieved at the global level, the impacts of human activity on the global environment have worsened. By this broad criterion, one may say that the transition to sustainable development has not been successful.

We are getting closer to global ecological limits

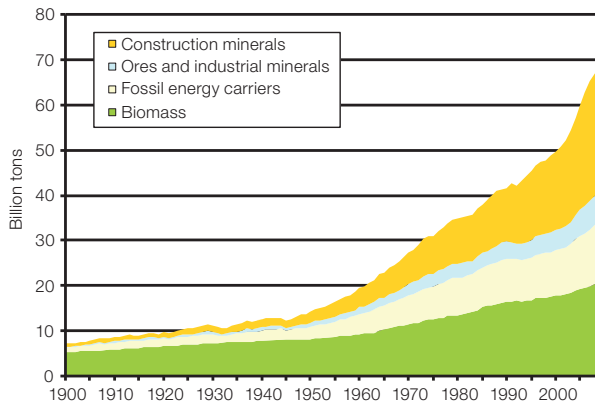
In recent years scientists have devoted time to identify what is referred to as planetary limits or boundaries, denoting sets of limits or thresholds that define a “safe operating space” for humanity. For example, in 2009 J. Rockström and colleagues reported that at least three planetary boundaries had already been breached, including those related to anthropogenic interference with the climate system, biodiversity, and the nitrogen and phosphorus cycles. Some studies have concluded that the size of the current global agricultural system has already outstripped safe boundaries for land use change.

Even though the definition of such thresholds, the number of relevant limits, and the way they correlate with each other are not yet fully understood and are subject to scientific and political debates, the consequences of trespassing some of them such as greenhouse gas concentrations in the atmosphere have been explored at an increasing level of detail. Whatever the “real” relevant thresholds may be, and whatever the “acceptable” level of risk that we collectively may want to select with respect to trespassing them, all the scientific assessments point to humanity as a whole getting closer to the limits, in some cases at accelerating speed.

How did we get there?

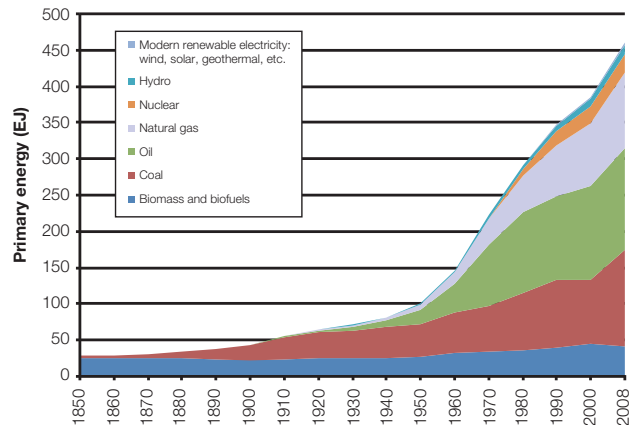
Figure 3 – Long-term trends in material use and energy consumption

Material use



Source: F. Krausmann et al. (2009), Growth in global materials use, GDP and population during the 20th century, *Ecological Economics*, 68, updated to 2009.

Energy



Source: A. Gröbler, 2008, "Energy transitions." in *Encyclopedia of Earth*.

At the global level, the impacts of the human enterprise on the environment are increasing. By historical standards, the path from an “empty” to a “full” world has been remarkably swift. Most of the expansion took place in the last century in what has been called the “great acceleration.” In the 20th century, a 4-fold increase in human numbers was accompanied by a 40-fold increase in economic output and a 16-fold increase in fossil fuel use, along with a 35-fold increase in fisheries catches and a 9-fold increase in water use. Carbon dioxide emissions increased 17 times, sulphur emissions by 13 and other pollutants by comparable amounts. Global primary energy use, carbon emissions, biodiversity loss, nutrient loadings, deforestation, global fossil water extraction are all still increasing.

The impact of human activity on the environment (the “environmental footprint”) is the product of population size, its level of affluence and structure of consumption, and a technology factor which measures the impact (e.g. pollution) associated with each dollar of GDP created in the production process. At the macroeconomic level, changes in environmental impacts can be related to changes in these variables.

Over the last five decades, both affluence and population have increased rapidly, each being about equally responsible for the overall five-fold growth in the economy. In recent years, the affluence factor has exceeded the population factor in driving growth. But both are clearly important in explaining the increase of human footprint.

Since the Earth Summit, private consumption has grown tremendously. In many emerging countries, middle-income groups have been growing fast, contributing to the rapid emergence of a global “consumer class” whose consumption choices tend to follow patterns observed in developed economies. In rapidly developing countries, the trends in consumption are set up by their fast-growing cities. Many large cities of the developing world now appear comparable to cities in developed countries as far as carbon emissions and resource consumption are concerned – so far, there is no clear evidence that the impacts of urbanization on consumption patterns are going to be substantially different in newly urbanizing countries from what they are in OECD countries.

On the other hand, examples of efficiency gains abound. For example, global primary energy efficiency has increased by a third since 1980. The carbon intensity of each dollar of economic output has fallen by about the same amount.

However, historically, reductions of impacts through improved technology have been insufficient to counterbalance increases linked with those in population and affluence. For example, between 1990 and 2007 carbon intensities have declined on average by 0.7% per year. Population has increased at a rate of 1.3% and average per capita income has increased by 1.4% each year (in real terms) over the same period. Efficiency has not even compensated for the growth in population, let alone the growth in incomes. Instead, carbon dioxide emissions have grown on average by 2% per year, leading to a 40 percent increase in emissions between 1990 and 2007.

The unrelenting growth in resource consumption since the beginning of the 20th century, when data become meaningfully available, largely reflects “rebound effects” – energy or resources saved through more environmentally friendly products or services are used in additional consumption.

To date, Government actions at all levels to limit the negative impacts of human activities on the ecosystem have strongly focused on technology. Population has proved difficult to fully address in a coordinated way among nations. Income growth has been the stated objective of all development policies including those focused on poverty eradication, and is seen as indispensable. Directly influencing consumption patterns, which together with income determine the “affluence” factor of environmental impacts, has also been considered undesirable as a policy goal in many countries.

In practice, the reluctance or practical difficulty to address a range of issues related to population and affluence has left technology as the main policy lever of focus in the sustainability debate. In such a growth-focused perspective, absolute decoupling is necessary to achieve sustainability. Hence, policy efforts have focused on enhancing and accelerating technological progress, in particular in terms of efficiency and pollution reduction.

Actual progress in technology performance at the global level has fallen short of such ambitions. While over the long run increasing eco-efficiency of technology use has greatly reduced the amounts of resources consumed and pollution produced *per unit of output*, absolute amounts of consumption and pollution have continued to increase unsustainably.

The scope of current national and global policies and technology programmes does not “add up” to the scale of actions required, calling for a reality check of current plans. For example, the goal of establishing a renewable low-carbon energy technology system on a global scale remains elusive, with modern renewables jointly accounting for 0.7 per cent of primary energy, compared to fossil fuels’ share of 81 per cent in 2008. Global CO₂ emissions have increased considerably faster in the 2000s than in previous decades. Despite national and international efforts to accelerate and direct energy technology change, the pace of the global energy and fuel transitions has slowed significantly since the 1970s.

What is “decoupling”?

The concept of ‘decoupling’ refers to the process by which economic output becomes progressively less dependent on material throughput, resources and energy as production processes are made more resource or energy efficient. *Relative decoupling* refers to a decline in the ecological impact per unit of economic output. The situation in which resource impacts decline in absolute terms is called absolute decoupling.

What can be expected from business as usual?

No one knows which path the world will take in the next 40 years. But there has been an impressively strong consensus among experts about the major sustainability issues and the broad direction of trends. In contrast, big differences exist on the suggested policy solutions arising from different world views, grounded in different values.

Many “business-as-usual” (BAU) scenarios have explored the potential consequences of the world continuing its dominant development model. Most recent scenarios of this type are “dynamics-as-usual” (DAU) scenarios that assume across the board incremental improvements following past dynamics. In principle, these scenarios are the closest to future projections. They provide a sketch of what the world could look like in 2050, if we continued the historical path of incremental improvements in reaction to perceived crises, instead of a shift toward a long-term perspective that aims to anticipate the troubles ahead.

How have DAU scenarios performed in retrospect?

Mainstream DAU scenarios developed in the 1990s greatly underestimated actual global economic growth and energy demand, and overestimated the rate of technology change. On balance, they projected lower environmental pressures than actually occurred. For example, actual GHG emissions in the 2000s followed the highest scenario contained in the set of IPCC-SRES scenarios created in 1997 and published in 2001, much higher than its DAU scenario.

The description in this section is based on work done for Rio+20, in particular by the OECD and PBL. More details are provided in the SD21 scenario report.

This DAU world in 2050 is one of high material consumption by 6 billion people in both “North” and “South”, which coexists with another 3 billion people living in poverty. By its sheer scale, human activity will have transgressed the majority of the planetary boundaries as defined by J. Rockström and colleagues in 2009, with unknown effects but increasing the long-term risk of global collapse of the ecosystem. The effects of such potential collapse are not included in any of the mainstream scenarios. Similarly, the models do not account for the consequences of potential price shocks

and supply disruptions that might result from increased competition for resources, such as a collapse of global fish stocks. Hence, the picture they paint is likely an optimistic view of the consequences of continuing as in the past.

People in 2050

A more crowded, urban world. World population will be 9.2 billion in 2050, 2.2 billion higher than today, with most of the increase in South Asia, the Middle East and Africa. Urbanization will reach 70%, implying an increase of 2.8 billion people in urban areas, compared to a decrease of 0.6 billion in rural areas.

Persistent poverty and hunger amid riches. Great progress is expected for another 2 billion people being lifted from poverty and hunger. As in recent decades, such progress will be fast enough to compensate for the growing world population, but leave roughly as many people extremely poor (almost 3 billion people living on less than US\$2 per day) as today. The number of people going hungry will likely be reduced by 500 million people, still leaving 250 million with insufficient food intake.

One billion people without access to basic services. More than 240 million people, mostly in rural areas, will remain without access to improved water source, and 1.4 billion people without access to basic sanitation. Child mortality from diarrhea, caused by unsafe water supply and poor sanitation, will decrease, but Sub-Saharan Africa will lag behind. In 2050, there will still be some 1.8 billion people without access to modern energy services for cooking and heating, down from 2.75 billion in 2010.

Universal primary and secondary education for all. Great progress is expected on making not only primary, but also secondary education universal, with women most likely accounting for most of the higher-level degrees world-wide in 2050.

Economy in 2050

Global middle class in a US\$300 trillion world economy. Gross world product quadruples to US\$300 trillion in 2050, with Brazil, Russia, India, China and South Africa (BRICS) alone accounting for 40% of the world economy. Income convergence across countries continues rapidly. Average GDP per capita is expected to triple to US\$33,000 in 2050, a level similar to OECD countries today. In OECD countries GDP per capita is expected to double. GDP per capita in BRICS would quintuple to US\$37,000 in 2050. However, some of the most vulnerable and poorest economies remain marginalized.

An energy-hungry, fossil-fueled world. Global primary energy use increases by 80%, with a fairly stable mix of fossil fuels (85%), modern renewable sources (10%), and nuclear energy (5%). Rapid energy efficiency and intensity improvements will continue to be outstripped by energy demand. Demand for bioenergy will increase by 35% by 2035. A large share of the new area for production of feedstock will come from clearing forests and conversions of pastureland. Food prices are likely to increase. National energy security is expected to decrease for most countries, especially the large Asian economies.

A thirsty world. Results from integrated assessments indicate rapid and significant increases in water demand from all economic sectors. Competing demands will pose increasingly difficult allocation problems and limit the expansion of key sectors, in particular food and agriculture.

Nature and life support in 2050

Two thirds of world population living under water stress. In 2050, a whopping 3.9 billion people (more than 40% of world population) will live in river basins under severe water stress, and 6.9 billion people will experience some water stress. Groundwater continues to be exploited faster than it can be replenished and is also becoming increasingly polluted. Surface water and groundwater quality is stabilized and restored in most OECD countries, whereas it deteriorates in developing countries. The number of people at risk from floods might increase by 400 million to 1.6 billion, with the value of assets at risk almost quadrupling to US\$45 trillion.

Global deterioration of urban air pollution, but fewer deaths from indoor air pollution. Urban air quality will continue to deteriorate globally, with concentrations in many cities far exceeding acceptable health standards. Premature deaths from exposure to particulate matter might double to 3.6 million per year, SO₂ emissions increase by 90% and NO_x emissions by 50%. This is despite continued declines in SO₂, NO_x and black carbon emissions in developed countries. Yet, there will be fewer premature deaths from indoor air pollution after 2020.

Fewer forests, more land for agriculture until 2030, then reversed trends. Agricultural land area is expected to increase until 2030, intensifying competition for land, and might decline thereafter, in line with declining population growth and agricultural yield improvements. Deforestation rates most likely continue to decline, especially after 2030, but most primary forests might be destroyed by 2050, even if zero net forest loss were to be achieved after 2020.

Accelerated increase in GHG emissions and global warming. GHG emissions are expected to increase at an accelerated rate at least until 2030, leading to an increase from 48 to 83 GtCO₂-e from 2010 to 2050. Most of the GHG emissions increase will be due to large emerging economies. This is despite expected decreases in LULUCF emissions from 2040 onwards. Atmospheric GHG concentrations might reach about 685 ppmv (CO₂-e), eventually leading to a 3-6°C warming.

Unabated loss of biodiversity. Biodiversity is expected to decline by at least 10%, with the highest losses in Asia, Europe, and Southern Africa. Pressure from invasive alien species will increase.

Collapse of ocean fisheries. Although they are not included in mainstream scenario exercises, there is evidence that continued overfishing beyond maximum sustainable yield, together with ocean warming and acidification, eutrophication, habitat degradation, and destruction of coral reefs, might lead to a global collapse of ocean fisheries based on “wild catch”, with efforts to replace by aquaculture-based fisheries.

Human interference with phosphorus and nitrogen cycles well beyond safe thresholds: Eutrophication of surface water and coastal zones is expected to increase almost everywhere until 2030. Thereafter, it might stabilize in developed countries, but continue to worsen in developing countries. Globally, the number of lakes with harmful algal blooms will increase by at least 20% until 2050. Phosphorus discharges will increase more rapidly than those of nitrogen and silicon, exacerbated by the rapid growth in the number of dams.

A better world by 2050: Mainstream sustainable development scenarios

Scenarios produced for Rio+20

The SD21 study on scenarios reviewed sustainable development futures in 2050, especially recent mainstream sustainable development scenario studies prepared for Rio+20 by IIASA-GEA, PBL, SEI, RITE-ALPS, OECD, FEEM, GSG, and others (Table 1). These mainstream scenarios do not refer to one single scenario, but are fairly similar in spirit and content, all bearing close “family resemblance” with the IPCC-SRES scenario B1.

Sustainable development scenarios produced for Rio+20 by various research groups have explored a broad range of sustainability goals. Most of those show a clear relationship to major international development and sustainability goals that are either agreed or have been under discussion.

They are also grounded in (subsets of) existing mainstream scientific sets of goals, but clearly leave out elements of wider sustainable development perspectives that typically include community or society aspects, such as peace or social capital. Essentially, by sticking firmly to assumptions that are considered plausible and reasonable today, these mainstream scenarios explore what could be achieved by pushing technology to the utmost, supposing we can overcome socio-economic and political constraints.

The sustainable development scenarios describe a much “better world” than BAU/DAU, a world that is more sustainable in important environmental and social dimensions and that promises a decent quality of life for everyone (Table 1).

Yet, even this world appears far from a paradise vision for 2050. In fact, it is not free from contradictions, and confronts decision-makers with a number of unresolved trade-offs. They highlight the enormity of the global sustainable development challenge, and may indicate that – no matter what – at some point in the future we will be forced to make much more drastic behavioral changes.

High level of agreement on overall scenario conclusions

Despite their variety in terms of modelling approach and desired goals, the sustainable development scenarios developed for Rio+20 agree to a large extent in terms of their overall conclusions.

- There are numerous feasible pathways to sustainable development.
- There is no agreement on “must have” lists, but scenarios show the benefits of reining in overall material and energy use, increased end-use efficiency, and reduced poverty.
- A broad pursuit of sustainable development is far superior in performance over pursuing single-issue objectives in isolation (e.g., promote economic growth first and introduce greenhouse gas mitigation policies later).
- Complex trade-offs related to the global commons need to be tackled globally.
- While sustainability goals put forward by politicians have become increasingly ambitious, their attainment has become increasingly difficult.
- Education, RD&D and population goals are essential, with very large synergies with the development and environmental dimensions.

Little agreement on specific policy suggestions

There is no single solution or policy for sustainable development. Bottom-up measures and policies need to be tailored to each issue, country, and sector. Great differences remain in terms of specific policy recommendations that are drawn ex-post from scenario results. A key problem is the existence of important trade-offs across time, sectors, and issues.

Scenarios produced for Rio+20 also highlight the equally important synergies and opportunities provided by policy strategies that are geared to simultaneous achievement of multiple sustainable development goals.

A call for caution

Many “green” scenarios are unsustainable in at least one or more dimensions. None of the mainstream scenarios for Rio+20 illustrate a path toward sustainable development in 2050 that would satisfy the full set of sustainable development goals suggested by science.

Proposed “solutions” are often inconsistent across sectors. For example, all the mainstream sustainable development scenarios for Rio+20 see substantial increases in biofuel production and deployment of modern renewables, and consequently lead to significantly increased water and land use, increased water stress for the majority of the world population, as well as anthropogenic interference with phosphorus and nitrogen flows at a level that has been deemed incompatible with planetary limits by global environmental science.

Table 1 – Goals and targets in sustainable development scenarios for Rio+20

Vision	Theme	Types of goals, targets, and outcomes	IIASA-GEA	PBL	SEI	OECD	RITE-ALPS	FEEM	GSG	
To develop	People	Poverty	Eradicate hunger by 2050		X				X	
			Eliminate poverty by 2050			X				
	Access		Universal access to improved water source and basic sanitation by 2050		X		X			
			Universal access to electricity and modern cooking fuels by 2030 {or 2050}	X	X	{X}				
	Health & education		Decreased impact of environmental factors on DALY		X					
			Universal primary education by 2015						X	
	Income		GDP per capita > US\$10,000 PPP in all regions by 2050			X				
			Income convergence; catch-up of Africa by 2050						X	
	Economy	Resources		Primary energy use less than 70GJ per capita by 2050					X	
				Primary energy use per capita is only 13% higher in 2050 than in 2010, and 48% higher in 2100					X	
			Use of renewables increase by 3.1 times from 2010 to 2050					X		
			Water demand increases from 3,560 km ³ in 2000 to only 4,140 km ³ in 2050				X			
		Security	Limit energy trade, increase diversity and resilience of energy supply by 2050	X						
	To sustain	Life support		Population weighted average of energy security index increases only by 2.3					X	
			Limit the increase in the number of people under severe water stress to an additional +2 bln {or +1.4 bln} from 2000, reaching 3.7 bln {or 3.1bln} in 2050				X	{X}		
			People under severe water stress <2 bln until 2050 {or 2.9 billion in 2100}					{X}	X	
			Reduce number of people living in water scarce areas vs. trend scenario		X					
Resources				Reduce the area for energy crop production to almost zero by 2020. From 2010 to 2050, limit increase in cropland area for food production to +15%, and reduce the irrigated area for food production by 5%					X	
				Cumulative fossil fuel use limited to <520 Gtoe from 2010 to 2050					X	
			Slow and later reverse deforestation and land degradation						X	
		Slow overfishing and later restore fish stocks						X		
Air pollution			Keep PM2.5 concentration below 35 µg m ⁻³ by 2030		X					
			Reduce NO _x , SO ₂ and black carbon emission by 25% vs. baseline by 2050				X			
			Reduce SO ₂ by 42% and black carbon by 21% by 2050 vs. 2010					X		
Climate change			Reduce premature deaths due to air pollution by 50% by 2030		X					
			Limit global average temperature change to 2°C [or 2.8°C] above pre-industrial levels with a likelihood of >50% {or 60%} by 2100	X	X	{X}	X	{X}	X	
			Atmospheric GHG concentration stabilization below 450 ppm [or 350ppmv] {or 550ppmv} CO ₂ -eq. by 2100		X				{X} {X}	
		Limit ocean acidification to keep aragonite stable, with pH=8.0 in 2150					X			
Nature	Biodiversity		By 2020: Prevent extinction of known threatened species and improve situation of those in most decline; halve the rate of biodiversity loss; halve the rate of loss of natural habitats and reduce degradation and fragmentation by 2020; conserve at least 17% of terrestrial and inland water. By 2050: stabilize biodiversity at the 2020/2030 level		X					
			CBD Aichi protected area targets of 17% of terrestrial and inland water areas and 10% of coastal and marine areas by 2020		X		X			
	Phosphorus and nitrogen cycles		Phosphorus removal in wastewater treatment increases from 0.7 Mt in 2000, 1.7 Mt in 2030, to 3.3 Mt in 2050				X			
		Reduce Nitrogen and Phosphorus use where possible, but without harming the ability of the agricultural system to meet the hunger target		X						

Sources: IIASA-GEA (Riahi et al., 2012); PBL (van Vuuren et al., 2012); SEI (Nilsson et al., 2012), OECD (2012); RITE-ALPS (Akimoto et al., 2012); FEEM (2011); GSG (Raskin et al., 2010).

Note: Brackets and parentheses denote alternative values for targets or dates, as indicated in the list of goals, targets and outcomes.

The SD21 study on scenarios also confirmed that sectoral scenario studies (e.g., those on food, water, forests, or development), as well as national integrated studies, are mostly carried out in isolation from integrated global scenario studies. Hence, while these national and sectoral studies highlight ways of overcoming some of the local and sectoral trade-offs, by design they cannot fully account for feedbacks and constraints across sectors or regions.

Competing demand for water: Reconciling results from integrated and sectoral assessments

Mainstream integrated scenario exercises developed for Rio+20 describe water demand increases by 55% to 2050, mainly due to manufacturing (+400%), electricity (+140%) and domestic use (+130%), leaving little scope for increasing irrigation.

On the other hand, some water scenarios focusing on agriculture undertaken by the Comprehensive Assessment of Water Management in Agriculture in 2007 forecasted that growing human population will translate into doubling demand for water for agriculture in 2050 from current level.

These differences point to the importance of taking into account cross-sectoral impacts. They also highlight uncertainties and difficult choices that lie ahead.

At the same time, global integrated studies also underestimate binding constraints to overcoming trade-offs, since they aggregate over local constraints, basically assuming free availability of resources over large geographic areas.

In other words, it is highly likely that scenarios in general tend to underestimate the challenge of moving humanity onto a sustainable development path. This calls for greater caution and humility about what can be achieved.

Do scenarios explore the kind of futures we want for our children?

The long-term future that we are exploring here is primarily for our children, which should be a reason to pay special attention to their aspirations. In fact, when children from different countries are asked what kind of future they would like to see for the world in 2050, their response typically is a broader wish list than what prominent sustainable development scenarios have explored since the 1970s. In particular, they often include wishes for a harmonious and peaceful world and sustainable, pleasant, and healthy local communities.

Mainstream scenario models are limited in the range of options they explore by the fact that they stick to “radical incrementalism” – pushing the current technology-focused approach to its limits. Under this type of assumptions, no single mainstream scenario has yet convincingly shown how all the complex trade-offs and resulting unsustainable patterns could be overcome. Given this, we can ask ourselves whether this type of assumptions would in fact allow us to reach futures that we really want for ourselves and our children. Scenario analysts of various disciplines need to work together and explore scenarios that are sustainable across all these dimensions. And decision-makers will need to be more courageous in opening up new options for consideration. Maybe the most important lesson is that at some point we will need to embrace systemic change.

Reconciling statements about progress, gaps and perspectives for sustainable development

Views on progress made, remaining gaps and ways forward in the furtherance of sustainable development cover an extremely broad spectrum and tend to differ across and within governments, civil society groups, academia, and the public at large. The following statements are typical of this wide range:

- a) Elements of a sustainable future are already visible. Corporations and NGOs are showing the way. What is needed is to quickly scale up these initiatives;
- b) While we are not yet on a sustainable development path, we know what should be done, and we have the means to do it. All that is needed is political will to implement commitments in terms of finance, technology and capacity development;
- c) Current environmental trends are unsustainable. Markets are the most efficient way to guide us on the right path. What is needed is full internalization of environmental externalities, and expansion of markets for ecosystem services;
- d) We are on a fundamentally unsustainable path. Drastic changes in behaviour and lifestyles are necessary to achieve the necessary transition towards sustainable development;
- e) Humanity has transgressed the Earth's carrying capacity decades ago. Only an immediate stop to ecosystem destruction, as well as population control and large-scale restoration of ecosystems might restore global biotic regulation and prevent total collapse of ecosystems, including the human species.

At first glance these statements look mutually contradicting. More in-depth analysis shows that none of them is necessarily wrong. Different conclusions are reached by choosing different scopes and completely different time scales. In fact, system size and time scales increase greatly from the focus on local, current actions to the comprehensive view of the Earth's biota and thousands of years. However, policy prescriptions derived from short-run and narrow approaches are often contradictory to those that would be predicated on long-run considerations.

What is immediately apparent too is that the different statements mix opinions on: (i) where we are today with respect to sustainability; (ii) what the main constraints to progress are; (iii) what means should be adopted to achieve sustainable development; and (iv) what specific policies should be used. Importantly, few perspectives articulate ends (where we want to be), as opposed to means.

Not only do views differ across all actors. One of the main barriers to productive dialogue is the fact that arguments are made at very different levels, referring to:

1. Sustainable development as an overarching goal, including the scientific basis that underpins it or its application to specific sectors or clusters;
2. The overall approach that should be followed to achieve sustainable development;
3. The nature and content of strategies that the international community and national governments select for going forward;
4. The details of the blueprints (e.g. Agenda 21) upon which action is based;
5. Progress and shortcomings in the implementation of specific actions and plans.

This can result, at best in unproductive exchange of arguments, at worst in incomprehension and mistrust. This report argues that in order to start a constructive conversation on sustainable development, views at these different levels have to be made explicit as far as possible.

Going forward – areas for action

CATEGORY	SD AS THE OVERARCHING OBJECTIVE	VISIONS FOR SUSTAINABLE DEVELOPMENT
Ideal world	Agree that sustainable development is the overarching paradigm, at national and international levels	Agree on what to develop and what to sustain, and frame such agreement in a political deal that is acceptable to all and has enough “teeth” to achieve the expected goal Agree on fair sharing rules for use of global commons (e.g. open oceans, atmosphere)
Political deal	Reconfirm sustainable development as the overarching goal. Agree on a desired level of intergenerational equity and on thresholds for global planetary limits that should not be trespassed	Agree on, or reconfirm, a minimal set of things to be developed and sustained Frame such agreement in a political deal that is acceptable to all and has enough “teeth” to achieve its objectives Re-examine the roles of various groups of countries including large emerging economies in an updated allocation of rights and responsibilities
Embedding sustainability in society	Integrate global environmental limits and related risks in rules, institutions, and decision-making at all levels	Incorporate resilience of social systems and ecological systems in decision-making Manage the global commons equitably and sustainably
Institutions for SD <i>Horizontal integration</i> <i>Vertical integration</i>	Increase the voice given to future generations in institutions at all levels	Define ways in which conflicts between rules and institutions can be resolved in a way that is compatible with overarching sustainable development objectives Design mechanisms that ensure that commitments from different groups and different levels on issues of global interest “add up”
Private sector – global economic engine		
Political commitment	Actively engage to eliminate the duality in “sustainable” and “mainstream” institutions, at national and international level Inscribe the maintenance and development of natural capital into the core mandates of Ministries of Finance, Economy or Development	Empower lower levels of governments to act on their own and try new approaches to sustainability
Participation and inclusiveness		Provide forums for discussion and decision-making among all components of society to elicit long-term strategies that achieve strong buy-in Re-introduce equity as a legitimate dimension of public discourse and decision-making, as opposed to an add-on to economic choices
Science, monitoring, evaluation	Improve the processes for interaction between science and policy, in particular regarding global environmental limits	Design an institutional framework that allows for monitoring of major sustainability areas and providing adequate feedback to decision-making on areas of global importance

GOALS AND STRATEGIES

Develop integrated strategies and strong institutions that can guide all actors towards global sustainability

Agree on division of tasks between the international system and the national level. The UN, international community could focus on:
1) managing global commons;
2) interface with Member States on international rules that affect global human impacts on the environment (trade, corporations, financial and capital flows, pollution);
3) Mechanisms for ensuring that national commitments on issues of global interest "add up"

Adopt a small, consistent and high-level set of sustainable development goals that cover the full scope of sustainable development concerns

Look for robust strategies instead of "efficient" strategies

Consider all relevant instruments at our disposal – from acting on values and tastes, to demand management, to production efficiency

Integrate sustainability thinking in educational curricula at all levels across disciplines

Develop strong institutions that can guide all actors towards global sustainability

Use integrated approaches to evolve sectoral goals and strategies that are consistent with broader goals and across themselves ("Nexus approaches")

Design systemic mechanisms by which the work of sectoral instruments such as UN conventions can be coordinated and made compatible with evolving objectives

Improve the compatibility of the system of rules governing the private sector with sustainable development objectives

Reassess roles for the public and private sectors in the different sectors of the economy and economy-wide

Commit to provide a level playing field for local, low-technology, and non-market solutions, in order to enable local knowledge, skills, and technologies to thrive

Governments at all levels should lead by example by putting public procurement rules and practices in line with their publicly advertised sustainability goals

Re-orient public investment (e.g. infrastructure, transports) in a direction that facilitates sustainable choices and behaviours

Put participation at the heart of decision-making at all relevant levels

Design transparent, independent and participatory monitoring and evaluation systems that provide the needed information to re-adjust course as needed

ACTION PLANS

Sectoral actions plans should be based on agreed integrated strategies

Build flexibility in rules and institutions so that their scopes, mandates, can be readjusted periodically in function of progress towards sustainability

Ensure consistency of sectoral development strategies with broader sustainability objectives, limits and constraints

Improve regulatory systems for financial and capital markets and corporations

Put in place adequate institutional mechanisms to provide avenues for the private sector and civil society to fully contribute to sustainability in the various sectors of the economy

Review regulations at all levels to ensure that they do not discriminate against local, low-technology, or non-market solutions

Ensure maximal impact of public procurement on sustainability objectives

Increase priority and resources for measurement and evaluation of action plans, institutions and standards

IMPLEMENTATION

Ensure coordination of implementation of sectoral strategies

Agree on credible mechanisms for enforcement of national commitments

Provide appropriate mandates and resources to all levels of governments

Mobilize the political will to manage natural resources sustainably

Reinforce monitoring and evaluation capacity and feedback with design of goals, strategies, and programmes

Sustainable development as an overarching paradigm

Recent trends make sustainable development more relevant than ever

According to science, pursuing business as usual puts humanity on an “overshoot and collapse” track. Virtually all BAU scenarios developed by major institutions indicate a collision course between global ecosystems and human activities – this may be one of the few points of broad agreement among governments and scientists.

For those who believe in the seriousness of global environmental issues, the choice of inaction violates moral and ethical principles. They believe that if this course were to be followed, future generations would run the risk of being unable to address basic development issues or at least would face a drastically reduced universe of possible choices, due to the collapse of essential ecological services. For many, the perspective of such unattractive future vindicates the relevance of sustainable development as the overarching paradigm that we should collectively adopt.

On the other hand, for technology optimists, we are facing a classic example of “environmental Kuznets curve”. As future generations will be richer, it makes sense for them to pay for the cleanup.

SD faces tough competition from other paradigms

The success of sustainable development as a paradigm can be measured by its official adoption as an overarching goal. On this front, the record is mixed.

On the one hand, sustainable development has been inscribed in the Constitutions of some countries, along with fundamental rights that are part of the sustainable development “package”. It has also made inroads into specific laws and regulations across sectors.

On the other hand, since 1992 sustainable development has never replaced other paradigms or overarching policy objectives such as growth and employment. In Europe, which is usually considered a leader in the operationalization of the sustainable development concept, this primacy of growth has translated into competing strategies (Lisbon strategy and Sustainable Development Strategy), and in practice the growth and competitiveness strategy seems to receive the highest attention and priority. So far, sectoral development models have also largely operated under traditional

paradigms, even though sustainability considerations have been incorporated to varying degrees.

The UN Commission on Sustainable Development was created after the Earth Summit in 1992 as the mechanism for decision-making on sustainable development. Despite early successes, it has not met initial expectations, which many observers have related to low priority accorded by Governments to that forum.

The resilience of mainstream paradigms is exemplified by the rise and fall of calls for deep changes in the economic and financial systems that followed the financial crisis in 2008. As noted by numerous observers, these calls rapidly faded as the focus shifted to “re-starting the economy”. In practice, so far the current economic model has emerged mostly unscathed from the post-crisis period.

The adoption of sustainable development without renunciation of other objectives has translated into resistance from institutions at all levels to fully accommodate sustainable development as a guiding framework for their operations, which has resulted in the creation of dual or parallel “tracks” in many areas.

Economic and financial governance has remained firmly outside of the remit of sustainable development. It has continued to function largely untouched by the concepts of sustainable development, both at the international and national levels.

Development as a discipline and practice has also remained largely independent from sustainable development. Although some concepts from sustainable development have been progressively integrated into the doctrines of development by practitioners, in particular at the level of project implementation, development paradigms that frame the context of international assistance have continued to evolve largely in isolation from sustainable development. As a result, there are dual tracks in development assistance, where sustainable development coexists (on an unequal footing) with “development” in the old sense, in the UN arena, in international financing institutions and in bilateral cooperation agencies.

The same duality can be seen at the national level, where dedicated institutions for sustainable development often coexist with older, stronger institutions that focus on business as usual. The influence of national sustainable development councils and similar structures has never reached a level where it could influence the main budgetary and policy choices. The marginalisation of sustainable development in environment ministries, or

the waning popularity of local Agenda 21 after the World Summit on Sustainable Development in 2002 are only some of the symptoms of the general trends.

Knowledge remains largely organized along traditional academic disciplines. By contrast, sustainable development thinking relies on systematic integration of all relevant dimensions of specific issues – from natural sciences to law to social and economic aspects. Until now, a convenient way to organize existing knowledge around this perspective, which would enable cross-discipline integration to occur more spontaneously, has been wanting. Knowledge generation and research is also still organized around traditional disciplines. While sustainable development curricula have been developed over the years at all levels of education, they remain relatively marginal additions to traditional curricula. Importantly, macro-economics as a discipline is still divorced from basic environmental considerations.

Is sustainable development too difficult to “sell”?

For most of the general public and politicians alike, the issues we face may be an example of a “difficult problem” where future gains from a shift to sustainability are to be traded for immediate losses (at least as compared to pursuing our current way of doing things). When push comes to shove, no one is eager to pay the price now in the hope that future generations will reap the dividends from our prudent behaviour.

Many experts agree that the position of sustainable development in the competition for legitimacy among world views has not strengthened since the World Summit on Sustainable Development in 2002, but may on the contrary have waned. Relevant for policy consideration is the presence in all countries of a wide spectrum of opinions regarding the seriousness of environmental issues, the priority that they should receive compared to other issues, and ultimately the electability of governments that campaign on them.

Whereas in the past there might have been a sense that providing more and clearer information about environmental issues would cause public opinions to shift, making global environmental issues more amenable to consensus-based policies, this has clearly not been the case everywhere.

Frustrating the hopes of societal changes towards more sustainable ways of living and consumption patterns has been a collective incapacity to make adjustments to value systems when those are at odds with sustainability. So far, many governments profess a reluctance to

openly tinker with consumer values at different levels of society. However, as we realize that market approaches have largely failed to bring in sizeable reductions in material throughput so far, we have to ask ourselves: can sustainability be achieved without touching on values? Are current values at the society, community and individual levels compatible with sustainable societies?

According to optimists, “social tipping points” with favourable impacts on overall sustainability may be reached soon and occur spontaneously, causing rapid changes in mainstream values and making those more compatible with sustainable lifestyles. Such examples could include a shift to more sustainable diets and food systems, if the demand for sustainably produced food, following the slow increase observed over the last decade, reached a threshold that made it the reference choice for the rest of consumers. However, tipping points in the other direction are also easy to envision, making this type of bet on the future a risky strategy to rely on.

Going forward: Giving credible signals

In today’s context, it can be asked whether government statements on their commitment to sustainable development are perceived as credible by the public. There is a danger of discredit of the whole idea of sustainable development if solutions are never truly implemented due to lack of political will or institutional resistance, or are watered down to the point where they become non-threatening to incumbent institutions. In the long run, half-hearted attempts both reinforce critics of the concept, as sustainable development visibly does not “deliver”. This can also lead to cynicism on the part of “true believers” who see the concept turned into a marketing opportunity for politicians or the private sector or instrumentalized to serve purposes they do not agree with.

In this context, **any attempt to get to grips with sustainability would need to be preceded by credible signals on the part of governments that “this time, it is for real”.**

Because money is not going to stop talking, giving the most powerful ministries and institutions the responsibility for sustainable development would perhaps be the best indication from governments to the public that sustainable development is the mainstream paradigm under which they operate. New or strengthened arrangements for Parliamentary oversight and scrutiny of national progress towards sustainable development could also be encouraged.

Inscribe the maintenance and development of natural capital into the core mandates of Ministries of Finance, Economy or Development

Giving an institutional voice to the interests of future generation

It has become commonplace to attribute low progress on sustainable development to short-termism on the part of the private sector and governments. Incentives built in the political and economic systems, such as short election cycles and short-term profit motives, would encourage decisions that favour immediate gains to longer term benefits, thus biasing decision-making against the interest of future generations. However, it is not obvious that governments that are not subject to those election cycles have performed better in terms of sustainability.

A high-level, strong incentive to correct short-term biases in decision-making would be to **inscribe the interests of future generations in legislation and institutions at all relevant levels**. Examples exist over the world that could inspire reforms in that direction. At the international level, this could take the form of a UN High Commissioner for Future Generations.

Inscribe the rights and interests of future generations in legislation and institutions at all levels

Ending the duality in institutions and processes

Another medium-term goal should be for national and international institutional frameworks alike to systematically adopt reforms to eliminate dual institutional tracks, establishing sustainable development firmly as the overarching paradigm under which all institutions operate.

In the development arena, a strong signal in that direction would be to adopt as a set of Sustainable Development Goals (SDGs) that cover all the dimensions of sustainable development as the successor to the Millennium Development Goals to guide international action and development cooperation in particular.

Actively engage to eliminate the duality of “sustainable” and “mainstream” institutions, at national and international levels

Table 2 – Three competing world views on sustainability and their basic principles and priorities

Political perspective	Mainstream economic model	“Green growth”	“Sustainable well-being”
School of thought	Neo-classical economics	Environmental economics	Ecological economics
Primary policy goal	More: Economic growth in the conventional sense, as measured by GDP. The assumption is that growth will ultimately allow the solution of all other problems.	More but with lower environmental impact: GDP growth “decoupled” from carbon and from other material and energy impacts	Better: Focus must shift from merely growth to “development” in the sense of improvement in sustainable human well-being, recognizing that growth has significant negative by-products.
Primary measure of progress	GDP	Still GDP, but recognizing impacts on natural capital	Measures of human welfare, often based on GDP but incorporating environmental and social dimensions (Index of Sustainable Economic Welfare, Genuine Progress Indicator or others)
Scale/carrying capacity/role of environment	Not an issue, since markets are assumed to be able to overcome resource limits via prices and new technology, and substitutes for resources are always available.	Recognized, but assumed to be solvable via decoupling and market incentive systems.	A primary concern as a determinant of ecological sustainability. Natural capital and ecosystem services are not infinitely substitutable and real limits exist.
Distribution/poverty	Acknowledged, but relegated to “politics” and a “trickle-down” policy: a rising tide lifts all boats	Recognized as important dimension. It is assumed that greening the economy will reduce poverty via enhanced natural assets, agriculture and employment in green sectors	A primary concern, since it directly affects quality of life and social capital. Questions the “trickle down” assumption --a too rapidly rising tide only lifts yachts, while swamping small boats
Economic efficiency/allocation	The primary concern, but generally including only marketed goods and services (GDP) and market institutions	A primary concern. Recognition of the need to include natural capital and the need to incorporate the value of natural capital into market incentives	A primary concern, but including both market and nonmarket goods and services and effects. Emphasis on the need to account for the value of natural and social capital to achieve true allocative efficiency.
Property rights	Emphasis on private property and conventional markets.	Recognition of the need for instruments beyond the market	Emphasis on a balance of property rights regimes appropriate to the nature and scale of the system, and a linking of rights with responsibilities. Includes larger role for common-property institutions in addition to private and state property.
Role of government and principles of governance	Government intervention to be minimized and replaced with private and market institutions	Recognition of the need for government intervention to internalize natural capital	Government should play a central role, including new functions as referee, facilitator, and broker in a new suite of common-asset institutions

Source: Authors, based on Costanza et al., 2012.

Visions for sustainable development

Many visions for sustainability coexist

Sustainable development, rather than a vision, proposes a way of thinking of issues. It is not prescriptive of what the world would look like. Many different futures would be compatible with its broad principles of sustainable development – including peace, human well-being, inter- and intra-generational equity, participation, and respect and maintenance of natural systems. As a consequence, strategies for sustainable development should, to the extent possible, be based on visions that define desirable ends, as well as feasible ways to achieve those ends. In the case of sustainable development, this means: (i) clarifying what needs to be sustained, and what needs to be developed; and (ii) eliciting paths that allow such a vision to happen, while keeping within the bounds imposed by natural systems. It is clear that there is no universal agreement on either of those points. Attempts to pinpoint more operational definitions of sustainable development have encountered widely differing value systems, which have made broad agreement on what should be sustained and what should be developed difficult to achieve. There is a dearth of society-wide discussions on *ends* (where we want to be), as opposed to *means* (what instruments we use to get there).

We need to agree on, or reconfirm, a minimal set of values to be developed and sustained

Institutional arrangements are needed to allow for reaching at least minimum scientific consensus on what to develop and what to sustain. This needs to draw on all relevant disciplines and academic communities, not just those dominant in few Western countries or economic disciplines.

Differing views of sustainability in the energy sector

Polarized and politicized views typically dominate the energy debate, at national, regional and global levels. This has made it increasingly difficult for energy decision-makers to untangle the evidential basis for developing consistent decision making frameworks.

Source: Howells, 2012.

Integrating ecological limits in international rules and decision-making processes

Across the board, our institutions are not designed so as to incorporate ecological limits and their consequences

on social and economic outcomes in their decision-making processes in a systemic manner. Rather, our collective mode of operation has been one of finding “fixes” whenever crises happen. This mode of operation has been fairly successful up to now. In the face of closing global environmental limits however, many have warned that such approaches will be insufficient and ineffective.

There is a need for identifying global thresholds that we collectively want to steer away from. In parallel, necessary changes should be made to integrate such thresholds at all the rungs of the ladder: objectives, goals, targets, actions plans, and implementation. We also need frameworks that allow rules and institutions to focus on robust strategies in the face of unknowns and uncertainty regarding the consequences of global environmental change.

Food and agriculture: Are we managing risk and uncertainty optimally?

Despite a wealth of more than 50,000 edible plants in the world, well over half of our food now comes from only three plants (rice, corn, wheat), making the world’s food supply highly vulnerable to biological diseases that would affect one of those. Fewer firms channelling global commodities between producers and consumers may also elevate risks as failures could be greater in scale and scope and thus more consequential.

Source: Giovannucci et al., 2012.

Integrate global environmental limits and related uncertainty and risks in rules, institutions, and decision-making at all levels

Improve the coherence of the system of rules and its compatibility with sustainable development

There is a widely voiced concern that so far, rules governing various aspects of the global economy have been designed and addressed in relative isolation, generating conflicting principles, rules and incentives across disciplines, which manifest themselves through real conflicts and disputes.

While tensions across principles of international and national law (hard and soft) are part of any healthy rule system, the way in which those conflicts are resolved is of utmost importance for the evolution of the system of rules. It is clear that without guidance regarding the way conflicts should be resolved, conflicts are

solved in “endogenous” or “organic” ways that result in the constitution of jurisprudence that favours most entrenched principles – those which serve dominant interests or are supported by more efficient institutions.

If sustainability is the broad objective, then the guidance itself has to be based on sustainability considerations. Such guidance has largely been missing until now. The institutional strengthening of the environmental pillar would help in this respect, by providing a more even playing field where competing claims and principles can be examined and adjudicated (for example, trade and environment issues).

Define ways in which conflicts between rules and institutions can be resolved in a way that is compatible with overarching sustainable development objectives

Trade rules: Primus inter pares?

During the past decades the WTO has expanded its scope from an institution concerned primarily with controlling barriers at borders to include new issues (intellectual property, technical barriers to trade, trade in services) where removing barriers to access may require ‘behind-the-border’ reforms to domestic legal and regulatory systems. Many have questioned the legitimacy of trade institutions to become the de facto source of rules in these areas, where regulatory structures are sometimes weak or fragmented. In particular, environmental, food safety, and health issues have been focal points for criticism as governments increasingly ask the WTO to adjudicate in areas where the original architects of the GATT system had purposely carved out space for domestic intervention and policy development. A dilemma is thereby created. At the same time as new agreements on food safety, intellectual property, services, and technical barriers to trade open the door to trade challenges that touch on non-trade areas, governments show increasing reluctance to advance issues related to the environment or social standards on the agenda of WTO negotiations. It is in these areas that transnational non-State, market-driven regulation systems have proliferated, where national regulations and international agreements have been perceived as weak or lacking

Source: Bernstein and Hannah, 2009.

Reconciling the needs for coordination and sovereignty

There have been concerns regarding the infringement of international rules on national sovereignty or on democratic choices. Sustainable development, because of its all-encompassing scope, has received negative attention from diverse components of public opinions worldwide as potentially interfering with national policy space or individual freedoms.

In instances when trade rules are invoked against health-related regulations, when choices regarding acceptance of new technologies are perceived to be “forced” against public opinions, when private arbitration is used to challenge public law, or when development assistance is accompanied by conditions that impose particular development paradigms upon societies, there is a sense of loss of democratic accountability.

Basic democratic principles require that peoples and communities should be the ones that determine the type of society in which they want to live. National circumstances should have priority – each country has to follow its own path to sustainable development. Societies should be able to determine what they want to produce or consume, based on their values. There should be clear limits to the possibility for components of the “engine” of global society (such as trade and investment rules) to challenge democratic choices made by citizens regarding how they want to live. For example, if some societies value precautionary approaches more than others, they should be free to express their choices in this respect and translate them in the law without being exposed to challenges by States, companies or the international community for doing so. The same should apply to standards in terms of consumer information and protection.

When genuine coordination and cooperation are needed, especially for the management of global commons, a key question is how much variance there can be among national paths, and what minimal degree of coordination needs to happen, for common goals to still be achievable. For example, it is clear that individual voluntary pledges to reduce greenhouse gas emissions do not add up to the reductions that would be necessary in order to limit climate change to below 2 degrees Celsius according to climate science. Solving these issues will suppose to find appropriate ways to manage complex vertical relationships between local, national and global levels.

Design mechanisms to ensure that commitments on issues of global interest "add up"

Not all issues need the same degree of coordination and cooperation. "Pure" global common pool resources such as oceans, climate, and biodiversity as a gene pool, truly need international agreements and enforcement to be sustainably managed. "Hybrid" sectors, involving a mix of local, national, and global impacts such as forests and management of biodiversity as conservation "in situ", need some degree of coordination. Other sectors such as urban development, health systems and education systems are best dealt with at the lowest level appropriate.

Strengthening inclusiveness and participation

Defining common visions and way forward

Perhaps the most successful example of sweeping society-wide transitions observed recently have been in some countries emerging from long conflicts, where considerable time and energy were spent in broad consultations and outreach to citizens to elaborate national visions and strategies for the future. To make the transition to sustainability happen, similar qualitative jumps, as opposed to marginal shifts, will be needed. Drawing inspiration from countries that have managed difficult transitions, **spending more resources on building consensus on clear visions and way forward may be a very effective use of public resources.**

More time and resources could be spent in eliciting visions, goals and strategies towards sustainability that achieve strong buy-in

Creating and reviving forums for decision-making on sustainable development

At the global and national levels alike, forums dedicated to sustainable development were created after the Earth Summit in 1992, but have mostly failed to gain a level of importance sufficient to make a difference. National sustainable development strategies to drive progress could be initiated or revived. National Sustainable Development Councils or other mechanisms could be used to engage all parts of society in the sustainability transition.

It would also be critical to revive forums at all geographical levels for comprehensive and meaningful discussions on specific sustainable development issues

among all actors, providing a space for "real", society-wide partnerships. Such forums would enable actors, including the private sector, to make a link between locally relevant objectives of sustainable development and their individual contribution. Such forums need to go beyond the call for voluntary measures such as e.g. corporate social responsibility (CSR) or principles for responsible investment.

Provide forums for permanent discussion and decision-making on sustainability issues among all components of society to elicit long-term strategies

Putting equity back at the forefront

In the last two decades equity issues have tended to be equated to poverty alleviation and access to basic services. Since 2000, there has been an increased focus on poverty, in particular due to the success of the Millennium Development Goals (MDGs) as a guiding framework on development. At WSSD in 2002 in Johannesburg, poverty alleviation was defined as one of the three overarching objectives of sustainable development along with sustainable management of natural resources and sustainable consumption and production. There is a broad consensus on the utmost importance of fostering basic human capacities to flourish as we go forward.

Due to this strong focus on poverty alleviation, the debate has tended to be framed in terms of finding the right policies for redistribution of income, taking outcomes in terms of income distribution as given. However, in many contexts addressing poverty systemically could probably be done more effectively by changing the underlying structures that determine income distribution. For example, policies aiming to improve food security, beyond food distribution and food price control instruments, should encompass reforms of local land and agricultural market structures that cause food insecurity in the first place.

Beyond policies that are directly aimed at redistributing income, policy choices in most areas have profound implications on equity and opportunities within and across communities and societies, as well as between generations. The corresponding choices are not systematically discussed in terms of equity, but are often presented as resulting from "efficiency" or "optimality" considerations as dictated by economics or even "markets". This defeats the purpose of sustainable development, where equity and public participation to societal choices should be central considerations.

Policy choices and equity implications: National and international examples

Equity issues are pervasive at all levels of decision-making. At the international level, choices regarding e.g. the design of trade agreements, provisions for access to benefit sharing for biodiversity, the set up of carbon markets, rules for intellectual property rights, and how revenues from natural resource exploitation are shared in practice between host countries and producers, all have equity issues embedded in them.

At the national level, choices made regarding the priority given to access to education and basic services versus other investments; the way access to commons is managed; the way revenues from the exploitation of commons and other natural resources are shared; the ways mechanisms for ensuring food security are set up; the rules (and their implementation) regarding who pays for environmental remediation of industrial activities (e.g. mining); the way rights to pollute are distributed in the economy (e.g. how carbon emission allowances are distributed or auctioned, and how the proceeds from their auction are used); and, considering the recent financial crisis, the way the bailouts of financial institutions are designed and implemented; all have direct equity implications, which can be one order of magnitude above the size of existing direct financial transfers to alleviate poverty.

Recognizing this fundamental political dimension of policy decisions and exposing it to the public for debate, and showing how everyone is expected to contribute to proposed solutions, would not only meet a core requirement of democratic practice; it could also contribute to re-building trust in governments and enhance society-wide acceptance of decisions that are not immediately “win-win” for all stakeholders.

Re-introduce equity as a legitimate dimension of public discourse and decision-making, as opposed to an add-on to economic choices.

Agreeing on ground rules for the fair sharing of our global commons in the long term would be necessary. One of the most important equity issues that will need to be addressed eventually is the fair allocation of rights to the scarce resources from global commons, in the face of limited yields of common

renewable resources (such as fish from the open ocean) and limited absorptive capacity of global ecosystems for pollution (as in the case of greenhouse gases for atmosphere). This is an ethical question, which cannot be answered by having recourse to economic models.

These basic equity issues have proven most difficult to address, notably because current allocations, which are often the implicit product of historical circumstances, are often distant from what common sense “fair” allocations would look like. For example, CO₂ emissions per capita exhibit variations across countries from more than 1 to 100. However, until these issues are settled in a fair and satisfactory way, collective actions are likely to remain limited in scope and ambition and there is little hope that they can achieve the overarching objective to manage our global commons sustainably.

One of the most important equity issues that will need to be addressed is allocating rights to the global commons fairly.

Empowering lower levels with means to act on their own

Progress towards more sustainable outcomes does not need to wait for a hypothetical consensus on what the future of the world should be, or how global affairs should be managed. Actions at lower levels can and should be taken as soon as possible.

For a number of issues, cities are a good place to start, as the physical place where action happens. Cities matter because they turn visions, policies and targets into services, brick and mortar. Because there are thousands of different cities, they also offer an exceptional opportunity for experiments, trials, and alternative pathways to be tested, documented and shared. Cities should be encouraged to propose and try out innovative integrated solutions.

Empower lower levels of governments to act as agents of change on their own and try new approaches to sustainability

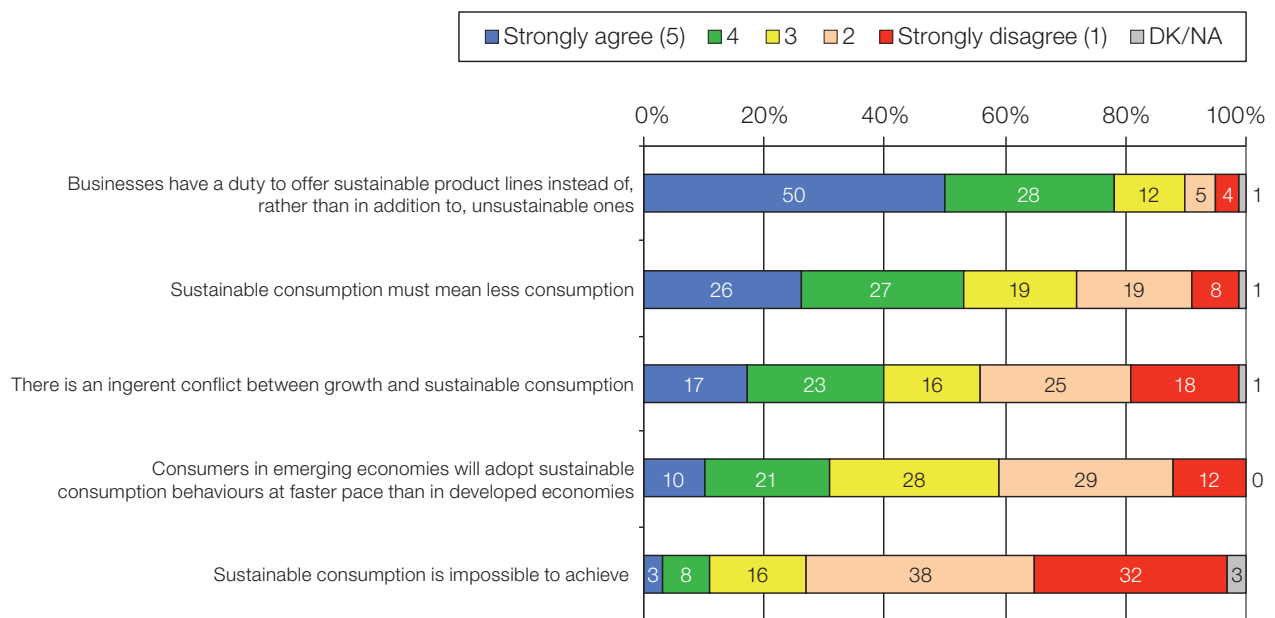
Goals and strategies for sustainable development

There are many roads to Rome

It seems fair to say that there is no agreement regarding the means through which sustainable development could or should be achieved. One of the most divisive fault lines concerns the compatibility of pursued economic growth at the global level with environmental sustainability, and by extension the compatibility of societies based on ever expanding material consumption

with global planetary limits. A recent global survey of experts found experts split on this issue. Another example of this may be the range of value assessments that have been made of globalisation, which has been a defining force of the evolution of the world for some decades. It has been presented both as a blessing and a curse by different communities that proclaim sustainable development as their overarching goal.

Figure 4 – Experts’ views on sustainable consumption issues



Source: GlobeScan/SustainAbility, 2011.

Integrated goals and strategies are needed more than ever

In spite of these differences, there seems to be a broad awareness that addressing symptoms of social problems or environmental degradation as they manifest themselves, often in isolation, is not a viable strategy (Table 3).

Clusters of sectors (or “nexus” approaches as they are sometimes called) may be a way to progress, but coordination should happen at the higher levels of

planning and decision-making– adjustments made locally at the implementation stage are inefficient, especially if sectors start from conflicting goals.

Integrated approaches need not be limited to natural-resources related sectors. Clusters consisting of industrial sectors together with human development-related sectors such as education and health can generate additional insights in terms of opportunities and trade-offs of societal choices (e.g, for food, health and education).

Helping achieve greater coordination across sectoral goals is a critical role for an improved science-policy interface. However, in order to be able to deliver such added value, the science-policy interface has to be organized in adequate ways. The recent multiplication of international scientific advisory panels, by replicating the sectoral organization in silos, runs the risks of

being unable to inform decision-making at a sufficiently strategic level, and failing to address trade-offs satisfactorily.

Use integrated approaches to evolve sectoral goals and strategies that are consistent across sectors and with broader sustainability goals

Table 3 – Interactions across land, agriculture and food, water, energy and climate in Burkina Faso

Sectoral goals and objectives	Sector-based rationale	Selected impacts on other sectors
Intensifying agricultural production in Burkina Faso	Burkina Faso's agriculture is highly extensive with low per hectare yields, low water and energy inputs. Increasing population and food demand (but also income generation with cash crops) will make an intensification of agriculture necessary in the future.	<ul style="list-style-type: none"> Increased energy and water inputs per hectare of agricultural land Medium to long term benefits due to higher food production and possibly decreased agricultural land requirements (interlinkages to biofuels)
Providing modern energy services to the population	Electrification rates are very low in the country, with a large share of the population relying on traditional biomass. Bringing modern fuels and electricity to people is one of the government's main targets.	<ul style="list-style-type: none"> Increased need for local electricity production or import Reduction of use of wood resources (and associated secondary benefits: biodiversity, decreased soil degradation) Direct GHG emissions. (interlinkages to biofuels)
Increasing water access for people and agriculture	Although increase over last decade access to drinking water needs to be increased in the country. Urban water demand will increase significantly in the next decades as urbanisation increase and population growth remains high. Irrigated agricultural land is expected to at least double within the next decade.	<ul style="list-style-type: none"> Water demand will be limited by availability and is dependent on future climate. Intelligent irrigation will increase agricultural output and might lead to different land use option (crops). Irrigated biofuel crops are controversial in this respect.
Introducing biofuels	Burkina Faso has very limited own energy resources and faces a growing energy demand in the future. Own biofuel production could increase energy security.	<ul style="list-style-type: none"> Depending on the location biofuels might displace currently grown crops and might endanger food security. If irrigated, strong influences on the water balance is expected as well as on the energy balance of the crop due to pumping and irrigation energy demand.
Reducing GHG emissions	GHG emissions in Burkina Faso increased from 11.2 to 18.2 MtCO ₂ e from 1995 – 2005. The bulk of the emissions and emissions increase during this period can be attributed to non-CO ₂ emissions, mainly from agriculture. While agricultural land use and energy consumption have both doubled in the same time, the share of CO ₂ emissions from fossil fuel use has remained stable at 4 to 6% of total emissions.	<ul style="list-style-type: none"> Based on growing population and food (and possibly biofuel) demand, agricultural land use and production are likely to increase sharply. On the other hand energy use is in fact a small contributor to GHG in Burkina. On balance increasing agriculture intensity, while necessitating more energy input, might result in a favourable GHG balance, as land use change would be reduced and carbon sinks (forests) preserved.

Source: Howells and Hermann, forthcoming.

Integrated strategies for cities

Affordable and inclusive cities. The concept of the affordable city should be of an urban system that does not depend on high capital intensive infrastructure as a pre-requisite for “development”. Municipal services do not need to be provided by bulk infrastructure. Instead, decentralized solutions could allow various alternatives. Land policy can give locational advantage for affordable homes linked with the service and transport infrastructure of the city. The great potential of informal settlements and their organizational structures is now slowly being acknowledged. The goal is not just eradication of poverty, but reduction of inequality.

Highlighting the focal roles of urban infrastructure. The task of sustainable urban infrastructure is to secure universal access to basic services, which is the prerequisite of inclusive and equitable cities. Pricing and cross-subsidies can distribute the burden of cost-sharing. Sustainable infrastructure has also the task to save finite resources and support sustainable consumption and behaviour. Sustainable mobility solutions are crucial to urban sustainability: Some of the goals are to prevent urban sprawl, to minimize mobility needs and to minimize resource flows. The infrastructures are utilized more efficiently, when they serve more people at shorter distances. Older cities with their existing infrastructures are in need of refurbishment, while urban areas to be newly built have to make the choice between either business-as-usual solutions or systemic changes. Quantum leaps could be contemplated, e.g. a full shift to renewable energy sources and distributed energy production, or innovative mobility solutions. However, it would be highly uneconomical to produce renewable energy to be wasted in inefficient infrastructure.

Source: Taipale, 2012.

Considering ends before selecting means or policies

Many current views on how to go forward focus on specific means or broadly defined policies (e.g. getting prices right, introducing carbon taxes, privatizing public services), which are considered to be the “right” ones independently from goals – the latter are usually not or vaguely defined in those views. However, using specific instruments or policies can be ineffective, and sometimes counter-productive, all the more when ends or goals are not clearly defined.

A priori exclusion of instruments and channels for action can also result in restrictive ways of defining “problems”. For example, considering food security, the widely publicized objective to produce 70% more food in 2050 was established by taking population growth, income growth, and changes in tastes as given. Taking this as an objective largely predetermines the “right” policies that will be chosen (all will be geared to increasing agricultural production), compared to a situation where broader definitions of the objectives would be selected.

Agriculture and food: At the threshold of a necessary paradigm shift?

There is widespread consensus that farmers must produce more food per unit of land, water, and agrochemicals. But they must do this while facing:

- More challenging physical conditions.
- Astonishing levels of waste, as 30-40 percent of all food, and at every step of the food cycle, is lost.
- Current trends in livestock and biofuels that imply very inefficient use of food-related resources.
- Pressures on food prices that are exacerbated by volatile market dynamics and inadequate global coordination.

- High concentration of cultivated species and in the supply chains, translating into high risk.
- Food is becoming disconnected from nutrition. There are now as many clinically overweight people in the world as undernourished. Epidemiological data already points to considerable societal and economic costs of the rapid rise of the clinically obese in many industrial economies.

Given these realities, we must recognize that we are often aiming at the wrong goal. Agriculture policy concentrates mostly on production and trade and is divorced from the even more vital purpose of good nutrition. Investing to fill the global “pipelines” with more food would appear to be a pointless strategy. Rather than simply “more” production, we must also consider what would be “better” production and better food systems. Besides its production function, agriculture needs to integrate other vital functions of ecosystem management as central features of its development. Multi-functional agroecology is a necessary working strategy, not an option.

According to many experts, our objectives should be:

- better access since there are more than 4000 kcal per person per day available in the global food system already.
- more nutrition or healthy food.
- fostering efficient agro-ecological landscapes that reduce risks.

Source: Giovannucci et al., 2012.

Putting all irons to the fire – ideology should come second to urgency

Given the magnitude of the challenges we face, in most areas, once ends have been agreed on, we should be open to considering all available channels for action, rather than pre-selecting means or even policies based on dogmatic views. For example, in the case of sustainable food production, satisfying solutions that meet several objectives (e.g. preserving biodiversity, regenerating or preserving soil, and delivering enough food and nutrition for all) will probably be found by combining policies addressing all sides of the food nexus (supply, demand, consumer information, tastes, etc.).

In designing goals, strategies, we should consider all the relevant instruments at our disposal – from acting on values and tastes, to demand management, to production efficiency

Getting prices right: Necessary, but not sufficient to lead to sustainable consumption and production patterns?

Calling for prices to better reflect environmental (and sometimes social) externalities has been a mainstay of the proponents of calls for “green growth” and “green economy”. For example, reflecting the price of emitted greenhouse gases in energies derived from fossil fuels is commonly advocated. Comprehensively implementing such changes in the price system faces important practical and political obstacles. In addition, many experts warn that such policies may be insufficient to curb consumption patterns on their own. Taking the case of road transport, current gasoline taxes are equivalent to carbon taxes of US\$250 per tCO₂ in China, US\$450 in Japan, US\$575 in Germany, and US\$830 in Turkey, which are 10 to 100 times higher than the prevailing carbon prices under the CDM or the EU-ETS, and higher than carbon taxes deemed necessary for the energy sector to achieve the desired 450 ppmv stabilization, according to most mitigation scenarios. Yet, only regulatory measures (such as successive Euro standards and those of the Top Runner Programme in Japan) have had significant impacts on fuel efficiency and emissions of road vehicles.

Making consumption patterns more sustainable: The need for systemic approaches

There seems to be growing recognition that a global decoupling of material consumption (and associated pollution) and growth will not happen on its own. Policy efforts to reduce, in absolute terms, the impacts of consumption and production patterns on natural resources and the environment have not succeeded at the global level. Global trends continue to be dominated by the impacts of rising incomes and the lifestyles of the wealthy worldwide.

More broadly, there seems to be an increasing skepticism that decreasing the ecological impacts of the global economy can be realized by relying only on clever market-based policies such as taxes, subsidies, provision of information, and other incentives.

Beyond correcting market failures and internalizing externalities, many argue that a more holistic approach is needed, where all available channels for action are considered, from education to demand management to clean production to public procurement to choice editing. Such strategies have to depart from two simplifying assumptions. First, individuals do not always behave like rational consumers. Second, communities do have social preferences and their modes of consumption can be determined and operate outside market forces.

Setting goals and targets for sustainable development

International agreements on issues related to sustainable development, including Agenda 21 and the Johannesburg Plan of Implementation (JPOI), included hundreds of commitments, many of which had numeric targets and dates for achievement. Many of those have not been achieved. No complete consolidated list of those commitments is monitored regularly. In practice, MDGs have put other internationally agreed goals on sustainable development in a second priority position. Nevertheless, all the agreed goals have been repeatedly reaffirmed as part of the agreed blueprint for sustainable development.

While there is some overlap between the MDGs and the goals contained in Agenda 21 and the JPOI, many have pointed to a limited inclusion of environmental goals in the MDGs. In addition, addressing unsustainable consumption patterns (as enunciated in Principle 8 of the Rio declaration) is not directly reflected in the MDGs.

In the preparatory phase for Rio+20, many actors have called for a process to agree on sustainable development goals. Such process will have to consider the extensive list of already internationally agreed goals. The question arises as to the criteria for selection of goals, especially if some already adopted goals are not included. Is it an implicit recognition that some goals or principles are less important to the international community? Or does it reflect a pragmatic decision to focus efforts where there is possibility for rapid success?

Ensuring that goals are consistent of with sustainability

Many of the suggested, well-intended sustainable development policies are unsustainable in some dimensions.

There is enormous room for improvement of the science-policy interaction in the selection of goals and targets. The policy community must consider scientists, and the scenario community needs seriously to take up independent cross-checking of the feasibility of simultaneous attainment of multiple goals.

Common goals for accomplishment by the global community should be related to areas where the international community has both the power to act and is the best placed to do so. The process of setting such goals would have to consider the need for economy in the number of goals that are adopted, so as to enable international institutions to effectively monitor them and enable their delivery. All efforts should be made – through improved science, modelling, and through limiting their number – to ensure that the goals are internally consistent.

In devising new global goals for sustainable development, more importance should be given to identifying the reasons why previously agreed goals have not been achieved.

A way forward: Build on consensus, work to resolve differences

People with diverse values and politics, even diverse levels of tolerance for risk, tend to have diverse interpretations of evidence and science. Today, this is further fuelled by vast amounts of data that makes it easier to select the data that suits a particular world-view and bolsters a position.

In many sectors as well as economy-wide, there are heated debates about the “right” policies that could lead to sustainable development, and these are sometimes fundamentally divergent because they are typically grounded in specific world views. Those views shape attitudes towards dimensions such as government intervention, how distributional issues should be addressed, and the roles of corporations and markets. There has often been a tendency for the proponents of different world views to advocate for “silver bullets” or blanket policies. However, in order to grasp the choices we face in addressing today’s challenges, it is necessary to be free of our silos and honestly consider all the options. This is critical if proposed policies are to be tested not only in light of past development experience but also considered in an integrated manner that accounts for the emerging – rather than the past – economic, social, and environmental context.

Frank discussions of world views and interpretations open the way to finding “high impact” areas of consensus that, if pursued, can make inroads towards more sustainable outcomes. Open discussions also allow all those with a stake to pinpoint their critical areas of disagreement. In many areas, it is precisely because areas of disagreement have been left under the rug that no significant progress is achieved. The results the SD21 studies show that this approach is a practical way forward. **Spending more energy to assess how to resolve differences would probably be a high-return investment. There is a critical role for neutral, open fora at different levels to play the roles of “honest brokers” to facilitate those discussions.**

Exploring areas of consensus and remaining disagreements in the food and agriculture sector

A study done for the SD21 project in collaboration with more than 70 leading thinkers and experts in food and agriculture explored the range of world views, priorities for action and recommended policies. Nine key areas of consensus for agriculture and food emerged:

1. Organized small and medium farmers, fully including women farmers, should be a primary focus of investment – recognizing that private enterprise will play a significant role in many solutions
2. Define the goal in terms of human nutrition rather than simply “more production”
3. Pursue high yields within a healthy ecology – they are not mutually exclusive and policy and research must reflect that
4. Impel innovation and the availability of diverse technologies high and low – suitable in different socioeconomic and ecological contexts
5. Significantly reduce waste along the entire food chain
6. Avoid diverting food crops and productive land for biofuels, but explore decentralized biofuel systems to promote energy and livelihood security that also diversify and restore rural landscapes
7. Insist on intelligent and transparent measurement of results – we cannot manage what we cannot measure
8. Develop and adapt public and private institutions that can effectively respond to these new goals
9. Motivate and reward investments and business systems that result in measurable impacts to the “public good”.

The study also identified the following areas of disagreement:

1. Will large or small scale farming best deliver food security?
2. What roles should corporation have in our food systems?
3. What role could GMOs play in improving food security?
4. How much agrobiodiversity should we promote in our farming systems?
5. What agricultural production technologies will best deliver sustainable food security?
6. Can we adapt to growing demand for livestock products?
7. How can trade affect food security?

Source: Giovannucci et al., 2012

Six suggestions to move forward in the energy sector

A study done for the SD21 project on the energy sector identified six common, ‘no regret’ areas of actions on which most of the energy experts agree. These are also simply important steps for energy decision makers to consider – regardless of the global discussion. They are:

- A. Promote tracking the diagnosis, progress and scenarios of national, regional and global energy systems with a common set of ‘strategic’ sustainable development indicators.
 - B. Develop methodologies for the integrated analysis of the systemic implications of meeting simultaneously global food, water and energy needs – given that each is essential and each may compete for common ecosystem (and other) services and affect each other.
 - C. Assess opportunities to increase the economic efficiency of the energy system – especially (but not limited to) where these promote end-use energy efficiency improvements.
 - D. Develop strategies and a supporting framework to help the poorest countries gain adequate, affordable access to modern energy services (at least to meet the MDGs) and prevent the 1.3 million deaths a year attributed to burning solid fuels in poorly ventilated housing.
 - E. Undertake transparent evaluations of ecosystem services and their limits, to support discussions on their usage.
 - F. Promote platforms for transparent national and international energy assessments (tracking economic development, fuel flows, physical resource use and environmental impacts in a quantitative manner)
- The need for clear targets, for which the suggested steps were important enablers, was also mentioned.

Source: Howells, 2012

Adjusting the institutional framework

Being strategic: Focusing on critical areas for international action

The international agreements on issues related to sustainable development, including Agenda 21 and the JPOI, include hundreds of commitments, many of which related to purely national issues and decisions. In practice, only a limited number of them can be achieved or even monitored. This implies that some goals have to be left aside while various actors focus on smaller subsets of strategic goals. In the process, the international system is at risk of being overburdened, and to loose credibility as many commitments and targets will not be achieved.

There would need to be a reflection on the opportunity to move towards a more targeted and strategic approach. In so doing, it would be particularly important to **define clear criteria for deciding where international**

action is indispensable, and what is best left for national and local governments.

One option for the international sustainable development system would be to **focus more on a limited number of core issues that really require international cooperation to be addressed successfully, including global public goods (e.g. knowledge) and global commons (e.g. atmosphere, oceans).** Devising effective institutions for managing the global commons already represents a formidable challenge, which has not been addressed fully satisfactorily so far.

In order to be consistent with these missions, the international system would also have to be charged with creating efficient interfaces with governments for the continuous adjustment of international rules that affect global commons (e.g. trade, corporations, financial and capital flows, pollution).

Managing the commons: Alternative approaches

Many resources essential to human welfare are “non-excludable,” meaning that they are difficult or impossible to exclude others from benefiting from these resources. Examples include oceanic fisheries (particularly those beyond the economic exclusion zone), atmospheric waste absorption capacity, timber from unprotected forests, and numerous ecosystem services, including the waste absorption capacity for unregulated pollutants.

In the absence of property rights, open access to resources exists—anyone who wants may use them whether or not they pay. On the other hand, under private property rights, individual users are likely to overexploit or underprovide the resource, imposing costs on others. Private property rights also favour the conversion of ecosystem structure into market products regardless of the difference in contributions that ecosystems and market products have on human welfare. Hence, the incentives are to privatize benefits and socialize costs.

A solution to these problems lies with common or public ownership. Public ownership can be problematic due to the influence of money in government, which frequently results in the government rewarding property or use rights to natural and social assets to the private sector. An alternative is to create a commons sector, separate from the public or private sector, with a legally binding mandate to manage resources created by nature or society as a whole for the equal benefit of all citizens, present and future. Abundant research shows that resources owned in common can be effectively managed through collective institutions or common assets trusts (CAT) that assure cooperative compliance with established rules.

CATs would cap resource use at rates less than or equal to renewal rates, which is compatible with inalienable property rights for future generations. Individuals who wish to use the resource for private gain must compensate society for the right to do so. This could be achieved through a cap and auction scheme, in which the revenue is shared equally among all members of society, or invested for the common good.

In sum, a commons sector can be used to ensure sustainability and a just distribution of resources. Once these two goals have been achieved, the market will be far more effective in its role of allocating scarce resources towards the products of highest value, then allocating those products towards the individuals who value them the most.

Source: Costanza et al., 2012

Improving horizontal integration of sectoral strategies and institutions

There is a paradox. On the one hand, lack of coherence has been repeatedly flagged as one of the causes for failure to progress towards sustainable development. On the other hand, many actors seem to be content with a multiplicity of legally binding instruments that are independent and act with no or minimal coordination with each other. Coordination, if any, currently happens mostly at the implementation stage – there is no systemic coordination of broad strategies across sectors, resulting in conflicting objectives and adverse impacts from one sector to another.

For example, open oceans are currently not managed in an integrated way. Rather, various human activities and resources are managed through independent instruments that are accountable only to their parties. This segmentation has been identified as many experts as inadequate to manage oceans sustainably.

What is needed is **concrete ways to coordinate and flexibly adjust the various legal instruments and institutions over time.**

Improve the compatibility of the system of rules applying to the private sector with sustainable development objectives

Private flows of resources and material drive the modern economy. Sustainability at the macro-economic level is the result of the aggregation of millions of invisible decisions made by households, firms, investors, and financial intermediaries. Therefore, **it is critically important to find ways for the private sector to contribute to more sustainable outcomes.**

The way resources are channelled into projects and investment is shaped by rules and institutions that together constitute the “engine” of the economic system. Those include trade rules, financial and capital market rules, rules applying to corporations; and rules applying to the broader system of public and private institutions. Many observers share the concern that taken as a whole, the “engine” as it is currently is not geared to deliver sustainable outcomes across the board. In other words, the way rules and institutions are set up may prevent agents in society from adopting more sustainable behaviours.

Because private flows of resources dwarf other flows, many think that it makes little sense to fight against the tide by trying to achieve sustainability mainly by “niche” investments by the public sector in an investment environment otherwise not conducive to sustainable

development. Similarly, providing “incentives” for more sustainable investment and behaviours at low leverage levels in the system (in specific sectors, for specific products or services, etc.), associated with fighting multiple symptoms (pollution, climate change, ocean acidification, depletion of fisheries, food shortages) is a strategy that is clearly not optimal, if the whole social and economic system goes against such choices in a structural manner.

Adjusting the parameters of the engine of the economic system so that sustainability outcomes are achieved as the result of default choices or solutions would be more effective, and probably less costly. Even in the absence of full consensus, various components of society including business leaders have framed visions in this way.

Such an approach would also have the social advantage of reducing the cognitive dissonance that arises from the awareness of the dangerous consequences of pursuing the current development model, and the simultaneous pursuit of that model.

Individual and corporate responsibilities and incentives should be aligned with each other and with broad social and ecological goals

Many of the challenges involved relate to the question of whether relying primarily on voluntary approaches is sufficient to solve sustainability issues. Since 1992, voluntary initiatives have flourished in areas covering all the stages of private investment chains, from principles for responsible investment applying to various types of investors to due diligence principles for financial intermediaries to transparency initiatives in extractive industries to corporate social responsibility policies to standards for environmental and sustainability reporting.

However, those voluntary initiatives are far from having achieved universal take-up. Large parts of global supply chains remain outside of sustainability initiatives, especially small and medium enterprises that constitute the bulk of the economic fabric. Moreover, adhering to sustainability principles may not always make sense from a pure profitability perspective. For example, there is mixed evidence on the relative performance of ethical and responsible investment funds relative to other funds. This inherently limits take-up of voluntary initiatives to situations where so-called “win-win” solutions are available. However, win-win solutions do not always exist. As importantly, there is no convincing evidence that the sum of voluntary initiatives have, or could, change private investments flows to become compatible with sustainability.

A new Convention for corporate sustainability reporting?

Since 1992, many proposals have emerged from different quarters to improve the regulation of private investment.

One of the missing components from Agenda 21 was an effective mechanism to address the role of transnational companies in a more globalizing world. A proposed 41st chapter of Agenda 21 had been put forward in 1991 by the UN Centre for Transnational Corporations (UNCTC). The draft chapter, titled 'Transnational Corporations and Sustainable Development', called for actions such as addressing the rights and responsibilities of transnational corporations in future environmental instruments. The chapter was not included in Agenda 21.

After 2002, NGOs moved their efforts to the ISO process, a result of which was the ISO 26000 on Social Responsibility (2010), which takes into consideration seven principles: human rights; labour practices; consumer issues; community involvement and development; the environment; fair operating practices; and organizational governance.

A proposal for a Corporate Responsibility Convention is now being championed by over 50 leading companies worth over US\$2 trillion in investment, led by AVIVA, the largest UK insurance company, and sixth biggest in the world. Announced in the UN General Assembly in 2011. It includes a requirement for publicly traded companies to report on their social and environmental impacts. The coalition also calls for every company to present a Corporate Sustainability Strategy to a separate advisory vote at its AGM.

Source: F. Dodd, M. Strauss, and M. Strong, *Only One Earth*, Earthscan, 2012.

Going forward, we will have to assess or re-assess a few critical questions.

To what extent are current rules and institutions governing private investment at odds with sustainability objectives, and how to best achieve consistency?

To what extent are voluntary approaches able to bring business and industry as a whole closer to sustainable practices globally, and where do they need to be accompanied by stronger regulation?

What strategy should be followed to align rules and institutions with sustainability objectives? What high-leverage points of intervention in the investment chains should be targeted?

Broad consensus remains to be found in this area. At the minimum, these questions should be explored in a more systematic way than they have been up to day.

Systematically assess the need for improvement of regulatory systems governing financial and capital markets, corporations, and capital flows in general

Four cross-cutting principles for institution-building for sustainable development

Across all sectors, four principles are critical to building institutional frameworks that are fit for meeting the challenges of sustainable development: improving governance of institutions at all levels; improving measurement, monitoring and evaluation systems; re-assessing the roles of public and private actors; and building institutions to increase the resilience of human and natural systems.

Four cross-cutting principles to building institutional frameworks that are fit for the challenges of sustainable development:

- **Improve governance**
- **Improve measurement, monitoring and evaluation systems**
- **Assess the roles of public and private actors**
- **Increase the resilience of human and natural systems**

1) Improving governance

For some, governance issues are the most critical precondition of any successful reform. The challenges of governance are immensely diverse across institutions; sectors, and geographical levels. In striving to improve governance at all these levels, general principles can be useful. Many of them are commonly accepted values and principles enshrined in international law. They include:

- Recognizing multiple values and approaches (water management, cities, locally adapted systems for management of commons)
- Putting participation at the heart of decision-making (participatory budget in cities; forums for dialogue on sustainable development in various sectors and for various geographical levels)
- Combating corruption

- Recognizing the rights of indigenous peoples and local communities
- Promoting gender equality.

In addition, it is important to build flexibility and feedback mechanisms into institutions so that mandates can be re-adjusted as needed, in order to serve broad societal objectives.

New governance challenges in agriculture

New governance challenges are emerging and will need a blend of public and private interests to creatively address them. Processes that strengthen the ability of farmers and communities to engage with both agribusiness and government are likely to lead to not only better resource management and technology use but also to improved productivity and well-being. These governance challenges include areas of land use, traditional knowledge and intellectual or cultural property rights as well as mechanisms to ensure the active involvement of women who are often at the center of decisions on food production and consumption around the world.

Source: Giovannucci et al., 2012.

2) Measuring progress, sharing data and knowledge

To better inform work at all levels, we should significantly strengthen our capacities to measure, model and monitor relevant dimensions of sustainability.

The work on sustainable development indicators has a long history, and such indicators have been adopted and used as management tools at various levels and in various sectors. Continuing to improve the relevance of those indicators to support decision-making would be important. At the macro-economic level, the idea of adopting core indicators of economic performance in addition to GDP has received attention from an increasingly large number of constituencies.

In order to facilitate sound macro-economic and sectoral investment decisions, accounting for natural capital in national accounts should be generalized, building on the System of Environmental-Economic Accounting (SEEA) adopted by the United Nations. As a relevant indicator of the wealth of nations, natural capital could be monitored in Economics ministries with the same importance as production indicators.

Better accounting for natural capital is critical

National level and more localized capacity to evaluate the services provided by ecosystems would provide critical information for decision-making in sectors such as agriculture and energy. It would also provide better benchmarks for assessing environmental impacts at the project level, helping in the implementation of the polluter pays principle. Although some confusion seems to exist on this subject, accounting for ecosystem services is different from creating markets for those services. Whereas the motivation for the latter is mutual gain arising from changed management of ecosystems, the former is useful to better reflect relative social values of different investment choices, independently from how the corresponding natural assets are managed.

More resources should be allocated to improving environmental monitoring and information systems at different scales.

Understanding and modeling the drivers of land use: still a challenge

During the last few decades increasing human population, economic development, emerging global markets and urbanization have been identified as the main factors that affect land-use practices around the world. These drivers operate at different levels from global to national and local, and even at the household or individual level, where many land use change decisions are being taken.

Importantly, national and local institutions, policies and governance practices influence those decisions in different ways, not the least by putting explicit or implicit priorities on different uses of land, often driving outcomes that are far from theoretical or stated political expectations.

Over the past three decades, the accuracy of the land use and land cover (LUCC) modeling has improved due to the increasing use of a combination of models from different disciplines. However, models – which are calibrated using historical data – still face challenges accounting for unexpected changes in the drivers of LUCC. For example, the recent land large foreign investment which led to greater conversion of land to agriculture was not captured by LUCC models. Neither were the policies in Brazil which led to dramatic reduction of deforestation.

Source: Nkonya et al., 2012

The hierarchy of formal and informal assessment tools and processes from projects to programmes, policies and strategies, across sectors and geographical units, needs review and major improvements. Scientific scenarios are needed to inform the development of action plans and projects. Integrated assessment studies are also needed at the national level, where many relevant choices need to be made – for example, those relating to land use.

In order to improve our understanding of the effects, of the various standards and certification systems, frameworks for assessing sustainability performance at different geographical scales need to be created.

Are we learning from pilot projects and eco-cities?

Experimentation is a critical part of sustainability innovation. But scaling it up is a challenge, because many initiatives are site- and population-specific. However, it is possible to take broad principles and apply them elsewhere with the inspiration that comes from seeing a whole system work in one place. One of the questions regarding the relevance of pilot projects and best practices is whether the learning through experience helps us move forward faster.

Are we learning from experience, good and bad? In fact, we might learn more from the bad experiences which, understandably so, are not broadly disseminated. In conference presentations extremely few courageous speakers show the real challenges. From the good ones, reliable and comparable data are not always available, and the platforms for information sharing are too few. It is often difficult to make the distinction between greenwash and real progress. Many experts may be well informed about development alternatives but that is not enough. Political decision-makers need to learn, too.

In short, information needs to become more fact-based and more systematic. Methods for information sharing also have to reach the right people in time.

Measuring sustainability impacts in the food and agriculture sector

In the food and agriculture cluster, market-driven solutions are promoted by many as ideal ways to drive sustainable practices and standards or certifications have become the mechanism of choice. However, concerns have begun to emerge about the extent of the benefits of sustainability-oriented certifications. Until recently, there have been no reliable and globally comparable metrics to understand the effects of sustainability initiatives and with the proliferation of sustainability labels – 426 available in 2011 – a reasonable understanding is important. The question of their effects is a significant one because these standards are being adopted by millions of producers and certified products are fast-growing and substantial multi-billion dollar market segments. For example, coffee, the world's most valuable export crop, and bananas, the most important fruit in global trade have both seen substantial shifts in the past decade and expect similar trends in the future.

Several initiatives exist, among them is the independent Committee on Sustainability Assessment (COSA), partnering with a number of organizations around the world, to develop innovative measurement tools that are globally comparable and establish sound empirical evidence of the extent and nature of the sustainability impacts in agriculture.

Source: Giovannucci et al., 2012.

3) Re-exploring the roles of governments and the private sector

The last twenty years have witnessed a retreat of governments from many areas where they used to play a major role. The mainstream paradigm urged governments to become “enablers” of private initiatives. It largely limited government roles to providing adequate legal and regulatory frameworks for private initiative to thrive on the one hand, and to providing support for the poorest segments of the population on the other hand. The extent to which this transition has taken place varies widely across countries; and associated benefits and disadvantages have been the subject of heated discussions. In some cases, it has become clear that governments and the public sector had a critical role to play beyond being “enablers”. There is a consensus that governments

have a critical role to play in investing in research and development in agriculture, for example for so-called “orphan crops”. Local governments also have a critical role to play as agents of change, as their closeness to their constituents enable them to embark on bold experiments of different paths to sustainability.

Reconsidering public and private sector roles in the agriculture and food system

International agencies and governments have retreated from agricultural investment and are just beginning to actively invest in the concepts of agroecology and nutrition. While some forward-looking food companies and NGOs are taking the lead in developing these areas, they are still a minority. Corporate power has grown to rival the influence and effect of the state, changing the dynamics of local and global food systems. Consequently, we will not advance effectively unless we address how public policy and private sector investment choices integrate toward a mutual and common good.

The public sector must lead a more thoughtful and principled guidance that reflect the new challenges and that take into account longer-term public needs. It is equally important to develop ways for the private sector to be a major part of the solutions to the new challenges of our food and agriculture systems.

Source: Giovannucci et al., 2012

Governments at all levels, through their investments policies, largely determine what is possible in terms of sustainability choices. In transport, the paradigm of individual cars as the privileged transport mode has conditioned the physical shape of cities and urban spaces. If public transport has to stop being considered as the “default” mode of transport, used only by those who cannot afford to buy cars, public transport needs to have a chance to compete in the eyes and pocketbooks of customers. Governments, as providers of most transport infrastructure, play a critical role. Transport infrastructure programmes that focus on creating new roads without concurrent investments in trains (passenger and freight), fluvial transport or other modes, necessarily result in

outcomes that favor individual transport. Lack of investment in public transport itself (e.g. clean buses, modern train cars, etc.) also creates a vicious circle. Implicit or explicit subsidies to private transport influence the choices of consumers in its favor.

How can the stigma of public transport as the “poor man’s vehicle” be overcome?

Many experts seem to have a sense that public transport could regain a place of importance, if not the upper hand, if five critical points could be addressed satisfactorily:

1. Before and beyond a stigma, the basic problem is often lack of availability of public transport.
2. There are powerful rationales for a well-functioning, attractive and affordable public transport system. Examples like bus rapid transit (BRT) systems, now implemented in many cities around the world, show that, with “fair treatment”, public transport can compete with private transport.
3. Currently, one of the main reasons consumers prefer cars to public transport is related to lower out-of-pocket expenditures. A balanced treatment of private and public transport would necessitate the removal of hidden subsidies to private transport and a more direct reflection of its negative externalities in the out-of-pocket expenses that consumers have to face.
4. The attractiveness of public transport depends in large part on broader issues related to city design and planning: space given to non-motorized transport, smooth inter-modal and intra-modal integration of transport routes, safety of public transport especially for vulnerable categories of the population (e.g. young women).
5. Instead of a defensive mode of communication, defenders of public transport should adopt a positive and aggressive way of communicating its benefits and attractiveness.

Source: Natural Resources Forum, 34 (4),2010, Viewpoints section.

Re-orient public investment (e.g. infrastructure, transports) in a direction that facilitates sustainable choices and behaviours

Governments also have a critical role to play as buyers of goods and services. Due to their importance as customers in some markets, they can make a difference in environmental outcomes by choosing environmentally friendly options. Governments can use their market power to influence producers to shift more rapidly to cleaner technologies. By lowering the costs of clean technologies due to scale economies, this can also help private consumers shift to environment-friendly products. Public demand for more sustainably produced goods and services can also have desirable indirect effects, such as raising consumer awareness about the environmental and social implications associated with different types of purchases.

Governments at all levels should lead by example by putting public procurement rules and practices in line with their publicly advertised sustainability goals

A low-impact society has to rely eventually on individuals or households to make low-impact consumption choices almost daily. However, the necessary policies to obtain this are far from being limited to those targeting the individual level, but rather apply to multinational corporations, plants and distributors all along the supply chains. Massive amounts of information and regulation are involved. Given this complexity, many questions remain of how to connect the maze of regulations, rules and incentives to individuals and communities, both in their everyday choices as consumers and in the rule-making processes itself. How can we adapt governance systems to this challenge?

4) Inscribing resilience in the design and operation of institutions

Our mainstream way of planning and designing institutions for the future has been largely focused on “efficiency” defined in a narrow sense – oftentimes, a quest for strategies that maximize private economic returns on investment under certain, favorable

scenarios. And while risk has been integrated into economic decision-making to some extent, we face a broad range of large uncertainties and unknowns (from climate change, global degradation of ecosystems, global crises) that will increasingly make the quest for “optimal” solutions a chimera. We have hardly begun to think on effective way to incorporate uncertainties and unknown factors into institution building. This leaves us highly vulnerable to unexpected or unknown shocks.

In the face of global planetary limits, large, irreducible uncertainty about the future, and multiple views on how best to go forward, the quest for “optimal” solutions based on narrow definitions of economic efficiency should leave way for the quest of robust solutions that increase global and national resilience to extreme shocks and events

We should be looking for goals and strategies that are robust – that is, likely to deliver socially acceptable outcomes even under adverse realizations of future conditions, as opposed to “optimal” or “efficient” solutions that perform well under the best possible conditions.

Resilience will have to be included in institutional design much more than it is now. Examples include:

- Encouraging biodiversity in agro-food systems to enhance their systemic resilience to shocks from various causes (new diseases, weather shocks, climate change)
- Planning and designing urban infrastructure for increased resilience to extreme weather events and climate change effects;
- Systematically incorporating resilience of households to economic shocks in economic and social policy design – for example, designing hedging mechanisms and policies to protect households from food price volatility and food shortages.

Implementation: Building a culture of sustainability

Building a culture of sustainability

The transition to a sustainable future will not occur in one day; nor can it succeed if capacity building efforts are focused only on implementing institutions. Transitions often happen in phases in which different groups (NGOs, local governments, users) may take the lead in turn, as illustrated by the case of large cities adopting sustainable transport. The end result has often been complete change in the perspectives of politicians, planners, engineers and experts, and citizens.

It is critical to build a culture of sustainability along with change among those who have the final say on the vision, design and implementation of new systems. Taking the example of transport, shifting the culture of city planning and

transport services from one of road builders to one of conceivers and implementers of an equitable, inclusive mobility system is what is required, but it turns out to be anything but easy. The role of civil society and non-governmental organizations (NGOs) in fostering sustainable mobility choices in this context is very important.

For better solutions to emerge and take root, long-term strategies are critical. In particular, local governments that pioneer innovative approaches and pilot projects do not do it by chance. In many cases, they have a long history of trial and error behind them. Cities should be patient in developing a culture of sustainability and transformation, which is based on a continuous analysis of their local identity and history.

Table 4 – Progressing in urban sustainability

	LAND USE	BUILDINGS / REGULATION	PUBLIC BUILDINGS	ENERGY / INFRASTRUCTURE	ENERGY / PRODUCTION	MOBILITY / INFRASTRUCTURE	MOBILITY / PUBLIC TRANSPORT	PUBLIC PROCUREMENT
"FAKE GREEN CITIES" Single measures w/o coherence	Low-density suburbs marketed as "eco cities" by real estate developers.	Legislation has some SD elements but is not enforced on ground.	A few "certified green buildings" but no monitoring.	A few stand-alone solar panels for show.	National REN policies, but taxation and subsidies do not support implementation.	Roads and highways, tree planting.	Limited bus and rail networks.	Recycled paper, otherwise the cheapest price as criterion. Corrupt practices.
"ECO CITIES" Focus on environment and poverty	Environmental protection areas, biodiversity.	Access to handicapped as a norm.	Experimental low-tech "eco-buildings".	Solar panels.	Co-production of heat and electricity.	Bicycle lanes are built and.	CNG for vehicles.	Energy efficiency criteria used for a few items.
"ENERGY CITIES" Focus on CO ² emission reductions, technology	Integration of land use and mobility planning.	Energy efficiency requirements that are implemented.	Energy refurbishment of public buildings.	Solar and pv panels and wind farms. Smart metering.	Gradual shift from fossil to renewable energy sources.	More tram, BRT & metro lines are built. Speed limits on roads.	Energy efficient vehicles, some use renewable energy.	Energy efficiency criteria used for most products.
"SUSTAINABLE CITIES"! Striving towards a culture of sustainability	Focus on metropolitan areas and prevention of segregation.	Participatory urban planning and design of public space.	Sustainability criteria used also in public housing.	Local grids and smart grids.	Increasing share of de-centralized energy production.	Traffic safety as a priority, public space as a realm for the pedestrians.	A multi-modal system with dense networks.	Also fair trade & decent work criteria and LCA used for all products and services.

Source: Taipale, 2012.

Providing appropriate mandates and resources to all levels of governments

Ultimately, the success or failure of sustainable development will largely depend on decisions and actions that are taken at the local level. This was well recognized by Agenda 21.

“All politics is local.” (Tip O’Neill)
“All economies are local.” (Jane Jacobs)

Cities should be encouraged to propose and try out innovative integrated solutions. For this, they need to be supported by higher levels of governments – not only through adequate mandates and finance, but by rule systems that actually encourage imaginative local strategies. Small communities cannot succeed alone – too much is predetermined for them. Even “model” cities can hardly be sustainable if they are not supported by higher levels of governments, on which they ultimately depend for choices relating to energy, transport, and general setting of institutions.

National governments should engage in a dialogue with local and regional government and re-examine delegations of competences, mandates and financing with a view to aligning them more closely with shared sustainability objectives. Taxation, cross-subsidies and user fees at local, metropolitan and national level can support sustainable development and curb unsustainable consumption, if they are designed with these goals in mind.

Recognizing the political nature of institutions

At the same time as we recognize the importance of sustained capacity building in many of our institutions, we have to recognize that the way we use rules and institutions, at least as much as the institutional landscape itself, is what drives outcomes. There is a fundamental political dimension in policy implementation and in the way institutions work. The same institutions and rules can be used in very different ways depending on interpretation and willingness to act. WTO jurisprudence on precautionary principle has evolved over time. Legal interpretations of fiduciary rules for public pension funds and other investors are evolving.

In conclusion, while looking at “implementation” of detailed plans, targets and objectives for sustainable development is very useful and is a first step towards adjusting course, a more political reading is necessary for real progress to happen.

Mobilizing the political will to manage natural resources sustainably

Management of oceans is a critical area where political will has been lacking to manage renewable resources sustainably. The main issues regarding fisheries were clearly addressed in the JPOI, which contained goals with targets and dates for restoring stocks to levels that can produce maximum sustainable yields, combating Illegal, Unreported and Unregulated (IUU) fishing, eliminating destructive fishing practices, and better managing ecosystems. None of the targets are likely to be met in time; many of the goals have been reconfirmed at COP10 of the Convention on Biological Diversity, held in 2010 in Nagoya.

Even where elaborate institutional frameworks exist, overfishing has continued to happen, as in the case of the Bluefin tuna in the Eastern Atlantic and in the Mediterranean.

Finding credible mechanisms for enforcement of commitments

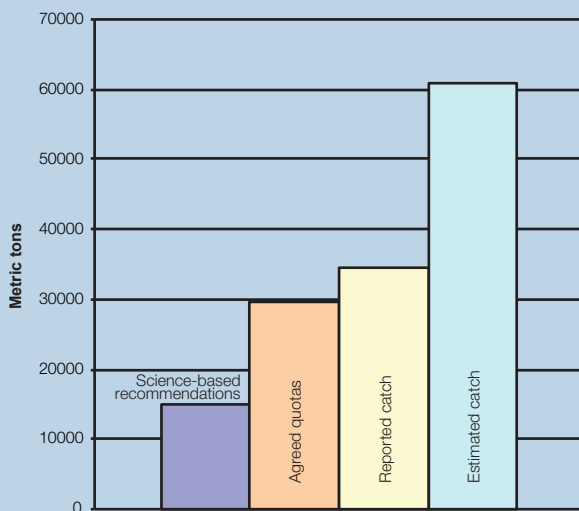
Part of the lack of trust that is apparent in international negotiations on sustainable development can be attributed to the fact that many past commitments, in particular on international development cooperation, have not been delivered as promised. Similarly, there has been a recurrent problem of enforceability of commitments in various global environmental areas, for example under the climate regime. Credible mechanisms are needed to reassure all parties that agreements can be enforced. Various systems of sanctions for non-compliance exist, are widely accepted and utilized in other areas of intergovernmental action as well as in domains of interaction between governments and the private sector. Provided political will exists, finding fair and appropriate enforcement mechanisms should not present an insurmountable challenge.

We need to find credible mechanisms for enforcement of national commitments under international agreements

Managing fisheries: A problem of political will?

The current overexploitation and depletion of the Bluefin tuna in the Eastern Atlantic Ocean and the Mediterranean demonstrates the issues faced by regional fisheries management organizations (RFMO) concerning lack of compliance and the need for improved implementation mechanisms. Since the late 1990s stock assessments conducted for the Eastern Atlantic and Mediterranean Bluefin Tuna by the International Commission for the Conservation of Atlantic Tuna (ICCAT), have all pointed to overexploitation and depletion of the stock. Between the establishment of catch quotas in 1998 and 2010, Total Allowable Catches (TAC) adopted annually by ICCAT were approximately twice as high as recommendations coming from its scientific committee, the Standing Committee on Research and Statistics (SCRS). Reported catches have been more or less equivalent to the legal ICCAT quotas. In 2010, the SCRS conducted a stock assessment, revealing the significant gap between reported catches and estimated realized catches, concluding to substantial under-reporting and lack of compliance from contracting parties between the 1990s and 2007. The SCRS has estimated that during this period effective catches could have ranged from 50000 tons to 61000 tons annually, approximately double the legal quotas. Thus in 2007, the ratio of estimated catches to science-based recommendations for sustainable management of the stock was approximately 4 to 1.

From science to practice: catches of Bluefin tuna in Eastern Atlantic and Mediterranean, 2007



Source: ICCAT/SCRS data.

Possible elements of a future deal

We need a renewed deal

According to experts who followed the preparatory process for the original Rio summit in 1992, the deal arising from Rio took a three-pronged approach. Developed countries would take the lead in changing production and consumption patterns; developing countries would maintain their development goals but take on sustainable development methods and paths; and developed countries would support developing countries through finance, technology transfer and appropriate reforms to the global economic and financial structures and practices. Issues requiring an integration of economic and environmental concerns such as climate, the interaction of trade and environment, and the relation between intellectual property rights and environmental technology and indigenous knowledge were to be resolved through international cooperation, in which the development needs of developing nations would be adequately recognised.

In the past twenty years, reality has consistently fallen short of such ambition. Despite continued intergovernmental deliberations, little progress has been made toward implementation of the original deal. Financial resources were delivered to developing countries, but at a level far lower than agreed. Developed countries did not shift to more sustainable consumption patterns and failed to pursue development paths built on sustainable production methods. As a result, pressure on the global environment has continued to rise.

To progress towards sustainable development, we need a renewed deal – the one that was made twenty years ago in Rio is moribund. Critical elements that a deal should encompass have been described in this report and are summarized in the following.

Agreeing on critical thresholds

A new deal would have to agree in the clearest terms possible on a desired level of inter-generational equity and the critical thresholds that must not be passed, inter alia in terms of poverty, inequalities, global environmental safe limits, state of stocks of renewable resources from the global commons.

What we need to develop, and what we need to sustain

A new deal would need to agree on, or reconfirm, what we want to develop and what we want to sustain,

acknowledging the different views on the meaning of sustainable development.

Defining subsidiarity rules: What should common action focus on?

The international agreements on issues related to sustainable development, including Agenda 21 and the JPOI, include hundreds of commitments, many of which related to purely national issues and decisions. Without a clear focus on issues of regional and global nature, the United Nations system is at risk of being overburdened, and to loose credibility as many commitments and targets will not be achieved.

In moving towards a more targeted and strategic approach, it would be particularly important to define clearer criteria for deciding where coordinated international action is indispensable, and what is best left for national and local governments.

One option could be to concentrate the actions of the international community and the UN on three broad tasks:

- 1) **Providing adequate and effective rules for the management of global commons;**
- 2) **Creating efficient interfaces with Member States for the continuous adjustment of international rules that affect global human impacts on the environment such as trade, corporations, financial and capital flows, and pollution;**
- 3) **Creating and managing effective mechanisms for needed commitments and actions in areas impacting the global commons to “add up”.**

Setting common goals for humanity

Mirroring the division of labour sketched above, common goals for accomplishment by the global community should be related to areas where the international community has both the power to act and is the best placed to do so. The process of setting such goals would have to consider the need for economy in the number of goals that are adopted, so as to enable international institutions to effectively monitor them and enable their delivery. All efforts should be made – through improved science, modelling, and through limiting their number – to ensure that the goals are internally consistent.

A new deal should adopt a small, consistent and high-level set of goals that cover the full scope of sustainable development concerns while respecting the “division of labour” across political levels.

Reflecting the changed world order

Looking back at the last decade of negotiations in the United Nations, it seems clear that the traditional divide among developed and developing countries upon which most of international rule-making on sustainable development since 1992 has been based, has become less and less acceptable to some governments, while at the same time remaining the *sine qua non* condition for engagement from other governments.

Since 1992, developing countries have followed very diverse trajectories. While many developing countries have remained marginalized in the international economic order, some formerly poor countries have become economic and sometimes geopolitical powerhouses. Yet, their political representation and voice in major international decision-making processes – from international economic governance to development aid – has remained below their newly acquired status. They are also not bound by international environmental instruments that reflect the reality of the 1990s, even though their individual and collective impacts on the global commons have grown. It seems clear that both sides of the issue urgently need to be revisited, as the current status quo has resulted in a major point of disagreement in global political debates and could foreclose any possibility of meaningful progress on sustainable development, or even agreement on broad principles to deal with global environmental issues.

A new deal should strive to give large emerging economies the voice in global decision-making that their importance commands. It should also strive to ensure that all countries meaningfully participate in instruments that are put in place to manage our global commons (e.g. atmosphere, oceans).

The new deal should clarify the needs of different groups of countries in terms of international assistance by rich countries, in order to maximize the impact of international development cooperation resources. It should also clarify how all donor countries, traditional and new donors alike, cooperate for increased effectiveness of the development cooperation system.

Giving teeth to the deal

A major area of focus for a new deal should be to devise more effective ways to coordinate actions and commitments (development aid, poverty reduction environmental impacts) made not only by national governments but also by other stakeholders such as the private sector so that they “add up” to keep humanity on a safe track.

Back to the future: Stockholm, 1972

The last 40 years have seen repeated attempts at improving humanity’s lot while preserving our common planet. At the Stockholm conference in 1972, India’s Prime Minister Indira Gandhi said:

“It is clear that the environmental crisis which is confronting the world will profoundly alter the destiny of our planet. No one among us, whatever our status, strength or circumstance, can remain unaffected. The process of change will challenge current international policies. Will the growing awareness of “one earth” and “one environment” guide us to the concept of “one humanity”? Will there be a more equitable sharing of environmental costs and greater international interest in the accelerated progress of the less developed world? Or will it remain confined to a narrow concern...?”

As it was then, this challenge is worth our efforts now. Limited progress in the past does not have to deter us from trying again.

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For access to the project study reports, further information and resources on SD21, please check http://www.un.org/esa/dsd/dsd_sd21st/21_index.shtml

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