![UN Logo] **Economic and Social Council**

2019 session
26 July 2018–24 July 2019
Agenda item 5 (a)
**High-level segment: ministerial meeting of the high-level
political forum on sustainable development, convened under
the auspices of the Economic and Social Council**

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 the achievement of the Sustainable Development Goals, it is important not to focus on the current trends alone, but also to look ahead as to whether they will allow for the realization of the Goals within the mandated time frame. The Goals are complex, and they place a new emphasis on the development and adoption of policies that build on the integrated, indivisible and interlinked nature and their call to reach those furthest behind first. New policy approaches need to be piloted and the potential impact of various policy approaches and measures for the realization of the Goals must be examined.

It is for this reason that the General Assembly decided, in its resolution 72/305, that the Economic and Social Council would include, on the final day of its high-level segment, a debate on future trends and scenarios and the long-term impact of current trends on the realization of the Sustainable Development Goals.

It is well recognized that a number of megatrends will have a major impact on the realization of the Goals, in particular: demographic changes; urbanization; climate change; conflicts and protracted crises; and frontier technologies.

The present report examines these trends and shows that policies will need to be adapted in order ensure their optimal impact on the realization of the Goals. This calls for a revisiting of approaches to planning and policymaking in various sectors. With the strong interactions, synergies and trade-offs between current megatrends, there is a need to establish 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 recommendations for future actions.

A more in-depth reflection on policies to drive forward the implementation of the Sustainable Development Goals amidst these long-term trends would require the engagement of scientists and policymakers in dialogue with the Council.

I. Introduction

1.   The 2030 Agenda for Sustainable Development, given its universality, broad ownership by all Member States and many sectors of civil society and business, as well as its ambition and broad reach, is a historical accomplishment of the United Nations.

2.   Since its adoption in 2015, there have been a number of significant efforts to implement its provisions and to achieve the Sustainable Development Goals. The voluntary national reviews at the high-level political forum on sustainable development show that many Governments have adapted their policies and institutional arrangements and have made efforts to mobilize civil society and the private sector to support the achievement of the Goals and the principles of the 2030 Agenda. These efforts show that both Governments and stakeholders have recognized that the 2030 Agenda can only be achieved through integrated policymaking.

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

4.   Five of these megatrends include: demographic changes; urbanization; climate change; conflicts and protracted crises; and frontier technologies. Since the global population is expected to reach 8.6 billion people by 2030, demographic changes will have a broad impact on societies, economies and the environment. With 55 per cent of the world population living in urban areas in 2018, rapid urbanization is leading to wealth creation, but also to growing needs in terms of infrastructure and social services and to increased carbon dioxide emissions. Conflicts, which have devastating impacts in terms of human lives, cost 12.4 per cent of gross domestic product (GDP) in losses to the global economy and undermine the likelihood of realizing the Sustainable Development Goals. 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 the realization of the Goals.

5.   The present report analyses these five megatrends and their potential implications for the realization of the Sustainable Development Goals. 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 for Sustainable Development

A. Demographic changes

1. Global trends

6.   According to data and projections, three main trends are impacting demographic changes in the twenty-first century:

      (a)   Although global population growth is slowing, from 1.24 per cent per year 10 years ago to 1.10 per cent per year today, the overall population is increasing by 83 million people annually;[1]

---

[1] *World Population Prospects: The 2017 Revision, Key Findings and Advance Tables*, Working Paper No. ESA/P/WP/248 (New York, 2017).

(b) The ageing of societies: since the global population aged 60 years or above reached 962 million in 2017, almost double the number in 1980, and is projected to double again by 2050, there will be more persons aged 60 years or above in 2050 than young people under 30 years of age;[2]

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

7. Within these trends, however, there are significant differences among regions and countries. Although the rate of global population growth will slow, more than half of the anticipated growth between 2019 and 2050 is expected to occur in Africa (where it is expected that there will be an additional 1.3 billion people by 2050). By 2050, the population in Asia is expected to increase by 750 million people, followed by population increases in 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 global population growth will be highest in Africa, and population growth in the 47 least developed countries, of which 33 are in Africa, will remain very high, leading to an almost doubling of their population to 1.9 billion people 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 developed regions by 2050.[5] Currently, Europe has the greatest percentage of population aged 60 years or over (25 per cent). Rapid ageing will also occur in other parts of the world, so that, by 2050, all regions of the world except Africa will have nearly a quarter or more of their populations aged 60 years or above. The number of older persons in the world, which is projected to be 1.4 billion in 2030 and 2.1 billion in 2050, could rise to 3.1 billion by 2100.

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

10. Overall, between 1950 and 2015, the Europe, Northern America and Oceania regions 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 Australia, Canada, Germany, the Russian Federation and the United States of America.[8]

2. 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

---

[2] Ibid.

[3] United Nations, Department of Economic and Social Affairs, Population Division, "Trends in International Migrant Stock: the 2017 revision", United Nations database, POP/DB/MIG/Stock/ Rev.2017, December 2017.

[4] *World Population Prospects: The 2017 Revision*.

[5] Ibid.

[6] Ibid.

[7] United Nations, Department of Economic and Social Affairs, Population Division, "Youth population trends and sustainable development", Population Facts, No. 2015/1, May 2015.

[8] Ibid.

structures and migrants cut across the Sustainable Development Goals on poverty eradication, health, gender equality, economic growth and decent work, reducing inequalities and sustainable cities. These 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 its Goals.

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

13. In Africa, the proportion of the population aged from 25 to 59 years 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 of working age will be shorter, peaking around 2030, while in Asia the same proportion of the population will peak sooner, around 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.

14. Between 2045 and 2050, life expectancy at birth is projected to rise to 77 years of age, up from a life expectancy of 72 years in the period 2010–2015.[10] Population ageing will have a profound effect on the support ratio, defined as the number of workers per retiree. By 2050, 7 countries in Asia, 24 in Europe and 5 in Latin America and the Caribbean are expected to have potential support ratios of below two working persons per retiree.[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 protections 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 and services and technologies for the prevention, detection and treatment of diseases.[12]

15. An ageing workforce may also be challenged to keep up with the pace of innovation and structural changes in the labour market.[13] In developed countries, an increased burden will be placed on public transfer systems resulting from the concurrent trends of a growing proportion of pensioners and a limited growth of the tax base. In developing countries, where most of the increase in the population above 60 years of age will occur, the elderly may continue to be less likely to have retirement savings plans or to be supported by public welfare systems, and to depend instead on assets and labour income[14] as well as on 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, including fiscal policies.

16. The 2030 Agenda recognizes that international migration can be a positive force for economic and social development. When migrants are able to find employment in areas of higher productivity in host countries, they provide a mechanism to rebalance labour markets in terms of supply and demand, and thus to increase the overall global productivity of labour. Migration across international borders can also help to

---

[9] *World Population Prospects: The 2017 Revision.*
[10] Ibid.
[11] Ibid.
[12] World Health Organization, *World Report on Ageing and Health* (Geneva, 2015).
[13] International Labour Organization, *World Employment Social Outlook: Trends 2018* (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, Austria, 2018).

promote investment and higher standards of living in countries of origin through remittances sent by migrants to their families and communities back home. It can also accelerate the global diffusion of new ideas and technologies.

17. Sustainable Development Goal 10, target 10.7, calls for the 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

1. Global trends

18. Today 55 per cent of the world's population lives in cities, a proportion that is expected to increase to 68 per cent by 2050.[15] Growth of the urban population is driven by an overall population increase and by continued rural to urban migration. Together, these two factors are projected to add 2.5 billion people to the urban population worldwide by 2050.[16]

19. 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 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 the developed countries, the speed and scope of urban transition will mean that many of them will reach that level by 2050. While close to half of the world's urban populations lives in settlements with fewer than 500,000 inhabitants, cities are reaching unprecedented sizes, with one person in eight living in 33 megacities with 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 per cent 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 the 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. 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 the Philippines, but contributes 47 per cent of the country's GDP.[21]

---

[15] *World Urbanization Prospects: The 2018 Revision – Key Facts* (New York, 2018).
[16] Ibid.
[17] Ibid.
[18] *World Population Prospects: The 2017 Revision.*
[19] *World Urbanization Prospects: The 2018 Revision*.
[20] World Bank, *Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change* (Washington, D.C., 2016).
[21] United Nations Human Settlements Programme (UN-Habitat), *World Cities Report 2016: Urbanization and Development – Emerging Futures* (Nairobi, 2016).

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

2.   Key implications for the implementation of the 2030 Agenda

23.   As the world continues to urbanize, sustainable development will depend 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, as are strengthened linkages between urban and rural areas, building on existing economic, social and environmental ties between the two.

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.

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 planning also needs to be part of actions in such areas as 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 by improving public transport and limiting the 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 Sustainable Development Goals will determine whether cities thrive in the years ahead. A recent positive trend is the mobilization by local and regional governments, key actors in realizing the Goals, in particular their involvement in localizing the Goals.[25]

C.   Climate change

1.   Global trends

28.   Human influence on climate, primarily through greenhouse gas emissions from fossil fuel use, as well as deforestation and unsustainable agricultural practices, has been the dominant cause of the warming observed since the mid-twentieth century:

---

[22] See https://unhabitat.org/urban-themes/climate-change/.

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

[24] General Assembly resolution 71/256, para. 65.

[25] Contribution from the local authorities major group.

the 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 other types of extreme weather; sea level rise; and biodiversity loss.[26]

29. Compared to a long-term decline over the past 7,000 years at a baseline rate of 0.01°C per century, it is estimated that, since 1970, the global average temperature has been rising at a rate of 1.7°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 (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 may imply substantial increases in the occurrence and/or intensity of extreme events.[28]

31. Primary energy supply is projected to grow by 50 to 70 per cent between 2010 and 2050. Moreover, fossil fuels are expected to remain in prominent use in the world energy system. As a result, energy use is expected to continue to be the main cause of greenhouse gas emissions. In addition, the agricultural systems and land use will continue to contribute to greenhouse gas emissions. The current and planned climate policies, to which countries committed to the Paris Agreement under 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, that is, to keep the increase in 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 greenhouse gas emissions. In 2010, it was calculated that emissions from agriculture, forestry and other land uses accounted for 24 per cent of greenhouse gas emissions.[31] Land-use changes also result in a loss of valuable habitats, land degradation, soil erosion and a decrease in clean water, which cause floods, forest fires and landslides that threaten lives and livelihoods in rural areas.

33. Extreme climate-related disasters have doubled since early 1990, with an average of 213 events every year between 1990 and 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

---

[26] Intergovernmental Panel on Climate Change, *Fifth Assessment Report* (2014).

[27] Ibid.

[28] Intergovernmental Panel on Climate Change, *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).

[29] United Nations Environment Programme, *Global Environment Outlook (GEO-6): Healthy Planet, Healthy People* (Cambridge University Press, 2019).

[30] Food and Agriculture Organization (FAO), *The State of World's Forests: Forest Pathways to Sustainable Development* (Rome, 2018).

[31] Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report* (Geneva, 2015).

infrastructure and increased scarcity of resources. Food crises in 23 countries, where there were 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 countries' 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, 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 and using modern recyclable building materials – all of which entails the need for significant spending.[34] Developed countries are better equipped to mitigate and adapt to climate change, but the solution to keeping warming levels below or at 1.5°C must be global.

2. Key implications for the implementation of the 2030 Agenda

36. Drivers of climate change are related 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 pre-industrial 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 experiencing food and water insecurity, adverse health impacts and economic losses, particularly in regions that already face development challenges. It would also make it easier to achieve certain Sustainable Development Goals, in particular those related to poverty, hunger, health, water and sanitation, cities and ecosystems (Goals 1, 2, 3, 6, 11, 14 and 15).[35]

38. Warming of 1.5°C is not considered to be 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 those who depend on agricultural and coastal activities for their livelihoods, indigenous people, children and the elderly, poor labourers, poor urban dwellers in African cities and people and ecosystems in the Arctic and in small island developing States.[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. The wide variety of options available to reduce the risks include lowering energy consumption, focusing on sustainable sources, promoting policies for decarbonization, reforestation or afforestation, sustainable agriculture and waste

---

[32] Food Security Information Network, *Global Report on Food Crises 2018* (2018).

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

[34] *Financing for Development: Progress and Prospects 2018* (United Nations publication, Sales No. E.18.I.5).

[35] Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*.

[36] Ibid.

management, reducing methane emissions and ensuring the retrofitting of buildings. Changing consumption and production patterns is critical.

40.   It is also important to move towards a development paradigm that helps to decouple 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 behaviour 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 (or increase resource decoupling) and reduce negative impacts on the environment (or implement impact decoupling).

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

42.   Countries should bear in mind synergies and trade-offs when considering the adoption of mitigation and adaptation policies in relation to sustainable development. 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 trade-offs because strategies that advance one Sustainable Development Goal may create negative consequences for other Goals. It is therefore essential to consider a range of adaptation options on the basis of people's values and the trade-offs they consider acceptable. It is also important to maximize synergies through inclusive, participatory and deliberative processes, and to 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 Goals. Appropriate choices across the mitigation portfolio can help to maximize positive side effects while minimizing negative side effects. The integration of mitigation with adaptation and sustainable development compatible with limiting warming to 1.5°C requires a systems perspective. It will pose the most difficulties to those countries with a 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 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]

---

[37] Ibid.
[38] Ibid.

D. Conflicts and protracted crises

1. Global trends

46. Peace, the rule of law and good governance are interrelated, 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, the 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.

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. It is important to note that half of the 836 million people estimated to live in extreme poverty today live in fragile contexts, and that this percentage is expected to rise to 80 per cent by 2030. Additionally, the number of globally displaced people has reached over 65 million, a figure almost double that seen 20 years ago.[40]

49. In 2017, the economic impact of violence on the global economy was estimated at $14.76 trillion, which is equivalent to 12.4 per cent of GDP, or $1,988 per person. It is evident that, in addition to the human, social and political costs, violence imposes substantial economic costs on society. In the same year, the cost of the economic impact of violence in the 10 most affected countries was, on average, equivalent to 45 per cent of their GDP. This is approximately 19 times higher than in the 10 countries least affected by violence, where the average economic cost of violence is just over 2 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, namely 2.8 per cent, their per capita GDP could rise to $527 by 2030.[42]

51. Environmental factors are also increasingly considered to be 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 have been added as 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 are already vulnerable and/or politically marginalized.

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

---

[39] FAO and others, *The State of Food Security and Nutrition in the World 2017: Building Resilience for Peace and Food Security* (Rome, 2017).

[40] Organization for Economic Cooperation and Development (OECD), *States of Fragility Report 2018* (Paris, OECD Publishing, 2018).

[41] Institute for Economics and Peace, The Economic Value of Peace 2018: Measuring the Global Economic Impact of Violence and Conflict (Sydney, 2018). Available at http://visionofhumanity.org/.

[42] Ibid.

Africa.[43] Marginalized groups living in rural areas, especially women and children, owing to their reliance on natural resources for their livelihoods and habitations, are the most affected by environmental degradation, 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, thus 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, the region in the world with the most significant number of people disproportionately affected by global warming, where the population has suffered from severe episodes of droughts and desertification over 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. It is expected that the effects of climate change will increase the 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 national borders by 2050, creating a looming human crisis and threatening the development process. [45] This risks aggravating existing socioeconomic tensions, which could lead to conflicts, violence and protracted crises.

2. Impact of conflict on the implementation of the 2030 Agenda

55. The 2030 Agenda, along with its Sustainable Development Goals, is a people centred, human-rights based agenda with an intrinsic relationship to peace and stability. Without peace, the 2030 Agenda will be impossible to achieve. It is therefore especially worrying that the prosperity gap between less and more peaceful countries is widening, including differences in human capital, levels of corruption, the functioning of government and the distribution of resources.

56. Thus, in conflict affected and fragile countries, it is important to look at how to build the capacity of poor people, empower them through community organizations and promote greater participation in decision-making, social inclusion and gender equality, as the absence of such elements is often an underlying cause of conflict. It is also important to look at all stages of the conflict cycle, from early warning and conflict prevention to crisis management, conflict resolution and post-conflict rehabilitation, including a targeted focus on transparency, accountability and confidence-building measures.

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

---

[43] United Nations, Office for the Coordination of Humanitarian Affairs, *World Humanitarian Data and Trends 2018*.

[44] FAO and World Food Programme (WFP), *Monitoring Food Security in Countries with Conflict Situations: a Joint FAO/WFP Update for the United Nations Security Council*, Issue No. 5, January 2019.

[45] World Bank, *Groundswell: Preparing for Internal Climate Migration* (Washington, D.C., 2018).

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

E. Frontier technologies for sustainable development

1. Global trends

59. Frontier technologies hold tremendous promise for human welfare: 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 because of the immense possibilities for economic growth, improvements in living standards and environmental protection such technologies can provide. They offer the potential for a world of 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 the widespread application of technological breakthroughs in genetics and nanomedicine. Creating decent jobs, building resilient infrastructure and promoting sustainable industrialization will involve automation, including three dimensional printing and artificial intelligence. Renewable energy technologies can expand access to affordable and reliable energy sources and allow the provision of electricity for people living in remote and isolated rural areas that are inaccessible to centralized grid systems. At the same time, drones can revolutionize the delivery of supplies, enable precision agriculture and replace humans in carrying out dangerous tasks. Small-scale customized satellites will soon be affordable for more developing countries, businesses and universities, allowing for the monitoring of crops and environmental damage.[47]

61. Big data and the Internet of things 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 – for example a car or a spare room – to income-earning capital, and can thus 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 for the prediction of demand. Blockchain technology is making it easier to verify financial transactions, potentially increasing access to financial services. This 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, although the availability of 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. The Internet of things allows the condition and actions of connected objects and machines

---

[46] *World Economic and Social Survey 2018: Frontier Technologies for Sustainable Development* (United Nations publication, Sales No. E.18.II.C.1).

[47] *Technology and Innovation Report 2018: Harnessing Frontier Technologies for Sustainable Development* (United Nations publication, Sales No. E.18.II.D.3).

to be monitored and managed, while connected sensors can monitor the natural world, animals and people, and 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, one third 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 artificial intelligence, driven by machine learning and deep learning, and facilitated by access to huge amounts of big data, cheap and massive cloud computing and advanced microprocessors have led to major advances, including the ability to execute tasks more efficiently than human capability.

2. Key implications for the implementation of the 2030 Agenda

64. Harnessing frontier technologies could be transformative in achieving the Sustainable Development Goals and producing more prosperous, sustainable, healthy and inclusive societies. They offer the prospect of solutions and opportunities for 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 terms of access to and the use of existing technologies, and the development of 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 to hostility, with regard to some technological advances. For that reason, appropriate capabilities are critical to the ability of countries to exploit the opportunities offered by new and emerging technologies – and there is a wide gap in such capabilities between developed and developing countries. Thus, research and development expenditures in most developing countries remain much smaller both in absolute terms and relative to GDP than the world average. In large part this reflects the low rate of investment in research and development in business in developing countries – where it accounts for approximately 32 to 38 per cent, which is 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. Generic, core and fundamental skills that are complementary to new technologies, including literacy, numeracy and basic academic skills, are equally important, as are 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. Despite the increasing deployment of telecommunication/information and communication technologies 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

---

[48] Ibid.
[49] Ibid.

inclusion goes hand in hand with improving inclusive education by ensuring the accessibility of devices, platforms and content for all.[50]

68. While developed countries, countries at the technological 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 the least developed countries, landlocked developing countries and small island developing states.

69. The challenge to close the technological divide is formidable. Millions are relegated to using technologies of the pre-industrial era, lacking access to the modern education and health systems that are necessary for the accumulation of a minimum level of human capital in order to 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, which can help them to achieve the Sustainable Development Goals. But to be effective, the Goals 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, trade, education and competition, along with macroeconomic policies, including monetary policies.

71. New and emerging technologies provide opportunities for leapfrogging, bypassing intermediate stages of technology through which countries have historically passed during the development process. In fact, not having legacy capital, that is, capital invested in technologies of the past, may mean that developing countries can accelerate the 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 the 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, although important technological, economic and governance obstacles still need to be overcome, particularly in the least developed countries.[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 both for countries at the technology frontier and the technologically-following, developing countries. While infrastructure and human capital are necessary preconditions for attaining 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.

---

[50] Contribution from International Telecommunication Union.
[51] *Technology and Innovation Report 2018: Harnessing Frontier Technologies for Sustainable Development* (United Nations publication, Sales No. E.18.II.D.3).

III. Conclusion and recommendations

73.   The megatrends discussed herein are having and will continue to have a significant impact on the implementation of the 2030 Agenda and the achievement of the Sustainable Development Goals and they need to be considered in the implementation process for both.

74.   Integrated policymaking is an important prerequisite for implementing the 2030 Agenda and achieving the Sustainable Development Goals. In this regard, it is important to look at the Goals in an integrated and interlinked way. However, this is not an easy task to accomplish. Traditionally government and public institutions work in silos. However, voluntary national review reports at high-level political forum on sustainable development[52] show that most countries have established coordination mechanisms and have acknowledged the need for integration, synergies and coordination of policies in various areas. It would be important to look at the mechanisms 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 sustainable development agenda by building alliances with other policy communities and negotiating policy options. This applies not only to Governments but also to non-State actors, including from the private sector, as all parties need to embrace the 2030 Agenda and Sustainable Development Goals 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 a significant impact on poverty reduction and alleviate the socioeconomic pressures that lead to and prolong 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.

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 Sustainable Development Goals by building on the existing progress. Technological breakthroughs should be embraced, promoted and aligned with the Goals. 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

---

[52] United Nations, Department of Economic and Social Affairs, *Voluntary National Reviews: Synthesis Reports*, for 2016, 2017 and 2018. Available at https://sustainabledevelopment.un.org.

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 mechanisms for managing frontier technologies must bring together all stakeholders: Governments, companies, scientists and civil society. In working towards the target date of 2030 for the achievement of the Sustainable Development Goals, 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.

_____