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Introduction: The Imperative of Sustainable Development*

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Business as usual is not an option

Humankind has made enormous progress in improving material welfare over the last two centuries. However, this progress has come at the lasting cost of degradation of our natural environment. About half of the forests that covered the earth are gone, groundwater resources are being depleted and contaminated, enormous reductions in biodiversity have already taken place, and, through increased burning of fossil fuels, the stability of the planet is being compromised.

The fifth assessment (AR5) of the Intergovernmental Panel on Climate Change (IPCC) leaves little doubt about the human influence on climate change. IPCC concludes with 95–100 percent certainty (thus, *extremely likely*) that the concentration of greenhouse gases (GHG) in the atmosphere has its origin in current production and consumption patterns.²

Changes in the global climate system are already having a negative impact on the livelihoods of people in the most vulnerable regions of the world. The contrast between wet and dry regions and between wet and dry seasons is increasing; ocean temperatures are rising and, with it, ocean acidification, threatening ocean life and likely affecting ocean circulation with further impacts on surface climate. The melting of the glaciers and ice sheets is *very likely*³ to accelerate, leading to further sea level rise with potentially devastating consequences for low lands, especially in Small Island Development States.⁴

Even as these threats are looming, more economic progress is needed in order to lift nearly 1 billion out of poverty and hunger and to provide a decent living

for all of the 9 billion people that will inhabit the planet by mid-century—2 billion more than today.

Continuation along previously trodden economic growth pathways will further exacerbate the pressures exerted on the world's resources and natural environment and sooner than later approach limits where livelihoods are no longer sustainable. Business as usual is thus not an option. Yet, even if we were to stop global engines of growth now, the depletion and pollution of our natural environment would still continue because of existing consumption patterns and production methods. IPCC confirms this where it indicates that even if CO₂ emissions are halted now, the negative impact of climate change will persist for many centuries⁵ with unbalance adverse effects on the life of people everywhere.

Thus, there is an urgent need to find new development pathways, which will ensure environmental sustainability and reverse global warming and ecological destruction, while managing to provide, now and in the future, a decent livelihood for all of humankind.

A transformative technological revolution is needed

To achieve this goal, a radically new economic strategy will be needed. Economies will need to “go green.” The objective of the green economy is to ensure that the boundaries of planetary sustainability are not crossed. One option for achieving this would be to limit income growth, as it would also, given existing production methods, limit the growth of resource use, waste, and pollutants. However, doing so would complicate efforts to meet the developmental objectives, such as lifting those at the bottom out of hunger and extreme poverty. Global redistribution could be an answer, but likely will be politically too difficult for a full response. More importantly, even if it could resolve the problems of hunger and poverty, global redistribution would still need to face the challenge of continuing environmental destruction and climate change. Reducing population growth could be another option, but we know from experience that is best achieved by improving living standards. Reducing nonrenewable energy and resource use, reducing waste and pollutants, and reversing land degradation and biodiversity losses would then seem key to greening the economy.

The latter will require transformative changes to production and consumption patterns supported by a fundamental technological overhaul. Technologies will need to undergo drastic changes so as to become more efficient in the use of energy and other resources and minimize the generation of harmful pollutants.

Many of the technologies needed for a green economy are already available, as evidenced, for example, by the range of options for generating renewable energy (wind, solar power, and biofuels, among others), technologies for carbon capture and more efficient energy use, techniques to replace nonbiodegradable resources, and sustainable farming and forestry techniques, as well as technologies to render coastlines and infrastructure less prone to natural disasters.

These options offer readily usable starting points. The main challenges to jump-starting the shift to a green economy lie in how to further improve these techniques, adapt them to specific local and sectoral needs, scale up the applications so as to bring down significantly their costs, and provide incentives and mechanisms that will facilitate their diffusion and knowledge sharing. Apart from scaling up existing technologies, efforts toward enhancing the development of new technologies should as well be redoubled. These are all difficult challenges that will require a long-term vision, political will, additional investments, and strengthen coordination of actions at global, regional, and national levels.

As so many of the components of existing economic systems are “locked into” the use of nongreen and nonsustainable technologies, much is at stake in terms of the high cost of moving out of those technologies. For instance, developing countries, especially low-income ones with relatively low rates of electricity usage, may be able to “leapfrog” into electricity generation based on renewable forms of primary energy.

The question is how to enable those countries to access, utilize, and, above all, afford green technologies. Further innovation and scaling up are also needed to drive down unit costs. Technologies will need to be “transferred” and made accessible, since most innovation takes place in the developed countries and private corporations in those countries are the main owners of the intellectual property rights covering most green technologies. The new technologies will also need to be introduced into new production processes. This would imply improving much existing infrastructure and actively promoting green technologies and industries.

Consequently, the technological revolution for a green economy will be fundamentally different from previous revolutions in three ways.

First, it will have to take place within a specific and limited time period. Given existing pressures on our ecosystem, especially those associated with climate change, the goal would need to be achieved within the next three to four decades—a huge challenge given that innovation and diffusion of technologies is a slow process. Previous technological revolutions typically required a

substantially longer period of time than that available now to accomplish the required green technology revolution.

Second, while not their sole responsibility, governments will have to assume a much more central role. The limited time available is one important reason for this. Under current circumstances, there needs to be an acceleration of technological innovation and diffusion, which is unlikely to occur if they are left to market forces. Equally important is the fact that the natural environment is a public good and not “priced” by the market. Markets for green technologies are in early stages of their development and are being shaped by government policy. Governments will also have to play a key role in promoting further research on and development of green technologies and their diffusion, inasmuch as the benefits will accrue to whole societies. In addition, since at present existing “brown” technologies are locked into the entire economic system, a radical shift to green technologies will mean improving, adjusting, and replacing much of existing infrastructure and other invested capital. Such transformations will be costly and necessitate large-scale, long-term financing, which is unlikely to be mobilized in full through private initiative and will require government support and incentives. Thus, not only will strong technology policies be needed but they must go hand in hand with active industrial and educational policies aimed at inducing the necessary changes in infrastructure and production processes.

Third, since the environmental challenges are global, the green technological revolution will need to be facilitated by intense international cooperation. The global dimension is most obvious in the case of climate change, but problems of food insecurity and deforestation have significant cross-border effects as well, stemming, for example, from food price instability and GHG emissions. Through international trade and investment, incomes and consumption in one country are linked to the ecological footprints left in the country of production. Multilateral environmental agreements, trade and investment rules, financing facilities, and intellectual property rights regimes would all need to be aligned so as to facilitate the green technological transformation. Since many, although not all, existing new technologies are owned by the advanced countries and the cost of inducing green technological change will be much higher for developing countries relative to their incomes, there will be important distributional challenges connected with greening the global economy, which will need to be addressed through traditional and other new mechanisms of international cooperation. Strengthened international cooperation will be especially important before the background that emission production has been highly concentrated in a few countries, while the negative effects of climate change are most pronounced in developing countries.

These huge challenges inspired a major United Nations report, the *World Economic and Social Survey 2011: The Great Green Technological Transformation*,⁶ which was released on the eve of the United Nations Conference on Sustainable Development (often labeled as “Rio+20”). The Rio+20 outcome document confirmed the *urgent* need to take action in reversing “unsustainable patterns of production and consumption, [. . .] addressing environmental sustainability and promoting conservation and sustainable use of biodiversity and ecosystems, regeneration of natural resources and the promotion of sustained, inclusive and equitable global growth.”⁷ In a follow-up to the conference, all of the UN membership initiated a comprehensive process of consultation, at a global scale, to identify a set of sustainable development goals (SDGs) that would help to build consciousness and political will around the need to act simultaneously across the economic, social, and environmental dimensions of development.⁸

This book

This book emanates from the background studies to the *Great Green Technological Transformation* report. While covering less ground, it deepens insights as to how such a technological transformation could come about from a variety of perspectives. It spells out the kinds of behavioral and policy changes that may need to accompany such a transformation, taking into account the complexity of inducing technological overhauls in energy and agricultural sectors. The assessment suggests that this will require major, but doable, improvements in national innovation systems and major, but affordable, shifts in investment patterns (and related macroeconomic adjustments).

Can we live up to the challenge?

Chapter 2 by Tim Jackson makes a compelling argument about the need to modify the philosophical and social foundations of conventional economics in order to enact the economic transformation needed for sustainable development. He defines sustainability as “living well” by creating strong, healthy, and just societies within the ecological limits of a finite planet.

In the conventional narrative, social progress depends on economic growth. Such narrative, Jackson argues, has its roots in the libertarian idea that the social good is best accomplished when people have the freedom to pursue their own happiness. In the postwar years, this notion was codified through

the measurement of gross domestic product, which aggregates the sum total of public and private consumption and investment expenditures and provides a “universal metric” of social progress—increasing economic output leads to higher living standards and better quality of life.

However, after decades of continuous growth, this model of progress based on economic expansion has failed to deliver minimum well-being evenly. There are millions of people who still suffer from hunger, and there remain large gaps among countries in basic indicators of well-being such as life expectancy. Simultaneously closing these gaps and meeting the needs of a population estimated to reach 9 billion in 2050 would require an economy fifteen times the size of today’s global economy, but with staggering consequences for the environment and pressure on natural resources. Unless substantial technological innovation in the use of natural resources unleashes a process of “decoupling” of economic growth from material inputs, reaching minimum levels of well-being for all in the future would have devastating consequences for the environment.

For Jackson, the crux of the problem is that capitalist economies are structurally dependent on continuous growth just to prevent economic and social collapse. This intrinsic need for continuous growth stands in stark contrast with the finite limits of the ecosystem on which we depend on for survival. Under this logic, sustainable development is confronted with an apparently impossible dilemma unless “absolute decoupling” allows for an absolute reduction of the resources’ impact of economic growth on natural resources.

Public policy, in this context, has a key role to play, not only in promoting altruistic behaviors but also by increasing investment in public goods and social infrastructure as well as better recognition of housework, child and elderly care, and volunteered work as part of a new “ecological macroeconomics.”

Will we be able to induce a green energy transition in time?

Chapter 3 by Charlie Wilson and Arnulf Grubler calls for a major worldwide transformation of the energy system to meet the double task of improving the use of natural resources to stay within planetary boundaries and meeting the demand of millions of people still lacking access to modern energy.

The authors provide a thoughtful review of the historical experience of energy technological change and diffusion and the lessons to be learned in the search for a much needed transition to low-carbon energy. The two major transitions shaping the *structure* of the global energy systems were driven by energy poverty, followed by the building of infrastructure to support industrialization and the

expansion of access to modern energy. The first transition took over a century to unfold (between the late eighteenth century until the 1920s), and it was defined by the emergence of steam power from coal, which helped to increase the availability of mechanical power, expand the use of energy, and transport systems. The second energy technology transition is associated with the displacement of coal-based steam technology and the dominance of electricity and petroleum-based technologies (automobiles, aircrafts, and petrochemicals). But, given that there are still 2 billion people lacking access to modern energy services today, this second transition is far from completed.

In the historical evolution of the current energy system, the environmental consequences of emissions were not a preoccupation until recently. For the reasons explained at the beginning of this chapter, there is now an urgent need to accelerate the transformation of the current energy system if we are to prevent dangerous levels of GHG that would trigger irreversible climate change. However, in contrast to the past, the energy technological transition for climate change mitigation will have to take place over a much shorter time horizon. This will require much greater reliance on a strong push induced by policies rather than rest on slow end-use induced innovation through the introduction of new products and services.

Chapter 4 by Alexander Roehrl further develops the analysis of Wilson and Grubler. This chapter reviews recent country experiences in the development of clean energy, including the use of taxes and other policy instruments to stimulate the adoption of and faster diffusion of alternative sources of energy. A rich experience has already accumulated in developing technologies to generate clean energy and in the application of policies aimed at shifting supply of and demand for energy toward sustainability objectives. Current efforts are far from sufficient, however, to meet the double challenge of reducing GHG emissions and expanding access to modern sources to the billions of energy poor people.

Roehrl argues that current efforts have failed to adopt systematic approaches with the result of slowing of both the introduction of clean energy sources and improvements in energy efficiency. Greater efforts will be needed to take account of at least three things. First, a system approach is needed in order to strike the right balance between economic, energy, and environmental concerns. For instance, meeting the current demand of energy with renewable sources is technically possible, but if based on the existing portfolio, it would require that all of the world's arable land be brought under cultivation for the production of biofuels—an obviously unrealistic option. Second, expansion of the generation of clean energy should go hand in hand with the development of technologies

and innovations that facilitate the widespread use of clean energy in industrial processes. Third, a power systems approach is also needed to make sure the deployment of intermittent renewables is accompanied by the development of smart grids to guarantee reliable energy services. At present, renewable energy is distributed through existing power systems, which largely rely on coal and other brown technologies for back-up capacity. In addition, policy makers need to balance the biophysical (what is possible within planetary limits), scientific-technical (what is technically doable), economic (what is affordable), and sociopolitical (what is acceptable socially and politically) limitations inherent in an agenda for energy transformation.

Chapters 3 and 4 provide important policy guidance for the acceleration of the future sustainable energy transition, including:

- Public funding is essential to catalyze development of new energy technologies for climate change mitigation.
- The “portfolio” of clean energy sources will need to be diversified. This will allow for prolonged periods of experimentation to support innovation in the diffusion and up-scaling of new clean energy technologies. It will further reduce the risk of “locking in” technologies that may prove suboptimal over time.
- Policies promoting clean energy technologies need to consider the energy system at large, leaving ample space for smaller scale (*granular*) technologies to develop alongside large scale ones. This will help decrease cost, diversify risks, and allow for wider experimentation.

These lessons still have to be internalized to inform policy decisions globally. At present, publicly funded research and development (R&D) is strongly biased toward the development of supply-side technologies (such as wind, solar, and, particularly, nuclear energy). Scenario analysis, as well as past patterns of technology diffusion, suggests that much more emphasis should be put on promoting energy efficiency and end-use adoption of clean energy in order to accelerate the transformation of the energy system needed to drastically reduce GHG emissions.

Are green energy investments affordable?

In Chapter 5, Marco V. Sánchez and Eduardo Zepeda review estimates of the financial resources needed to bring sustainability to the world’s energy system.

Available estimates of the Global Energy Assessment (GEA, 2012) modeling exercise suggest a wide range of investment requirements. These requirements change with the assumptions made about the choice of technology, timeframe, and policies adopted by countries. Additional investment requirements would range between \$1.7 trillion per year (about 1 percent of today's world gross product [WGP]) and \$2.2 trillion per year (more than 3 percent of WGP). The latter estimate would include the investment cost associated with adapting devices to the new sources of energy (car engines, boilers, etc.), as well as the likely costs of new regulation and incentives for the promotion of sustainable production and consumption patterns. Yet, by all measures, such investment requirements would seem quite affordable in macroeconomic terms. The challenge thus will be one of political commitment, strong leadership, careful policy design, and much attention to incentives that effectively induce the necessary behavioral change around the globe. Any shortfall in any of these areas would risk entering into a scenario of catastrophic climate change. In the light of the consequences of inaction, the likely cost of a green energy transformation should appear infinitely affordable.

The chapter further analyzes a number of options to make the energy system environmentally sustainable. The investment and policy challenges in the transformation of the energy system are different for developed and developing countries. For developed countries, the main challenges lie in changing the energy mix toward sustainable energy and promoting sustainable consumption patterns. Developing countries have a more difficult challenge. Their transition toward sustainable energy will need to run parallel to the expansion of the supply of energy to meet the needs of millions of people who lack access to modern energy. Simultaneously, developing countries are in need of extending the social and economic infrastructure required to improve living standards. The investment effort that developing countries will have to make to build sustainable energy systems is much larger to that of developed countries (when measured as share of GDP). The authors show that sustainable energy investments tend to be high in low-income regions, moderate in middle-income regions, and low in industrialized regions. In Sub-Saharan Africa, for example, additional energy investment requirements for sustainability are projected to amount to more than 3 percent of GDP by 2020. Together with other investment needs for human development and economic development, this could add to financing burdens beyond the means of many low-income countries, which would require international financial assistance to meet such sustainable development needs.

But even as investment requirements seem affordable, the required macroeconomic adjustment in developing countries likely will be significant.

Sánchez and Zepeda illustrate the possible implications using a scenario analysis based on economy-wide models for Bolivia, Costa Rica, and Uganda. The particular interest is to assess whether addressing both the challenge of making the energy transformation and that of achieving human development goals (reducing poverty and improving education, health, and water and sanitation) over the coming decades will be feasible, macroeconomically speaking.

The authors use economy-wide country models to simulate various policy scenarios. In one simulation they assess the implications of the introduction of a carbon tax that would discourage the consumption of fossil fuels. With the additional government revenue, the authors simulate the impact of three policy options: to reduce the fiscal deficit (and strengthen economic growth), to increase investment in economic infrastructure (roads, bridges, and electricity networks), or to increase investment in education.

Results vary depending on country-specific initial conditions. In the case of Bolivia, the model simulations suggest that investment in public infrastructure has the strongest positive impact on economic growth, while investments in tertiary education yield the stronger impact in the case of Costa Rica. In Uganda, additional investments in irrigation for agriculture and in primary education have the strongest impact in terms of overall GDP growth. In contrast with the previous results, when the additional resources are used to invest in education, human development indicators improve, but in Bolivia and Uganda economic growth will slow down. And when the additional resources are used to increase investment in public infrastructure, all human development indicators improve (presumably due to improved access to social services). In sum, these economy-wide model assessments suggest that in each of the three country cases there is clear scope to accelerate sustainable development in terms of its three key dimensions (economic, social, and environmental). Increasing public investment for growth, human development and environmental protection need not compromise basic macroeconomic stability. However, such investments require careful design to secure synergies between economic growth, human development, and environmental sustainability objectives.

Technological innovation in emerging economies

Chapter 6 by Xiaolan Fu and Jun Hou provides evidence from the experience in emerging economies (China and India, in particular, as well as Brazil) in promoting dynamic processes of technological innovation for sustainable development. In a relatively short period, these countries have built successful

systems of innovation in green technologies leading to the development of competitive firms in the generation of wind energy, photovoltaic (PV) solar panels, and electric cars.

In all these cases, proactive government policies to stimulate and fund investments in the R&D of the related technologies were critical. Support measures were substantial. In other areas, most transfer of technology to emerging economies still takes place through foreign direct investment and imports of capital goods. The impact in terms of raising technological capacities of recipient countries tends to be rather asymmetric, however, but increases with the degree of absorptive capacity in the country in question. Such absorptive capacity of countries depends on the existence of domestic capacity to engage in R&D and the ability of organizations and firms to identify and assimilate new knowledge. Hence, effective technology transfer is conditional on building synergies between international technology transfer and indigenous innovation capacity.

The authors use the case of the wind power sectors in China and India to illustrate this. The development of wind power in these countries started with the traditional pattern of transfer of technology through foreign direct investment, licensing, and joint ventures in the early face. This evolved to the next stage through publicly supported domestic R&D, further international R&D collaboration, and cross-border acquisitions of technology and plants.

In all this, the role of government policy and support has been critical, both in facilitating the adoption of the technology and the creation of new knowledge. By requiring foreign investors to use local content, imposing national certification, and custom duties favoring components imports over complete wind turbines, as in the case of India, government policies created incentives for local learning and innovation. In all cases, there has also been a substantial increase in public investments for R&D, as a precondition to create domestic technical capacities.

Similarly, government regulations (such as setting up pollution standards for industry or benchmarks to improve energy efficiency) have nurtured incentive driven innovation systems. Policy coherence across regulatory, financial, technological, and industrial policies is particularly relevant in this case. The relatively recent and successful experience of China, India, and Brazil, developing expertise in key areas of environmentally sustainable technology are evidence of the opportunity emerging economies have to lead the creation of green technology. Building dynamic synergies between technology transfer and localized innovation is critical to facilitate the adaptation and diffusion of technology but governments need to take the lead in helping the transition from traditional innovation systems toward sustainable innovation systems.

Toward a truly green revolution in agriculture

In the final chapter of this volume, Diana Alarcón and Christina Boudoroglou argue for a major technological transformation in agriculture to address the double challenge of expanding global food production and remaining within environmentally sustainable boundaries. Population growth and rapidly changing diets add to the demand for food at a time when there is increasing competition for land (including for the production of biofuels), intensification of adverse weather conditions affecting food production, and existing agricultural production methods are a significant source of GHG emissions. Increasing the availability of food at local levels will also be needed to meet the needs of the estimated 805 million people suffering from chronic hunger in 2012–14.

Doubling food production to meet the expected demand in the next thirty years with current technology and production practices is not sustainable. Agriculture, forestry, and other land use already account for 24 percent of global GHG emissions, and, at unchanged trends, the share would increase to 30 percent. Agricultural irrigation accounts for 70 percent of water withdrawals and intensive livestock production together with excessive use of agrochemical pesticides and fertilizers is a major source of water pollution.

At the same time, climate change has severe adverse consequences for agriculture. Land degradation leads to substantial productivity losses; changing temperatures and precipitation are affecting the timing and length of growing seasons and yields, and prolonged droughts and extreme floods are hitting large agricultural areas more frequently.

Smallholder farmers are at the heart of the challenge and the solution to food security and environmental sustainability: 80 percent of the world's food is produced in family farms and 90 percent of the food consumed in developing countries is produced locally. Development strategies for food security and environmental sustainability must focus attention on improving the productive capacity and livelihoods of smallholder farming, including by harnessing the technology and innovation needed to increase the productivity, profitability, stability, resilience, and climate change mitigation potential of rural production systems.

The chapter reviews the evidence of multiple experiences among farmers and communities adopting technology and innovative agricultural practices to boost productivity and reduce the environmental impact of production. A large number of successful experiences involve green technologies for pest and weed management, improved water efficiency, and maintenance of biodiversity.

Some of these experiences have been replicated with large-scale impacts. Examples include the integrated pest management (IPM) approach and the system of rice intensification (SRI). Much greater efforts are needed, however, in order to facilitate extensive experimentation and continuous R&D to adapt the new technology and production methods to local contexts. This can only be achieved through financial and political support from governments with effective participation from civil society organizations, and especially with direct involvement of local farmers.

Building a sustainable agricultural innovation system (SAIS) would provide the framework to direct resources to boost the productivity of small-scale agricultural producers. A SAIS framework would contribute to secure long-term financial support for R&D, infrastructure, and improved access to inputs, credits, and markets for small-scale farmers; it would help to recognize the dynamic nature of learning and innovation among the multiple actors engaged in the process and the institutional context in which innovation takes place, and it would help to identify the multiple actors that produce knowledge, technology, and capacities to innovate.

The international community has much to contribute to the global agenda for food security and environmental sustainability by increasing the resources for R&D as a global public good but also by introducing the necessary reforms to policies in Organisation for Economic Co-operation and Development (OECD) countries in the area of subsidies to agriculture and biofuels and trade.

In short, the chapters in this book illustrate the many challenges of redirecting global and national innovation systems toward sustainable development. Technological change is a cumulative process and outcomes tend to be uncertain. Hence, it would be pretentious to argue that this book provides any definitive answers. Yet, as argued, the world cannot afford not to urgently and actively work on the solutions to induce the required direction of change: *going green*.

Notes

* *Going Green: Technology and Innovation for Sustainable Development*, edited by Rob Vos and Diana Alarcón. Bloomsbury Academic published in association with the United Nations.

- 1 The views expressed in this chapter are those of the authors and do not necessarily represent the official position of the organizations where they work.

- 2 "It is extremely likely that more than half of the observed increase in global average surface temperatures from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forcing together" (IPCC, 2014: 15).
- 3 The IPCC report assigns the label "very likely" to a 90–100 percent probability of occurrence.
- 4 Ibid.
- 5 IPCC, 2013. "Summary for Policymakers." In Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.), *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf.
- 6 United Nations, (2011), *World Economic and Social Survey 2011: The Great Green Technological Transformation*. United Nations, New York. Retrieved online: http://www.un.org/en/development/desa/policy/wess/wess_current/2011wess.pdf.
- 7 Paragraph 61 of the Resolution adopted by the General Assembly on July 27, 2012, *The Future We Want*. A/RES/66/288. The text in italics is quoted directly from the resolution.
- 8 At the time of writing, the UN General Assembly would initiate negotiations toward the development agenda to be adopted in 2015. At the heart of these discussions is a proposal for a set of seventeen SDGs intended to bring attention to the multiple interrelations across the economic, social, and environmental dimensions of development. The SDG proposal can be found at: <http://sustainabledevelopment.un.org/owg.html>.

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