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Long-term impact of current trends in the economic, social and environmental areas on the realization of the Sustainable Development Goals

Report of the Secretary-General

Summary

With 2030 as the target date for realizing the SDGs, it is important to not focus on the current trends only, but to also look ahead at whether they will allow to realize the SDGs. The SDGs are complex and place a new emphasis on developing and adopting policies that build on the interrelations and integration of the goals and reach the furthest behind first. New policy approaches need to be piloted. This makes it important to examine scenarios related to the potential impact of various policy approaches and measures on the realization of the SDGs.

This is why the General Assembly decided that the Economic and Social Council would dedicate its high-level segment to debate long term trends and scenarios and the impact of current trends on the realization of the SDGs. It is well recognized that a number of mega trends will have a major impact on the realization of the SDGs. Five such major trends are demographic changes, urbanization, climate change, conflict and protracted crises and frontier technologies.

This report examines these trends and shows that policies need to adapt so as internalize their high impact on the realization of the SDGs. This calls for revisiting approaches to planning and policy making in various sectors. With the strong interactions, synergies and trade-offs between those mega trends, there is need to put in place the institutions and ways of working that will allow whole of government and whole of society approaches to address these trends through mutually reinforcing policies and actions.

The report ends with some recommendations for future actions.

A more in-depth reflection on policies to drive the implementation of the SDGs amidst these long-term trends would need to scientists and policy makers to engage in a dialogue at ECOSOC.

I. Introduction

1. The 2030 Agenda for Sustainable Development was a historical achievement of the United Nations Member States, given its universality, huge ownership by all Member States and many parts of civil society and businesses, as well as its ambition and broad reach.

2. Since its adoption, there have been a wealth of efforts to implement its provisions and reach the Sustainable Development Goals. The Voluntary National Reviews at the UN High-Level Political Forum on Sustainable Development have shown that many governments have been adapting their policies and institutional arrangements and made efforts to mobilize civil society and the private sector around the SDGs and the principles of the 2030 Agenda. These efforts show the realization of both governments and stakeholders that only through integrated policy making it is possible to achieve the 2030 Agenda.

3. While approaches vary, it is broadly accepted that policies to realize the SDGs can best succeed if they are rooted in solid evidence and data and informed by a keen knowledge of the present situation and current trends. At the same time, it is also important to look further ahead and anticipate the mega trends that can be expected to influence the course of sustainable development.

4. Such mega trends include demographic changes, urbanization, climate change, conflict and technologies. Demographic changes because, with an expected 8.6 billion people in 2030 for example, those changes have impacts on societies, economies and the environment. Rapid urbanization, with 55 per cent of the world population living in urban areas in 2018, is leading to new wealth creation but also to growing needs in terms of infrastructure or social services and increased carbon dioxide emissions. Conflicts have devastating impacts in terms of human lives, cost 12.4 per cent of GDP in losses to the global economy and undermine the likelihood of realizing the SDGs. At the same time, harnessing frontier technologies, while addressing risks and persistent gaps among developed and developing countries in access to existing technologies, could be transformative for realizing the SDGs.

5. The present report analyses these five megatrends and their potential future implications for the realization of the SDGs. It identifies policy actions that may mitigate their negative effects and put the world on track to realize the vision of the 2030 Agenda.

II. Global trends and key implications for the implementation of the 2030 Agenda

A. Demographic changes

Global trends

6. According to data and projections three main characteristics are impacting demographic changes in this century:

- Slowing down of global population growth, from 1.24 per cent per year ten years ago to 1.10 per cent per year today, increasing the overall population be 83 million people annually[1];
- Aging of societies, as the global population aged 60 years reached 962 million in 2017, almost double the number of 1980, and it is projected to double again by 2050. Therefore, there will be more persons over the age 60 alive in 2050 than young people under the age of 30[2];

[1] *World population prospects* (2017, United Nations publication)
[2] Ibid.

• The estimated number of international migrants increased by almost 50 per cent between 2000 and 2017, reaching 258 million in 2017[3].

7. However, within these trends, significant differences among regions and countries exist. Thus, even though the global population growth will slow down, more than half of the anticipated growth between now and 2050 is expected to occur in Africa (1.3 billion will be added by 2050). Asia is expected to be the second largest contributor (750 million will be added by 2050) followed by Latin America and the Caribbean, Northern America and Oceania. Europe is the only region projected to have a smaller population in 2050 than in 2017. Beyond 2050, it is estimated that Africa will be the main contributor to global population growth, but population growth in the group of 47 least developed countries (LDCs), of which 33 are in Africa, will remain very high, leading to an almost doubling of the population of the LDCs countries to 1.9 billion in 2050.[4]

8. The distribution of young and old persons across regions is also uneven, with two thirds of the world's older persons currently living in the developed regions. It is expected that nearly 8 in 10 of the world's older persons will be living in the developed regions in 2050.[5] Currently, Europe has the greatest percentage of population aged 60 or over (25 per cent). Rapid ageing will occur in other parts of the world as well, so that by 2050 all regions of the world except Africa will have nearly a quarter or more of their populations at ages 60 and above. The number of older persons in the world is projected to be 1.4 billion in 2030 and 2.1 billion in 2050 and could rise to 3.1 billion in 2100.

9. At the same time, Africa, Latin America and the Caribbean, and Asia were home to 1.8 billion children and 1.1 billion young persons in 2017.[6] By 2030, the number of youth is projected to grow to nearly 1.3 billion,[7] which shows that developing world, especially Africa will have a disproportionate concentration of people in the 15-29 year-old age group.

10. Overall, between 1950 and 2015, the regions of Europe, Northern America and Oceania were net receivers of international migrants, while Africa, Asia and Latin America and the Caribbean were net senders, with the volume of net migration generally increasing over time. It is projected that between 2015 and 2050, the top net receivers of international migrants (more than 100,000 annually) will be the United States of America, Germany, Canada, the United Kingdom, Australia and the Russian Federation.[8]

Key implications for the implementation of the 2030 Agenda

11. Profound changes in global demography, in terms of population growth, age composition and migration, have the potential to alter the trajectory of global sustainable development. Policies dealing with population growth, various age structures and migrants cut across the goals on poverty eradication, health, gender equality, economic growth and decent work, reduced inequalities and sustainable cities will need to be adopted in an integrated way in order to ensure that all these issues are taken into account when implementing the 2030 Agenda and the SDGs.

12. The concentration of population growth in the poorest countries will make it harder for those countries to eradicate poverty, reduce inequality, combat hunger and malnutrition, expand and update education and health

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3 United Nations (Population Division), Trends in International Migrant Stock: The 2017 revision (United Nations database, POP/DB/MIG/Stock/Rev.2017)

4. *World population prospects* (2017, United Nations publication)

5 Ibid.

6 Ibid

7 *Youth trends and sustainable development* (2015, UNDESA, Population Division)

8 Ibid.

systems, improve the provision of basic services and ensure that no one is left behind unless specific measure are undertaken that will target these areas through the implementation of the 2030 Agenda.

13. In Africa, the proportion of the population aged 25-59 is projected to continue to grow from 35 per cent in 2017 to 45 per cent by 2090. In Latin America and the Caribbean, the increase in the proportion of the population at working ages will be shorter, with a peak around 2030, while in Asia the proportion aged 25-59 will peak sooner still by about 2020[9]. Providing these generations of children and youth with health care, education, and employment opportunities will be critical for the successful implementation of the 2030 Agenda for Sustainable Development.

14. On the other hand, life expectancy at birth is projected to rise from 72 years in 2010-2015 to 77 years in 2045-2050.[10] Population aging will have a profound effect on the support ratio, defined as the number of workers per retiree. By 2050, seven countries in Asia, 24 in Europe, and five in Latin America and the Caribbean are expected to have potential support ratios below 2.[11] These low values underscore the fiscal and political pressures that many countries are likely to face in the coming decades in relation to pensions and social protection for a growing older population. Additionally, the increase in non-communicable diseases among ageing populations, will force public health systems to adapt to meet the growing demand for age-appropriate care, including long-term care, services and technologies for prevention, detection and treatment of diseases.[12]

15. An ageing labor force would also be challenged to keep up with the pace of innovation and structural changes in the labor market.[13] In developed countries, an increased burden will be placed on public transfer systems, due to concurrent trends of a growing proportion of pensioners and limited growth of the tax base. In developing countries, where most of the increase in the population above the age of 60 will occur, the elderly could continue to be less likely to have retirement savings plans or be supported by public welfare systems, and instead depend on assets and labor income[14] as well as traditional family support structures. It is, therefore, important to take into account this support ratio when shaping pension, health care and welfare policies and systems as well as fiscal policies.

16. The 2030 Agenda for Sustainable Development recognizes that international migration can be a positive force for economic and social development, and in the occasion that migrants are able to find employment in the host countries in activities of higher productivity, they can offer a mechanism to rebalance labor markets between areas of origin and destination and thereby increase the global productivity of labor. Migration across international borders can also help to promote investment and higher standards of living in countries of origin through remittances sent by migrants to families and communities back home, it can also accelerate the global diffusion of new ideas and technologies.

17. Target 10.7 calls for facilitation of “orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies”. This is a complex task. It significantly impacts ways to maximize the benefits and minimize any potential disruptive influence.

B. Urbanization

Global trends

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9 *World population prospects* (2017, United Nations publication)

10 Ibid.

11 Ibid.

12 World Health Organization, *World Report on Ageing and Health* (Geneva, 2015)

13 International Labour Organization, *World employment social outlook* (Geneva, 2018)

14 International Institute for Applied Systems Analysis, *Transformations to Achieve the Sustainable Development Goals - Report prepared by The World in 2050 initiative* (Laxenburg, 2018)

18. Fifty-five per cent of world population now live in cities, with the projection of 68 per cent by 2050.[15] Growth in the urban population is driven by overall population increase and by continued rural- urban migration. Together, these two factors are projected to add 2.5 billion to the world's urban population by 2050[16].

19. However, the situation varies by regions. Today, the most urbanized regions include Northern America (with 82 per cent of its population living in urban areas in 2018), Latin America and the Caribbean (81 per cent), Europe (74 per cent) and Oceania (68 per cent). The level of urbanization in Asia is now approaching 50 per cent. In contrast, Africa remains mostly rural, with 43 per cent of its population living in urban areas.[17] It is being projected that Asia will be home to more than 50 per cent of the global urban population by 2050, while Europe's urban population as a percentage of a global total, is likely to shrink[18].

20. Although many developing countries have not yet reached the same level of urbanization as today's developed countries, by 2050 the speed and scope or urban transition will make many of them reach that level. And even though close to half of the world's urban dwellers reside in settlements with fewer than 500,000 inhabitants, cities are reaching unprecedented sizes with one in eight living in 33 megacities (having 10 million or more inhabitants). By 2030, the world is projected to have 43 megacities, most of them in developing regions.[19]

21. Globally, cities have become economic and financial powerhouses contributing to nearly 80 percent of the world's GDP. This is due in part to economies of scale in urban agglomerations and lower unit costs of service provision, which generate prosperity.[20] GDP contributions from cities are also often greater than their share of national population. The ratio of the share of urban areas' income to the share of its national population is greater for cities in developing countries than those of developed countries. Thus, for example, 16 per cent of the population of France lives in Paris, yet the capital accounts for 27 per cent of GDP, while the metropolitan area of Manila, concentrates 12 per cent of the population of Philippines but contributes 47 per cent of the country's GDP.[21]

22. However, cities are also major contributors to climate change as they account for 71-76 per cent of the world's carbon dioxide from global final energy use, with transport and buildings being among the largest contributors.[22]

Key implications for the implementation of the 2030 Agenda

23. As the world continues to urbanize, sustainable development depends increasingly on the successful management of urban growth, especially in low-income and lower-middle-income countries where the most rapid urbanization is expected between now and 2050. Integrated policies to improve the lives of both urban and rural dwellers are needed, strengthening the linkages between urban and rural areas and building on their existing economic, social and environmental ties.

24. To ensure that the benefits of urbanization are shared and that no one is left behind, policies to manage urban growth need to ensure access to infrastructure and social services for all, focusing on the needs of the urban poor and other vulnerable groups for housing, education, health care, decent work and a safe environment.

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15 *World Urbanization Prospects: The 2018 Revision*, (2018, United Nations publications)
16 Ibid.
17 Ibid.
18 *World population prospects* (2017, United Nations publication)
19 *World Urbanization Prospects: The 2018 Revision*, (2018, United Nations publications)
20 World Bank Group, *Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change,* (Washington, 2016*)*
21 *World Cities Report: Urbanization and Development – Emerging Futures* (2016, United Nations publication)
22 UN Habitat https://unhabitat.org/urban-themes/climate-change/

25. The provision of decent housing has been a persistent challenge with the widespread growth of slums or informal urban settlements— particularly in the developing world. In 2010, as many as 980 million urban households lacked decent housing, as will another 600 million between 2010 and 2030.[23] Thus, it is crucially important that cities improve access to decent housing for all through effective land-use planning and efficient, affordable financing. Land-use and planning also needs to be part of actions in areas of transport, energy, emergency preparedness, and related fiscal and funding solutions. It is also key in addressing issues of poverty and social exclusion.

26. Well-managed urbanization, informed by an understanding of population trends over the long run offers unique chances to protect and improve the urban ecosystem and environmental services, reduce greenhouse gas emissions and air pollution and promote disaster risk reduction and management. This can be done through policies to reduce the exposure of the population to unhealthy air, disease and water pollution. It is also important to provide efficient use of energy including through improving public transport and limiting use of private cars. Sustainable consumption patterns are also critical including with regard to the increase of waste. Supporting the development of disaster risk reduction strategies related to natural and human-made hazards is also key.[24]

27. The ability to adopt integrated urban policies aligned with the SDGs will determine whether cities thrive in years to come. A recent positive trend is the local and regional governments' mobilization and involvement in localizing the SDGs. Local and regional governments are key actors in realizing the SDGs.[25]

C. Climate change

Global trends

28. Human influence on climate, primarily through greenhouse gas (GHG) emissions from fossil fuel use, as well as deforestation and unsustainable agricultural practices, has been the dominant cause of observed warming since the mid-20th century, while global average surface temperature warmed by 0.85°C between 1880 and 2012. Increases in temperature to date have already profoundly altered human and natural systems, including increases in droughts, floods, and some other types of extreme weather; sea level rise; and biodiversity loss[26].

29. Since 1970 the global average temperature has been rising at a rate of 1.7°C per century, compared to a long-term decline over the past 7,000 years at a baseline rate of 0.01°C per century. These global-level rates of human-driven change far exceed the rates of change driven by geophysical or biosphere forces that have altered the Earth System trajectory in the past; even abrupt geophysical events do not approach current rates of human-driven change[27].

30. Future climate-related risks depend on the rate, peak and duration of warming. In the aggregate, they are larger if global warming exceeds 1.5°C before returning to that level by 2100 than if global warming gradually stabilizes at 1.5°C, especially if the peak temperature is high (e.g., about 2°C) Some impacts may be long-lasting or irreversible, such as the loss of some ecosystems. For many regions, an increase in global mean temperature by 1.5°C or 2°C implies substantial increases in the occurrence and/or intensity of some extreme events.[28]

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[23] World Cities Report, UN-Habitat, 2016

[24] New Urban Agenda, paragraph 65

[25] Contribution from Local Authorities Major Group

[26] IPCC Fifth Assessment Report, or AR5 (IPCC, 2013b)

[27] Ibid.

[28] *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, (Geneva, 2018)*

31. Primary energy supply is projected to grow by 50-70 per cent between 2010 and 2050. Moreover, fossil fuels are expected to remain prominent in the world energy system. As a result, energy use is expected to continue to be the main cause of GHG emissions. In addition, the agricultural systems and land use will continue to contribute to GHG emissions. The current and planned climate policies to which countries committed under the Paris Agreement of the United Nations Framework Convention on Climate Change, are expected to lead, at best, to a stabilization of emissions. This is considerably less than would be needed to achieve the objectives of the Paris Agreement, i.e. to keep the temperature well below 2°C, and if possible, below 1.5°C. Achieving these objectives would require an almost complete decarbonization of the energy system.[29]

32. The world's forests can store an estimated 296 gigatons of carbon in both above- and below-ground biomass.[30] However, deforestation and forest degradation, caused notably by the conversion of forest land to agriculture and livestock areas, are now contributing to GHG emissions. In 2010, it was calculated that GHG emissions from agriculture, forestry and other land uses accounted for 24 per cent.[31] Land-use changes also result in a loss of valuable habitats, land degradation, soil erosion, and decrease in clean water causing floods, forest fires, and landslides that threaten lives and livelihoods in rural areas.

33. Extreme climate-related disasters have doubled since early 1990, averaging 213 events every year between 1990–2016. Rapidly changing weather conditions are leading to sudden population displacement, changes in the distribution of resources within society, exacerbated gender inequalities, the destruction of infrastructure, and increased resource scarcity. Food crises in 23 countries, with over 39 million food-insecure people in 2017, were also attributed to climate change, mainly drought. Two-thirds of these countries were in Africa.[32]

34. Climate change is a global challenge, but its adverse impacts are distributed unevenly across countries and social groups. The degree of vulnerability grossly depends on the extent, intensity and type of impact, as well as the country's percentage of income derived from climate-sensitive productive activities.

The response to climate change depends on the affected country's level of development, which often dictates the ability to prepare, respond and mitigate.[33]

35. In general, the poor and vulnerable social groups in developing countries are disproportionally affected by the impacts of climate change. Developing countries will require large-scale investment to build resilient infrastructure, expand safety nets and adopt new climate-smart technologies, such as measuring nitrogen in land cultivation, using recyclable modern building materials —all of which entail significant spending needs.[34] Meanwhile, developed countries are better equipped to mitigate and adapt to climate change, but the solution to keep the warming below or at 1.5°C has to be global.

Key implications for the implementation of the 2030 Agenda

36. Drivers of climate change relate to global population growth, increases in demand for food, water and energy, and agricultural practices. Policy practices, both adaptation and mitigation, are crucial.

37. Limiting global warming to 1.5°C rather than 2°C above preindustrial levels would make it markedly easier to achieve many aspects of sustainable development, with greater potential to eradicate poverty and reduce inequalities. Impacts avoided with the lower temperature limit could reduce the number of people exposed to climate risks and vulnerable to poverty by 62 to 457 million. It would lessen the risks of poor people to experience food and water insecurity, adverse health impacts, and economic losses, particularly in regions that already face

29 GEO6, UN Environment, Cambridge University Press, 2019

30 Food and Agriculture Organization, *The State of World's Forests*, (Rome, 2018)

31 *Climate Change 2014 – Synthesis Report*, Intergovernmental Panel on Climate Change (Geneva, 2015)

32 World Food Programme, *Global Report on Food Crises 2018,* (Rome, 2018)

33 United Nations Office for the Coordination of Humanitarian Affairs, *World Humanitarian Data and Trends* (Geneva, 2018)

34 Report of the Interagency task Force on Financing for Development, *Financing for Development: Progress and Prospects 2018*, (2018, United Nations publication)

development challenges. It would also make it easier to achieve certain SDGs, in particular those that relate to poverty, hunger, health, water and sanitation, cities and ecosystems (SDGs 1, 2, 3, 6, 11, 14 and 15).[35]

38. Warming of 1.5°C is not considered 'safe' for most nations, communities, ecosystems and sectors, as it would still pose significant risks to natural and human systems as compared to the current warming of 1°C. Some of the worst impacts on sustainable development are expected to be felt among agricultural and coastal dependent livelihoods, indigenous people, children and the elderly, poor laborers, poor urban dwellers in African cities, and people and ecosystems in the Arctic and small island developing States (SIDS).[36]

39. Maintaining the status quo is not a viable option. The cost of inaction is much higher than the investments needed to tackle climate change and environmental degradation. A wide variety of options are available to reduce the risks, ranging from lowering energy consumption and focusing on sustainable sources, decarbonization policies, reforestation or afforestation, sustainable agriculture and waste management to reduce methane emissions, retrofitting of buildings. Changing consumption and production patterns is critical.

40. It is also important to move towards a development paradigm that helps decoupling economic growth from environmental degradation. The dilemma of expanding economic activities while reducing the rate of resource use and reducing the environmental impact of any such use poses a serious challenge to society and requires significant changes in government policies, corporate behavior and consumption patterns by the public. Countries need to adopt policies that commit both governments and industries to reduce the amount of resources used for each unit of production, in other words, increase resource decoupling, and reduce negative impacts on the environment, in other words, implement impact decoupling.

41. A circular economy that calls for moving away from a linear production and consumption system, with the aim to redefine growth, reduce demand for natural resources, promote renewable energy sources and reduce emissions, provides an alternative to our current economic system and could be promoted in sustainable development strategies.

42. Synergies and trade-offs of mitigation and adaptation policies in relation to other sustainable development policies should inform the way forward to avoid trade-offs or maladaptation. Considering the transboundary nature of climate, natural ecosystems, pollution and resource use, regional, global and cross-sectoral collaboration and response is required to effectively deal with the challenges.

43. It is especially important to look at tradeoffs as strategies that advance one SDG may create negative consequences for other SDGs. It is therefore essential to consider a range of adaptation options based on people's values and the trade-offs they consider acceptable. Also important is to maximize synergies through inclusive, participatory and deliberative processes, and facilitate equitable transformation.

44. The design of the mitigation portfolios and policy instruments to limit warming to 1.5°C will largely determine the overall synergies and trade-offs between mitigation and sustainable development. Individual mitigation options are associated with both positive and negative interactions with the SDGs. Appropriate choices across the mitigation portfolio can help to maximize positive side effects while minimizing negative side effects. Integration of mitigation with adaptation and sustainable development compatible with 1.5°C warming requires a systems perspective. It will pose the most difficulties to those countries who have high dependency on fossil fuels for revenue and employment generation.[37]

45. Without societal transformation and rapid implementation of ambitious greenhouse gas reduction measures, pathways to limiting warming to 1.5°C and achieving sustainable development will be exceedingly difficult, if not

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[35] *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (Geneva, 2018)*

[36] Ibid.

[37] Ibid.

impossible, to achieve. Limiting warming to 1.5°C would require all countries and non-state actors to strengthen their efforts without delay. This could be achieved through sharing efforts based on bolder and more committed cooperation, with support for those with the least capacity to adapt, mitigate and transform while reconciling low-carbon trajectories and reducing inequalities.[38]

D. Conflict and fragile countries

Global trends

46. Peace, rule of law and good governance are inter-related, mutually reinforcing and critical foundations for achieving sustainable development.

47. Crises are generally driven by multiple factors and conditions that are often interlinked and interdependent. Drivers of conflict can include political exclusion, weak governance, politicization of ethnicity and ideology, elections-related violence, injustice, human rights violations, corruption, organized crime, proliferation of small arms, and light weapons, inequitable access to social services and weak social welfare systems, poverty, unemployment, food insecurity and harmful social and gender norms among others.

48. Global peace continues to deteriorate. Since 2010, state-based conflicts have increased by 60 per cent, while conflicts between non-state actors have risen by 125 per cent[39]. Conflict often results in significant civilian fatalities, humanitarian needs, forced displacement, the use of child soldiers, weakening of the social fabric and economic losses. Of particular note is that half of the 836 million people estimated to live in extreme poverty today live in fragile contexts and this is expected to rise to 80 per cent by 2030. Additionally, the number of globally displaced people has reached over 65 million; almost double than 20 years ago.[40]

49. The economic impact of violence to the global economy was $14.76 trillion 2017, which is equivalent to 12.4 per cent of global gross domestic product (GDP) or $1,988 per person. It is evident that, besides human, social and political costs, violence imposes substantial economic costs on society. The economic impact of violence in the ten most affected countries was on average 45 per cent of their GDP. This is approximately 19 times higher than the ten countries least affected by violence in which the average economic cost of violence is just over two per cent of GDP[41].

50. If the least peaceful countries were to grow at a rate equivalent to that of the most peaceful countries at 2.8 per cent, per capita GDP could be up to US$527 per capita higher by 2030[42].

51. Environmental factors are also increasingly considered potential risk factors or risk multipliers for violence, putting additional stress on existing political, social and economic pressure points faced by communities and countries. High exposure to the adverse effects of climate change, natural disasters, degradation of natural resources, including land and water, as well as poor natural resources management are increasingly added to the root causes of crises and population movements. Drought, for example, can exacerbate existing tensions and increase the likelihood of violence in communities that are largely dependent on rain-fed agriculture and pastoralism, and already vulnerable and/or politically marginalized.

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38 Ibid.

39 Food and Agriculture Organization, *The State of Food Security and Nutrition in the World,* (Rome, 2017)

40 States of Fragility Report, OECD, 2018

41 Institute for Economics & Peace. The Economic Value of Peace 2018: Measuring the Global Economic Impact of Violence and Conflict, Sydney, October 2018. Available from: http://visionofhumanity.org/

42 Ibid.

52. Water scarcity is increasingly a trigger of conflict. In 2017, water played a major role in conflict in at least 45 countries, particularly in the Middle East and North Africa.[43] Marginalized groups living in rural areas, especially women and children, are the most affected by environmental degradation owing to their reliance on natural resources for their livelihoods and habitations, and they have little or no alternative means of making a living.

53. In some countries, communities have resorted to raiding livestock and destroying or stealing crops, contributing to a cycle of violence that undermines livelihoods and further exposes rural communities to acute hunger.[44] This is particularly evident in the Sahel region, which is the world's region with the most significant number of people disproportionately affected by global warming, having suffered from severe episodes of droughts and desertification in the past 50 years. The shrinking resources, coupled with the changing demographics, are expected to trigger more conflicts owing to a growing competition over access to land and water.

54. Climate change is increasingly related to conflict in situations of existing institutional and socioeconomic fragility and political uncertainty. Climate change is expected to increase displacement of people due to higher exposure to extreme weather events, poverty and economic shocks. The worsening impacts of climate change in Sub-Saharan Africa, South Asia, and Latin America, three densely populated regions of the world, could see over 140 million people move within their countries' borders by 2050, creating a looming human crisis and threatening the development process,[45] which would risk aggravating existing socio-economic tensions which could possibly lead to conflicts, violence and protracted crises.

Impact of conflict on the implementation of the 2030 Agenda

55. The 2030 Agenda with its SDGs is a people centered, human-rights based agenda which shows an intrinsic relationship to peace and stability. Without peace, 2030 Agenda will be impossible to achieve. It is, thus, especially worrying that the prosperity gap between less and more peaceful countries is widening, which includes differences in human capital, levels of corruption, functioning of government and distribution of resources.

56. It is, thus, important in conflict and fragile countries to look at how to build poor people's capacity, empower them through community organizations, and promote participation, social inclusion and gender equality as the absence of these is very often an underlying cause of conflict. It will also be important to look at all stages of the conflict cycle, from early warning and conflict prevention, through crisis management, conflict resolution and post-conflict rehabilitation that includes targeted focus on transparency and accountability and confidence-building measures.

57. Raising awareness of the adverse effects that climate change could have on security is also important, as is identifying geographical hotspots, and assisting countries in developing and implementing adaptation strategies, particularly in transboundary contexts as well as developing and implementing climate-smart agriculture projects and providing platforms for energy security dialogue, cooperation, and sharing of best practices on sustainable and renewable energy and energy efficiency by bringing together major energy- producing, transit and consuming countries.

58. Local institutions have also an important role in managing vulnerability and providing incentives to enhance resilience. They are indispensable agents for the sustainable management of natural resources and of response strategies such as adaptation and mitigation. It is, therefore, essential that institutions are strengthened to deal with climate-related conflicts in order not to contribute to disempowerment of communities and create or prolong conflict.

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43 United Nations Office for the Coordination of Humanitarian Affairs, *World Humanitarian Data and Trends* (Geneva, 2018)
44 Food and Agriculture Organization and World Food Programme, *Monitoring food security in countries with conflict situations*, (Rome, 2019)
45 World Bank, *Groundswell: Preparing for Internal Climate Migration* (Washington, 2018)

E. Frontier Technologies for Sustainable Development

Global trends

59. Frontier technologies hold incredible promise for human welfare as they can and should play a major role in finding and applying the necessary global solutions. They let us imagine a future with no hunger, fewer diseases, individualized medicine and greater economic prosperity as they provide immense possibilities for economic growth, improvements in living standards and environmental protection, offering the potential for a world of far greater prosperity, while enhancing environmental sustainability and mitigating climate change.[46]

60. Achieving the goals of ending hunger, reducing maternal and infant mortality or ending epidemics of AIDS, malaria or tuberculosis will require widespread application of technological breakthroughs in genetics and nanomedicine. Creating decent jobs, building resilient infrastructure and promoting sustainable industrialization will involve automation, 3D printing and AI. Renewable energy technologies will expand access to affordable and reliable energy sources and allow the provision of electricity in remote and isolated rural areas inaccessible to centralized grid systems, while drones could revolutionize the delivery of supplies, enable precision agriculture and replace humans in dangerous tasks. Small-scale customized satellites will soon be affordable for more developing countries, businesses and universities, allowing monitoring of crops and environmental damage.[47]

61. Big data and IoT are new digital developments that make it possible to optimize business operations and facilitate the creation of new products, services and industries. Online technology platforms convert spare assets and capacity – a car or spare room – to income-earning capital, and thus can also redefine employment and livelihood. The possibility of collecting unlimited amounts of data through Internet-connected sensors and monitoring of the web and social media allows prediction of demand. Blockchain technology is making it easier to verify financial transactions, potentially increasing access to financial services. The same technology can also be used to hold more satisfactory public elections by ensuring the integrity and transparency of voting data. Blockchain can also be applied to official documents and digital authentication systems, but at the same time the availability of the fine-grained and increasingly personal data also introduces new risks.

62. Big data analysis can help to manage or help resolve critical global issues, assist in the creation of new scientific breakthroughs, advance human health, provide real-time streams, monitor natural systems, improve the efficiency of resource use, and support decision-making by business people, policymakers and civil society. IoT allows the condition and actions of connected objects and machines to be monitored and managed, while connected sensors can monitor the natural world, animals and people, exchange data with other connected objects, systems and users through the Internet. The number of such devices is expected to rise from 15 billion in 2015 to 50 billion by 2020, a third of these being computers, smartphones, televisions and mobile devices. The market, currently valued at $655.8 billion, is expected to reach $1.7 trillion in 2020 and between $3.9 trillion and $11.1 trillion by 2025.[48]

63. Recent breakthroughs in AI have led to major advances, driven by machine learning and deep learning, facilitated by access to huge amounts of big data, cheap and massive cloud computing, and advanced microprocessors. AI now includes image that exceeds human capabilities.

Key implications for the implementation of the 2030 Agenda

64. Harnessing frontier technologies could be transformative in achieving the SDGs and producing more prosperous, sustainable, healthy and inclusive societies. They offer the prospect of solutions and opportunities for

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[46] *World Economic and Social Survey* (2018, United Nations publication)

[47] Harnessing frontier technologies for sustainable development. Technology and Innovation report, UNCTAD, Geneva 2018. Available at https://unctad.org/en/PublicationsLibrary/tir2018_en.pdf

[48] Ibid.

sustainable development that are better, cheaper, faster, scalable and easy to use. This should be combined with action to address persistent gaps among developed and developing countries in access and use of existing technologies, and to develop innovations (including non-technological and new forms of social innovation).

65. However, new technologies threaten to outpace the ability of some societies and policymakers to adapt to the changes they create, giving rise to widespread anxiety and ambivalence or hostility to some technological advances. Therefore, capabilities are critical to countries' ability to exploit the opportunities offered by new and emerging technologies – and there is a wide gap in capabilities between developed and developing countries. Thus, R&D expenditures in most developing countries remain much smaller both in absolute terms and relative to gross domestic product, than the world average. In large part this reflects low business R&D business accounts for 32-38 per cent of R&D in developing countries, around half the world average of 68 per cent.[49]

66. Research capacity, however, is only one aspect of the capabilities needed for the exploitation of new technologies. Also important are generic, core and fundamental skills that are complementary to new technologies – such as literacy, numeracy and basic academic skills – together with basic financial and entrepreneurial skills and, increasingly, basic digital and even coding skills. Internet access is also critical. Matching the supply of skills to rapidly evolving market needs is essential. This requires agility in education policies, and may mean transforming education and training systems, as there are signs that education institutions are not keeping pace with technological advances.

67. Digitization is increasingly and fundamentally changing societies. Digital inclusion means empowering people and ensuring inclusiveness, equality and equity through information and communication technologies (ICTs). Despite the increasing deployment of telecommunication/ICT networks, equipment, services and applications, many people remain excluded from the information society, which creates winners and losers in societies and presents new ethical and moral dilemmas. In this fast-changing digital world, fostering digital inclusion goes along with improving inclusive education by ensuring the accessibility of devices, platforms and content for all.[50]

68. While developed countries – countries at the technology frontier – grapple with the opportunities and challenges associated with frontier technologies, many developing countries are yet to fully reap the benefits of existing technologies. A great technological divide persists, in part explaining the 'development divide' between developed and developing countries. This divide is particularly pronounced for LDCs, landlocked developing countries (LLDCs) and small island developing states (SIDS).

69. The challenge to close the technological divide is formidable. Millions are relegated to using technologies of the pre-industrial era, lacking access to modern education and health systems that are necessary to accumulate a minimum level of human capital adopt many frontier technologies. It is almost impossible for countries to access digital technologies and online economic opportunities unless their citizens have electricity, broadband Internet connection, a minimum level of education, and an enabling environment within which services can be offered.

70. Frontier technologies nevertheless present unique opportunities for developing countries, helping them to achieve SDGs. But to be effective they need to be internally consistent and fully aligned with national development plans. Coherence is needed across policy areas such as industrial policies and those on science technology and innovation, foreign direct investment (FDI), trade, education and competition, along with macroeconomic policies, including monetary policies.

71. New and emerging technologies open opportunities for leapfrogging – bypassing intermediate stages of technology through which countries have historically passed during the development process. In fact, not having legacy capital – i.e. capital embodied in technologies of the past – means developing countries can accelerate the

[49] Ibid.

[50] Contribution from International Telecommunication Union

general process of technological catch up through appropriate policy measures and strategies. For most developing countries, limited capabilities mean that such opportunities arise primarily in the form of adoption of existing technologies rather than the development of new technologies. Nevertheless, there is potential for leapfrogging in the energy sector through the development of decentralized renewable energy systems. This may provide a cost-effective means of accelerating sustainable development. Innovation policies can support such a process, if backed by finance, investment and technology transfer, but important technological, economic and governance obstacles need to be overcome, particularly in LDCs.[51]

72. In general, national development strategies need to pursue both basic infrastructure developments and human capital accumulation to bridge the technology and development divides. National innovation systems drive innovation, diffusion and adoption of new technologies. This is true for both countries at the technology frontier and the technologically-following, developing countries. While infrastructure and human capital are necessary preconditions for technological catch-up, their quality and efficacy are largely determined by the system of interconnected universities, research institutions, and research and development departments of industrial firms and utilities that create, store and transfer new technologies.

III. Conclusion and recommendations

73. The megatrends discussed in this report have and will have a significant impact on the implementation of the 2030 Agenda and SDGs and need to be considered in their implementation.

74. Integrated policy-making is an important prerequisite for achieving the 2030 Agenda and the SDGs. In this regard, it is important to look at SDGs in an integrated and interlinked way. However, this is not an easy task to accomplish. Traditionally government and public institutions are used to work in silos. Voluntary National Review reports at HLPF,[52] however, show that most countries have established some type of coordination mechanism and have acknowledged the need for integration, synergies and coordination of policies in various areas. It would be important to look at instruments and tools put in place for achieving coherence in particular for planning and budgeting processes.

75. Countries need to make efforts to design policies that take account of the interests of all policy communities, minimize conflicts, and maximize synergies. Trade-offs should be addressed in a transparent way with appropriate measures taken to mitigate negative impacts.

76. It is important for the various policy communities to create ownership of the policy coherence agenda by building alliances with other policy communities and negotiate policy options. This does not apply only to governments, but also to non-state actors including private sector as they all need to embrace the 2030 Agenda and SDGs as part of their business plans.

77. Good governance is important for achieving the 2030 Agenda. Respecting the rule of law, strengthened multilevel governance, enhanced institutional capacity, and the ability to mobilize and effectively use national resources are necessary elements for achieving good governance. The equitable distribution of resources and income and the establishment of effective social protection systems can have significant impact on poverty reduction and alleviate socio-economic pressure leading to and prolonging conflict. Strategies that contribute to conflict prevention, such as decentralization and power-sharing arrangements, should be utilized as appropriate, as should platforms for reconciliation and transitional justice in post-conflict contexts.

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[51] Harnessing frontier technologies for sustainable development. Technology and Innovation report, UNCTAD, Geneva 2018. Available at https://unctad.org/en/PublicationsLibrary/tir2018_en.pdf

[52] Synthesis of Voluntary National Reviews 2016,2017, 2018, UNDESA

78. The achievement of sustainable and equitable economic growth should be decoupled from environmental degradation and global resource efficiency in consumption should be improved. Investments in research and technological innovations in the areas of energy, agriculture, industry, transportation, construction and other sectors together with cross-sectoral and cross-disciplinary cooperation are also imperative. In developing economies, it is necessary to combine and coordinate public investment with the opportunities provided by the technological revolution to redefine patterns of consumption and production, towards a low-carbon growth path.

79. Frontier technologies can help to achieve the goals set in the 2030 Agenda by building on the existing progress. Technological breakthroughs should be embraced and promoted, while aligning them with the SDGs. Achieving prosperity for all -- and leaving no one behind – will require bridging the technology divide between and within countries. Developing countries have the most to gain as well as the most to lose from the opportunities created by frontier technologies. Policies should aim to ensure that technologies are compatible with the overarching goal of leaving no one behind. The new reality created by frontier technologies calls for stronger and more effective international cooperation. New regulatory mechanism for managing frontier technologies must bring together all stakeholders: governments, companies, scientists, and the civil society. It is important that regulations strike a balance between fostering innovation and efficiency, on the one hand, and fairness, equity and ethics, on the other.