

The Deteriorating Condition of Our Common Home

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“Nature is declining globally at rates unprecedented in human history — and the rate of species extinctions is accelerating, with grave impacts on people around the world now likely.” That is the sombre message from a landmark soon-to-be-published report entitled *Nature’s Dangerous Decline*. This report, coming from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), is the most comprehensive scientific report ever undertaken on nature and the natural environment; in fact it is so comprehensive that, at the time of writing (January 2020) the full six-chapter report, expected to exceed 1,500 pages, had not yet been published. However, the gist of the report has been made available through a 12-page *Media Release* and a 39-page *Summary for Policy-Makers*, both issued in May 2019, almost exactly four years after the publication of *Laudato Si’*, Pope Francis’ encyclical on “Care for our Common Home”.

The IPBES report presents an ominous picture of the way the health of the natural systems on which we and all other species depend is deteriorating more rapidly than ever before. “We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide”.¹ While more food, energy and materials than ever before are now being supplied to people in most places, this is increasingly at the expense of nature’s ability to provide such contributions in the future and frequently undermines nature’s many other contributions. The net result is that the biosphere² is being altered to an unparalleled degree, while biodiversity³ is declining faster than at any previous time in human history.

This very full report presents decision-makers with the authoritative science, knowledge and policy options that they must consider in their concern to preserve and maintain the natural environment. But while it maps out in considerable detail the disastrous course upon which humanity and the modern world are set, the IPBES report, like *Laudato Si’*, also tells us that it is

¹ Sir Robert Watson, Chair, IPBES, in: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2019). *Nature’s Dangerous Decline*. IPBES Media Release, 6th May 2019.

² Biosphere = the part of the earth’s surface and atmosphere inhabited by living things.

³ Biodiversity = the existence of a wide variety of plant and animal species in their natural environments.

not too late to make a difference: what is needed is urgent and unprecedented social and economic transformation at every level, from local to global, aimed at bringing about a fundamental, system-wide reorganisation of the technological, economic, political and social features that govern today's world, including its ideals, goals and values. Provided the necessary urgent and concerted efforts are made to promote such radical transformative change, nature can be conserved, restored and used sustainably while simultaneously meeting other global goals set by society, such as the Sustainable Development Goals (SDGs) adopted by the United Nations.

The Human Context

The human setting for the IPBES report is that, since 1970, the world's population has more than doubled (from 3.7 billion in 1970 to 7.7 billion in 2019⁴), the global economy has grown nearly fourfold and global trade has increased tenfold. These changes have taken place unevenly across countries and regions, with resource extraction and production often occurring in one part of the world to satisfy the needs of distant consumers in other regions. The uneven scale of development comes out strongly in the fact that the per capita GDP is 50 times higher in developed than in developing countries.

Increased population and global economies that are strongly focussed on promoting consumption are driving up the demands for food, water, energy and materials, while at the same time they are generating a great increase in waste. As an index of the scale of the growth in consumerism, the report states that, in a period which saw a staggering increase in the number of consumers, there has been a 15% increase in global per capita consumption of materials since 1980, while the total urban area has more than doubled since 1992. Notwithstanding the increase in global per capita consumption, the report brings out starkly that there has also been global failure to respond to basic human needs. Although there has been a 300% increase in food crop production since 1970, around 11% of the world's population remains undernourished while 821 million people in Asia and Africa face food insecurity. In addition to this, more than 3 billion people – 40% of the global population – lacks access to clean and safe drinking water, while approximately 2 billion people rely on wood fuel to meet their primary energy needs. Compounding the survival problems that people face, there is the further very disturbing fact that currently more than 2,500 conflicts are occurring worldwide over fossil fuels⁵, water⁶, food and land. Sadly, it would appear that exclusion,

⁴ United Nations, Department of Economic and Social Affairs, Population Division (2019). *World Population Prospects 2019, Online Edition*.

⁵ The principal fossil fuels are coal, petroleum and gas.

⁶ "China, India, and Bangladesh are locked in a dispute over the Brahmaputra, one of Asia's largest rivers, with China and India actively constructing dams that have raised fears of water diversion. India's government has

scarcities and/or unequal distributions of nature's contributions to people are fuelling social instability and conflict.

Ways in which Nature is being Abused

The IPBES *Media Release* and *Summary for Policy-Makers* devote considerable space to presenting key facts and statistics that outline the way in which men and women have been ruthlessly damaging the natural world, especially in the past 50 years. The distressing facts that these documents present illustrate very powerfully the truth of what Pope Francis said in *Laudato Si'* (LS): Mother Earth “now cries out to us because of the harm we have inflicted on her by our irresponsible use and abuse of the goods with which God has endowed her” (LS, §2). The following are some of the abuses to which the IPBES documents draw attention⁷, with reference in some cases to what *Laudato Si'* says about the problem.

1. **Global Change in Nature:** Across most of the globe nature has now been significantly altered by multiple human interventions, with the great majority of indicators of ecosystems⁸ and biodiversity showing rapid decline. Seventy-five per cent of the land surface has been significantly altered, 66% of the ocean area is experiencing increasing cumulative negative impacts, and over 85% of wetlands have been lost. A great expansion has occurred in the production of food, animal feed, fibre and bio-energy, but at the cost of many other contributions of nature to the condition of life, including air and water quality, climate regulation and habitat provision. The rate at which this global change in nature has been occurring during the past 50 years is unprecedented in human history; for instance, the global rate of species extinction is already more than ten to hundreds of times higher than it has averaged over the past 10 million years.
2. **Global Warming:** “A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system. In recent decades this warming

used water-flow diversion to punish Pakistan for terrorist attacks. Dam-building on the Nile by Ethiopia has raised the ire of downstream Egypt. Water-related tensions are on the rise within countries as well, between rural and urban communities, and among agricultural, industrial, and household consumers. Last year, water scarcity fuelled conflicts in parts of eastern Africa, such as Kenya, which has a history of tribal clashes over access to water.” Jayati Gosh, *The Growing Threat of Water Wars*. Project Syndicate, 13th November 2019.

⁷ Unless otherwise indicated, the data in the numbered paragraphs that follow, and in many instances the actual language used, come from the IPBES *Media Release* and *Summary for Policy-makers*, both published in May 2019. In some cases reference is also made to documents that emerged at the time of COP 25, the international Climate Conference that took place in Madrid in December 2019. Note: COP = Conference of the Parties of the UN Framework Convention on Climate Change.

⁸ Ecosystem = a system involving the interactions between a community of living organisms and its non-living environment.

has been accompanied by a constant rise in the sea level and, it would appear, by an increase of extreme weather events” (LS, §23). The most widespread scientific benchmark for measuring global warming is the rise in global temperature relative to pre-industrial levels. Such a global rise in temperature, occurring everywhere at more or less the same time, is something that entered human history only at the time of the industrial revolution which occurred during the period from 1760 to some time between 1820 and 1840. The 2015 Paris Agreement aimed to keep the global temperature increase this century to well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to no more than 1.5°C. But with average temperatures over the past 30 years rising by 0.2°C per decade, human interventions had already led by 2017 to an observed global warming of approximately 1.0°C. Even more critically, the United Nations Secretary-General noted in December 2019 that “pathways reflecting countries’ current climate plans imply global warming of about 3°C by 2100, with warming continuing afterwards.”⁹ And even 1.5°C of warming would lead to extreme temperatures in many regions, leaving millions of people exposed to lower crop yields, food insecurity, water stress, lost incomes and livelihoods, and poorer health. Since 1980, emissions of greenhouse gases¹⁰ have doubled, raising average global temperatures by at least 0.7° Celsius.¹¹ However, despite the Paris Agreement’s resolve that the production of greenhouse gases should reach its peak as soon as possible, global carbon emissions were set to hit another record high level in 2019, with natural gas being the biggest contributor to the growth in emissions.

3. **Climate Change:** “Climate change is a global problem with grave implications: environmental, social, economic, political and for the distribution of goods. *It represents one of the principal challenges facing humanity in our day.* Its worst impact will probably be felt by developing countries in coming decades” (LS, §25; emphasis added). In June 2019, Pope Francis declared that the world was experiencing a global “climate

⁹ *Report of the Secretary-General on the 2019 Climate Action Summit and the Way Forward in 2020.* www.un.org/en/climatechange. page 3.

¹⁰ The greenhouse gases and their relative emissions by type are: carbon dioxide from the use of fossil fuels (57%); carbon dioxide from deforestation and the decay of biological material (17%); methane, largely from mining, rice paddy-fields, and the beef and dairy cattle industry (14%); nitrous oxide (8%); carbon dioxide (other) (3%); miscellaneous others (4%). Source: Matt McGrath, *COP 25: Longest climate talks end with compromise deal*, BBC 15th December 2019 (quoting Intergovernmental Panel on Climate Change). In a global warming context, carbon dioxide is particularly harmful because it remains in the atmosphere for centuries and in oceans for even longer.

¹¹ In November 2019, the World Meteorological Organization (WMO) announced that the concentration of heat-trapping greenhouse gases in the atmosphere reached a record high in 2018. The last time the earth experienced comparable concentrations of carbon dioxide was three to five million years ago, when the temperature was two to three degrees Celsius warmer, and sea levels were 10 to 20 metres higher than at present. *Climate Change: Another Year of Record Gas Emissions, Warns UN Meteorological Agency*, WMO, 25th November 2019.

emergency”, warned of the dangers of global warming and stated that a failure to act urgently to reduce greenhouse gases would be “a brutal act of injustice toward the poor and future generations”.¹² He also endorsed the Paris Agreement of a 1.5°C limit on temperature rises and warned of “catastrophic” effects for humanity if the world crossed such a threshold. He called for the “radical energy transition” that would be needed worldwide to stay within that limit, urged businesses to take a leading role, and noted with approval how young people were calling for a change. Climate change is projected to become more and more important in the coming decades as a direct driver of changes in nature and its ability to contribute to people and human well-being. Climate change is increasingly worsening the impact of other drivers¹³ on nature and human well-being. The frequency and intensity of extreme weather events, and the fires, floods and droughts that they can bring, have increased in the past 50 years.¹⁴ In addition, the adverse impacts of climate change on biodiversity are projected to increase with increasing global warming.

4. **Use of Fossil Fuels:** The problem of global warming “is aggravated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide energy system” (LS, §23). This remains a heavily subsidised area, with global subsidies for fossil fuels amounting to \$5.2 trillion in 2017, or 6.5% of global GDP.¹⁵ “We know that technology based on the use of highly polluting fossil fuels – especially coal but also oil and, to a lesser degree, gas – needs to be progressively replaced without delay” (LS, §165).¹⁶ “Compared to coal, natural gas is a cleaner fossil fuel, but unrestricted natural gas use merely cooks planet Earth more slowly than coal”.¹⁷ But

¹² *Pope Francis declares 'climate emergency' and urges action*. F. Harvey & J. Ambrose, *The Guardian*, 14th June, 2019.

¹³ According to the IPBES report, the following are the drivers (or causes) which, in order of the magnitude of their impact, are having the largest relative global impacts in changing the face of nature: (1) changes in land and sea use; (2) direct exploitation of organisms; (3) climate change; (4) pollution; and (5) invasive alien species.

¹⁴ The year 2017 saw 18.8 million people displaced due to natural disasters in 135 countries — almost twice the number displaced by conflict. *Climate Change and Poverty. Report of the Special Rapporteur on Extreme Poverty and Human Rights*. UN Human Rights Council, June 2019.

¹⁵ *Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates*. David Coady et al., IMF Working Paper, WP/19/89, May 2019.

¹⁶ At a meeting in June 2019 with the leaders of some of the world’s biggest multinational oil companies (BP, ExxonMobil, Shell, Total, Chevron, etc.), Pope Francis sought to impress on them the urgency and scale of the challenge that fossil fuels were posing for environmental sustainability, and the central role being played by those present, as energy leaders in tackling the emissions crisis; however, the oil magnates made no pledges to reduce their greenhouse gas emissions, and set no timetable for action. F. Harvey and J. Ambrose, *Pope Francis Declares 'Climate Emergency' and Urges Action*. *The Guardian*, 14th June 2019.

¹⁷ Glen Peters, Research Director, CICERO Centre for International Climate Research, December 2019.

instead of deriving ever more energy from the sun and from wind and water movements, the world is on the road to using more fossil fuels than ever before: “Governments are planning to produce about 50% more fossil fuels by 2030 than would be consistent with a 2°C (global warming) pathway and 120% more than would be consistent with a 1.5°C pathway”.¹⁸ The United Nations Climate Action Summit of September 2019 considered prohibiting the building of new coal-fired plants after 2020, but while many countries pledged to limit the use of coal, or phase it out altogether,¹⁹ not all were in agreement.

5. **Loss of Biodiversity:** The average abundance of native species in most major land-based habitats has fallen by at least 20%, mostly since 1900. The Earth is home to an estimated total of 8 million animal and plant species (of which 5.5 million are insect species); around 1 million of these, more than ever before in human history, are now threatened with extinction, many within decades. An average of around 25 per cent of species in assessed animal and plant groups are threatened. In addition, local varieties and breeds of domesticated plants and animals are disappearing globally – approximately 560 domesticated breeds of mammals were extinct by 2016, with at least 1,000 more threatened. “Each year sees the disappearance of thousands of plant and animal species which we will never know, which our children will never see, because they have been lost for ever” (LS, §33).
6. **Exploitation of the World’s Resources:** Today, humans extract more from the earth and produce more waste than ever before. Globally, approximately 60 billion tons of renewable and non-renewable resources are extracted from the earth every year – nearly double what it had been in 1980. Across the world there are some 17,000 large-scale mining sites (in 171 countries), mostly managed by 616 international corporations, as well as about 6,500 offshore oil and gas ocean mining installations (in 53 countries). Mined products contribute more than 60 per cent of the GDP of 81 countries. In addition, the value of agricultural crop production (\$2.6 trillion in 2016) has increased approximately threefold since 1970.
7. **Pollution and Waste:** Air, water and soil pollution have continued to increase. Each year three to four hundred million tons of heavy metals, solvents, toxic sludge, and other wastes from industrial facilities are dumped into the world’s rivers and oceans. Greenhouse gas emissions, untreated urban and rural waste, pollutants from industrial, mining and agricultural activities, oil spills and toxic dumping have had strong negative effects on soil, freshwater and marine water quality and the global atmosphere. Fertilizers entering coastal water systems have already produced more than 400 ocean

¹⁸ *The Production Gap Report*, UN Environmental Programme (UNEP), November 2019.

¹⁹ *Report of the Secretary-General on the 2019 Climate Action Summit and the Way Forward in 2020*. www.un.org/en/climatechange. page 7.

'dead zones' (with a combined area greater than that of the UK) where life cannot survive. Marine plastic pollution has increased tenfold since 1980. Nearly eight million tons of plastics enter the world's oceans every year, with this amount likely to rise tenfold by 2025 if there is no improvement in current waste management practices.²⁰ As much as 80% of the plastics in the world's oceans comes originally from litter thrown into rivers.²¹ When they get into the ocean, these plastics break up into smaller fragments called microplastics which can be harmful to fish, birds and various forms of marine life. In 2014 it was estimated that more than 250,000 tons of these microplastic particles were floating in five major plastic "garbage patches" that covered 40% of the world's oceans.²² These gigantic plastic "garbage patches" bring to mind the lament of Pope Francis: "The earth, our home, is beginning to look more and more like an immense pile of filth" (LS, §21). Mortality from air pollution also occurs, caused by people inhaling or ingesting very small particles of toxic matter that are fine enough to penetrate the lungs and bloodstream. These particles come either directly from fuel combustion or are formed indirectly from atmospheric reactions involving gases in the atmosphere. Coal and diesel combustion, rather than natural gas and gasoline, are the major causes of fossil fuel air pollution.²³ Mining operations may also lead to harmful, pollution in the air, soil, plants and water, leaving people exposed to long-lasting injurious effects. Following almost a century of lead and zinc mining, Kabwe has won for itself the unenviable reputation of being the most toxic city in the world.²⁴ A review of air pollution in Zambia's Copperbelt found that the main sources of pollutants were the "gases from smelter operations and dusts within the mines and those blown from both operational and abandoned waste rock, overburden and tailings dump sites. There were also visual signs of impaired vegetation cover and corroded housing infrastructure in the affected areas".²⁵

8. **Deforestation:** High-biodiversity tropical forests continue to dwindle. The global forest area today is only about two-thirds of its estimated pre-industrial level. Since 1970, the global raw timber harvest has risen by 45%. Up to 100 million hectares of tropical forest were lost between 1980 and 2000, mainly because of cattle ranching in Latin America

²⁰ *The Facts on Plastic Pollution*. plasticoceans.uk/the-facts-plastic-pollution-2, 2019.

²¹ Earthwatch Institute, 2018. *Plastic Rivers: Reducing the Plastic Pollution on our Doorstep*. www.earthwatch.org.uk/plastics

²² *Plastic Pollution in Oceans and on Land* (2019). www.britannica.com/science/plastic-pollution.

²³ David Coady et al., *Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates*. IMF Working Paper, WP/19/89, May 2019.

²⁴ Damian Carrington, *The World's most Toxic Town: the Terrible Legacy of Zambia's Lead Mines*. *The Guardian*, 28th May 2017.

²⁵ Mwaanga, P., Silondwa, M., Kasali, G. and Banda, P. M. (2019). *Preliminary Review of Mine Air Pollution in Zambia*, Docwire News.

and plantations in South-East Asia.²⁶ During the first eleven months of 2019 almost 9,000 square kilometres (900,000 hectares) of Brazil's Amazon region experienced deforestation, nearly twice what had been reported in the first eleven months of 2018.²⁷ A further 32 million hectares of primary or recovering forest were lost between 2010 and 2015. *Laudato Si'* has identified "deforestation for agricultural purposes" as a factor contributing to global warming (LS, §23). "Things are made worse by the loss of tropical forests which would otherwise help to mitigate climate change" (LS, §24).

9. **Water Security:** "Access to safe drinkable water is a basic and universal human right (but) some studies warn that an acute water shortage may occur within a few decades unless urgent action is taken" (LS, §§30, 31). Already, fourteen of the world's largest cities have experienced water scarcity or drought conditions.²⁸ The scandalous bottom-line figure is that today, well into the 21st century, 40% of the world's population still lacks access to clean and safe drinking water, while it is estimated that by 2030 demand for freshwater will exceed supply by 40%.²⁹ While water covers 70% of the earth's surface, most of this is salty sea-water, unfit for human consumption or for domestic or industrial use, with only 3% of all water being usable freshwater. Two-thirds of that is locked away in the polar ice-caps or frozen glaciers which store water in the winter months and release it slowly during the warmer summer period. But with the increase in global warming, these water reserves are melting, leading to water shortages in some places and floods and rising sea-levels in others. Glaciers and snow-packs are disappearing, affecting the freshwater supplies to those in downstream communities and making less water available for agriculture, energy generation, cities and ecosystems around the world. As a result, some 1.1 billion people worldwide lack access to water and a total of 2.7 billion find water scarce for at least one month of the year.³⁰ It is estimated that in this way global warming and rising demand have placed a quarter of the world's population at risk of water supply. But while there is not enough water in many places, the world is also facing the growing challenge that the warming global climate is leading to too much water in others. In the decade 2005-2015, 112 million people were affected by floods.³¹ A further aspect of the emerging global water crisis is

²⁶ "We are especially concerned about areas that are so crucial for maintaining the natural equilibrium that makes life possible, such as the Amazon region; the river basins of the Congo, India, and Indonesia; and the great extensions of open sea." *Universal Apostolic Preferences*. Letter of Father Arturo Sosa, Superior-General, to the Society of Jesus, 6th February 2019.

²⁷ *Deforestation in Brazil's Amazon up by 104%*. RTE News, 14th December, 2019.

²⁸ Stephen Leahy, *From Not Enough to Too Much, the World's Water Crisis Explained*. National Geographic, March 2018.

²⁹ Jayati Gosh, *The Growing Threat of Water Wars*. Project Syndicate, 13th November 2019.

³⁰ *Water Scarcity/Threats*. World Wildlife Fund (WWF), 2019.

³¹ L. Guppy and K. Anderson, 2017. *Water Crisis Report*. United Nations University Institute for Water, Environment and Health, Hamilton, Canada

that it makes its heaviest impacts on women and girls because in many developing countries they are the ones most likely to be responsible for collecting water for their homes. It is estimated that every day women in Africa walk a daily average of 6 kilometres to fetch water for their families, spending 200 million hours as they do so.³² That is the equivalent of 8.3 million days or more than 22,800 years! This daily routine reduces their energy for other activities and robs them of the opportunity to spend their water-collecting time with their families, or to pursue school and income activities to improve their lives.

10. **Exploitation of Organisms:** The direct exploitation – and even more seriously, the overexploitation – of animals, plants and other organisms mainly through harvesting, logging, hunting and fishing, continues to have a large negative impact on land-based and freshwater ecosystems, while fishing has had the largest negative impact in marine ecosystems.
11. **Land-Use Change:** Land-use change is driven primarily by agriculture, forestry and urbanization, all of which are associated with air, water and soil pollution. Over one-third of the world's land surface and nearly three-quarters of available freshwater resources are devoted to crop or livestock production. Agricultural expansion is the most widespread form of land-use change, with over one-third of the terrestrial land surface being used for cropping or animal husbandry. Agricultural expansion, alongside a doubling of the urban area since 1992 and an unprecedented expansion of infrastructure linked to growing population and consumption, has come mostly at the expense of forests (for the greater part, long-established tropical forests), wetlands and grasslands. At the same time land degradation has reduced the productivity of 23% of the global land surface.
12. **Infrastructure:** Due to infrastructure expansions, extensive areas of the planet are being opened up to new threats. Globally, paved road lengths are projected to increase by 25 million kilometres by 2050, with nine-tenths of all road construction occurring within least-developed and developing countries. The number of dams has grown enormously in the past 50 years. Worldwide, there are now about 50,000 large dams (higher than 15 metres) and approximately 17 million reservoirs (larger than 0.01 hectares or 100m²). The development of roads, cities, hydroelectric dams, and oil and gas pipelines frequently comes with high environmental and social costs, including deforestation, habitat fragmentation, biodiversity loss, land grabbing, population displacement, and social disruption (especially for indigenous peoples and local communities).
13. **Transport, Travel and Tourism:** Long-distance transportation of goods and people, including for tourism, has grown dramatically in the past 20 years with negative

³² Kathryn Reid. *Walk for Water: your 6K vs. theirs*. World Vision, March 2019.

consequences for nature overall. The rise in air-borne and sea-borne transportation of both goods and people, including a threefold increase in travel from developed and developing countries, has increased pollution and significantly raised invasive alien species. Eight per cent of the global greenhouse-gas emissions are from transport and food consumption that are related to tourism.

14. **Ocean Degradation:** Human activities have had a large and widespread negative impact on the world's oceans. These include direct exploitation – and even worse, overexploitation – of fish, shellfish and other organisms, land- and sea-based pollution, including that from river networks, and land-/sea-use change, including coastal development for infrastructure and aquaculture. Alarming, the world's oceans are running out of oxygen at an unprecedented rate.³³ This deterioration is occurring because (1) the extra heat that comes from global warming is leading to warmer oceans which hold less oxygen than cooler water; and (2) ocean plant life is growing rapidly due to the run-off into waterways of fertilizers, sewage and animal waste, as well as nitrogen deposits from the burning of fossil fuels; this increased plant life leads in turn to increased demands for oxygen, especially in the upper levels of ocean waters. In addition, coral reefs are particularly vulnerable to global warming and are projected to decline to between 10 and 30% of their former cover at 1.5°C warming and to less than 1% at 2°C warming. Moreover, the highest concentrations of metals and persistent organic pollutants from industrial discharges and agricultural run-off are found in coastal waters, poisoning coastal fish stocks. The decrease in ocean oxygen levels will adversely impact global fish resources and hence human populations all over the world. In addition, because of increased and persisting carbon dioxide levels, the world's oceans continue to become ever more acidic and therefore less supportive to the survival of fish and other sea-organisms and to the well-being of coral reefs.
15. **Rising Sea-Levels:** Over the past two decades, the global average sea-level, which has risen by 16 to 21 cm since 1900, continued to rise at a rate of more than 3 mm per year. This rise in sea-levels puts between 100 and 300 million people at increased risk of floods and hurricanes because of loss of coastal habitats and protection. "A rise in the sea-level can create extremely serious situations, if we remember that a quarter of the world's population live on the coast or nearby, and that the majority of our megacities are situated in coastal areas" (LS, §24).
16. **Sea-Fishing:** In 2015, 33% of sea-fish stocks were being harvested at unsustainable levels; 60% were being fished at their maximum sustainable levels, while only 7% were being harvested at levels lower than can be sustainably fished. In 2011, up to 33% of the world's reported fish catch was illegal or unregulated. A common but mostly illegal

³³ *Ocean Deoxygenation: Everyone's Problem*. International Union for the Conservation of Nature (IUCN), December 2019.

practice is dynamite- or blast-fishing where explosives are used to stun or kill shoals of fish for easy collection. This practice can be extremely destructive to the surrounding ecosystem, as the explosion often destroys the underlying coral reefs that support the fish. The explosion stuns the fish and causes their swim bladders to rupture. This results in some of the dead or dying fish floating to the surface, while most of them sink to the seafloor.³⁴ “Marine life in rivers, lakes, seas and oceans, which feeds a great part of the world’s population, is affected by uncontrolled fishing” (LS, §40).

17. **Pollinator Loss:** More than 75 per cent of global food crop types, including fruits and vegetables and some of the most important cash crops such as coffee, cocoa and almonds, rely on insect or animal pollination. Up to US\$577 billion in annual global crops are at risk from the loss of pollinators that are disappearing through the extinction of various species of insects and small animals.
18. **Evolutionary Changes:** In response to human interventions many organisms show ongoing biological evolution so rapid that it is detectable within only a few years. This human-driven ‘contemporary evolution’, which has long been recognised in microbes, viruses, agricultural insect pests and weeds, is now being observed in some species within all major taxonomic³⁵ groups (animals, plants, fungi and micro-organisms). Such changes are occurring in response to human activities such as hunting, fishing, harvesting, soil and water pollution, the use of pesticides and urbanization, as well as to climate change, ocean acidification, invasive species and pathogens.
19. **Alien Species, Pests and Diseases:** Nearly one fifth of the earth’s surface is at risk of plant and animal invasions, with adverse impacts on native species, ecosystem functions and nature’s contributions to people, as well as economies and human health. The rate of introduction of new invasive alien species seems higher than ever before and shows no sign of slowing. Cumulative records of alien species have increased by 40% since 1980. Across the 21 countries with detailed records, the numbers of invasive alien species per country have risen by about 70% since 1970. In addition, the UN Food and Agricultural Organization, FAO, has warned that plants, which make up 80% of the food we eat, and produce 98% of the oxygen we breathe, are under constant and increasing threat from pests and diseases: “human actions are reducing biodiversity and creating conditions where pests can thrive; and the growth of international travel and trade, which has tripled in volume in the last decade, means that pests and diseases can quickly spread around the world, causing great damage to native plants and the environment. ... Healthy plants are not something we can take for granted.”³⁶

³⁴ Wikipedia (2016), *Blast Fishing*.

³⁵ Taxonomic = Ways of classifying and naming organisms in an orderly system that indicates natural relationships, especially those that are evolutionary.

³⁶ FAO Director-General Qu Dongyu, 2nd December 2019.

20. The Poor and Vulnerable: The areas of the world projected to experience significant negative effects from global changes in climate, biodiversity, ecosystem functions and nature's contributions to people are also areas in which many of the world's poorest communities reside. Because they depend very strongly on nature for subsistence, livelihoods and health, these communities will be disproportionately hard hit by these negative changes. "Damage done to the earth is also damage done to the most vulnerable, such as indigenous peoples, peasants forced to emigrate, and the inhabitants of urban peripheries. The environmental destruction being caused by the dominant economic system is also inflicting intergenerational damage: not only does it affect those now living on earth, particularly the very young, but it also conditions and jeopardizes the life of future generations".³⁷ Today we have come to realise that a true ecological approach must always become a social approach so that we "hear *both the cry of the earth and the cry of the poor*" (LS §49; emphasis in the original). "Climate change will have devastating consequences for people in poverty. Even under the best-case scenario, hundreds of millions will face food insecurity, forced migration, disease, and death. Climate change threatens the future of human rights and risks undoing the last fifty years of progress in development, global health, and poverty reduction".³⁸ It should also be noted that land or resource tenure insecurity, as well as declines in nature, have greater impacts on women and girls, who often experience more negative effects than men and boys. "(T)he deterioration of the environment and of society affects the most vulnerable people on the planet. (T)he gravest effects of all attacks on the environment are suffered by the poorest" (LS, §48). "Despite contributing the least to climate change, it is the poor and vulnerable who suffer the most from these impacts."³⁹ According to an OXFAM report, "The poorest half of the world's population – 3.5 billion people – is responsible for just 10% of carbon emissions while the world's richest 10% produce around half of all emissions."⁴⁰ In view of the rapid decline in many of nature's contributions to people, very many of the international Sustainable Development Goals (SDGs) will not be achieved, particularly those relating to poverty, hunger, health, water, cities, climate, oceans and land.

³⁷ *Universal Apostolic Preferences*. Letter of Father Arturo Sosa, Superior-General, to the Society of Jesus, 6th February 2019.

³⁸ *Climate Change and Poverty. Report of the Special Rapporteur on Extreme Poverty and Human Rights*. United Nations Human Rights Council, June 2019.

³⁹ Advocacy Group Representing 47 Least Developed Countries at COP 25, the Madrid Climate Summit, December 2019.

⁴⁰ *World's Richest 10% Produce Half of Carbon Emissions while Poorest 3.5 Billion Account for just a Tenth*. OXFAM, December 2015.

21. Public Policies: Around the globe, subsidies with harmful effects on nature have persisted. In 2015, OECD countries provided an estimated \$100 billion in financial support to agriculture that was potentially harmful to the environment. Undesirable as this was, it is dwarfed by the global subsidies for the fossil fuels which form the basis for the worldwide energy system and produce more than half of the greenhouse gases that have resulted in global warming and led to harmful climate change. In 2017, countries subsidized the fossil fuel industry by \$5.2 trillion, or 6.5% of global GDP.⁴¹ Coal was the largest source of subsidies (44%), followed by petroleum (41%), natural gas (10%), and electricity production (4%). Another trillion went to support natural resource overexploitation. In 2015, China was by far the largest subsidizer (at \$1.4 trillion), followed by the United States (\$649 billion), Russia (\$551 billion), the European Union (\$289 billion), and India (\$209 billion).⁴² Meanwhile, developing countries could only watch as wealthier countries grew rich by burning an irresponsible amount of fossil fuels.⁴³ Generally, economic incentives have favoured expanding economic activity, and often environmental harm, over conservation or restoration. A key element of more sustainable future policies is the evolution of global financial and economic systems to build a sustainable global economy, steering away from the current limited paradigm of economic growth. But even more urgent is the political will to reduce carbon emissions and to limit global warming to no more than 1.5° Celsius. Unfortunately, the Madrid Summit on climate change that ended in December 2019 brought fresh doubts about the world's collective resolve to slow the warming of the earth and put a halt to the harmful climate changes that this brings. "The message from climate activists was passionate, the warning from the scientific community and countries already experiencing the effects of climate change, urgent. The action from world powers excruciatingly slow and inadequate".⁴⁴ This failure in political commitment means that the danger remains that global temperatures could rise by at least 3° Celsius before the end of this century, something that would be a recipe for global disaster.

⁴¹ *Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates*. David Coady et al. IMF Working Paper, WP/19/89, May 2019.

⁴² *Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates*. Appendix 5. David Coady et al., IMF Working Paper, WP/19/89, May 2019.

⁴³ *Climate Change and Poverty. Report of the Special Rapporteur on Extreme Poverty and Human Rights*. United Nations Human Rights Council, June 2019.

⁴⁴ *COP25 was Meant to Tackle the Climate Crisis. It Fell Short*. Tara John, Arwa Damon, Ingrid Formanek and Sheena McKenzie, CNN 15th December 2019.

Nature's Dangerous Decline and Laudato Si'

It is quite remarkable the way in which the very comprehensive IPBES report on *Nature's Dangerous Decline*, developed over a number of years by 145 expert scientists from 50 countries (with inputs from more than 300 contributing authors) and based on the systematic review of about 15,000 scientific and government sources, agrees, both in its central message and much of its scientific detail, with what Pope Francis had set out four years earlier in *Laudato Si'*. Indeed, the IPBES report returns in its own way to many of the issues that the Pope raised in his encyclical: climate change; global warming; pollution; waste disposal; the intensive use of fossil fuels at the heart of the worldwide energy system; the lack of universal access to clean drinking water; the loss of biodiversity; the melting of the polar icecaps; the serious rise in sea-levels that is having a negative impact on the living conditions of millions of people residing on sea-coasts; over-consumption and the depletion of natural resources; the need to protect oceans, coral reefs, and marine and aquatic life; deforestation and the special need to protect the Congo and Amazon river basins; the concentration of the world's poorest communities in the most fragile parts of the planet; the doubling of urban areas since 1992.

Taking Action on Behalf of Our Common Home

Achieving Environmental Sustainability

The second half of *Laudato Si'* considers possible future lines of approach and action that “can help us escape the spiral of self-destruction which currently engulfs us” (LS, §163). Pope Francis draws attention to the fact that today “the issue of environmental degradation challenges us to examine our lifestyle” (LS, §206). He also stresses that a “global consensus is essential for confronting the deeper problems, which cannot be resolved by unilateral actions on the part of individual countries” (LS, §164). Unfortunately, however, “politics and business have been slow to react in a way commensurate with the urgency of the challenge facing our world” (LS, §165). Due to lack of political will, recent World Summits have failed to reach meaningful and effective agreements on how to safeguard and protect the environment.⁴⁵ This is “chiefly because the global economic and financial sectors, being transnational, tend to prevail over the political” (LS, §175). In the Pope’s view, what this points to is the urgent need for an effective world

⁴⁵ “A UN climate summit in Madrid stumbled towards the finish line after marathon talks between countries exposed deeper divides than ever over how to enact humanity's plan to avert global warming disaster. Faced with fire-alarm warnings from science, deadly extreme weather events made worse by climate change, and weekly strikes by millions of young people, negotiations in Madrid were under pressure to send a clear signal that governments were willing to double down in tackling the crisis. But observers and delegates from nations already bearing the brunt of climate-related disasters said the COP 25 in Madrid had resolutely failed to live up to its own slogan: Time for Action.” *UN Climate Talks Stagger Towards 'Mediocre' Outcome*. RTE News, 15th December, 2019.

political authority that would, among other things, guarantee the protection of the environment.

At the more local level, *Laudato Si'* points to the need to promote ways of conserving energy, modifying consumption, developing an economy of waste disposal and recycling, protecting certain species, and planning for diversified agriculture and the rotation of crops (LS, §180). Like the IPBES report, the encyclical also speaks of the need for an education that would encourage people to adopt new habits which would help them to establish harmony within themselves, with others, with nature and other living creatures, and with God (LS, §210). This environmental education should capitalise on the new ecological sensitivity and generous spirit of young people some of whom make admirable efforts to protect the environment,⁴⁶ but who are overwhelmed by the myths of a modernity grounded in the mindset of utilitarianism, unlimited progress, consumerism, and the unregulated market (LS, §§209, 210). "Education in environmental responsibility can encourage ways of acting which directly and significantly affect the world around us, such as avoiding the use of plastic and paper, reducing water consumption, separating refuse, cooking only what can reasonably be consumed, showing care for other living beings, using public transport or car-pooling, planting trees, turning off unnecessary lights, or any number of other practices. Re-using something instead of discarding it, when done for the right reasons, can be an act of love which expresses our own dignity" (LS, §211).

In several other places *Laudato Si'* comes back to the present-day market-driven culture of consumerism and the need to modify or reduce consumption: "The market tends to promote extreme consumerism in an effort to sell its products. Compulsive consumerism is one example of how the techno-economic paradigm affects individuals" (LS, §203). This is also echoed by the IPBES report which, in its proposals for greater environmental sustainability, speaks of the need to lower total consumption and waste and the need to promote "visions of a good quality of life that do not entail ever-increasing material consumption" (see below). The

⁴⁶ In September 2019, the youth climate activist Greta Thunberg scolded world leaders at the UN Climate Action Summit for failing to address climate change. The 16-year-old, who has become one of the leading voices for a generation confronting the consequences of a warmer planet, said that calls for real action against climate change are still being ignored by political leaders, despite the continuous praise of world leaders for the global youth climate movement that she helped create. "People are suffering. People are dying, and dying ecosystems are collapsing. We are in the beginning of a mass extinction, and all you can talk about is the money and fairy tales of eternal economic growth We will not let you get away with this, right now is where we draw the line." *CBS News*, 23rd September 2019.

Another young climate activist is 8-year-old Licypriya Kangujam who spoke at the COP 25 UN Climate Summit in Madrid urging global leaders to take immediate action to save the planet and the future of young children like her. But, as she lamented, "our policy-makers from around the world just gather here every year at COPs and do nothing concrete for our future." *8-Year-Old Activist Licypriya Kangujam, Dubbed India's 'Greta', A Star at COP25 Global Climate Summit*. All India Press Trust of India, 12th December 2019.

Pope's encyclical also calls for an environmental impact assessment, free of all economic and political pressures, to be built into the planning of business ventures and projects (LS, §§182, 183).

In a number of places the IPBES report returns to the notion that it is not too late to make a difference, but that it is only through major change that nature can be conserved, restored and used sustainably.⁴⁷ This 'transformative change' must begin to take place now at every level, from local to global, bringing about a fundamental, system-wide reorganisation of the technological, economic, political and social features that govern the world today, including its ideals, goals and values. Key to these more sustainable future policies is the evolution of global financial and economic systems to build a sustainable global economy that is not restricted to the current limited model of economic growth. This calls for a deep social, political and economic transformation. So that the changes essential for this 'transformative change' may be brought about, the IPBES report states that it is crucial that efforts be directed at a number of features of the global socio-cultural, political, economic and financial landscape:

1. There is need for a more wholesome and sustainable vision of what a good quality of life entails. Very specifically, this vision should incorporate the achievement of a fulfilled human life that would not demand ever-increasing material consumption. In this way, the IPBES message stresses the need to delink the idea of a good and meaningful life from "ever-increasing material consumption", a challenge to which *Laudato Si'* repeatedly returns. The central importance of reducing consumption is highlighted again in the two immediately following items.
2. There is urgent need to lower total consumption and waste and in particular to reduce consumption among the affluent.
3. Thinking and action related to moral and financial responsibility should be extended to include the impacts on nature associated with consumption.
4. The whole question of inequalities should be addressed, especially those relating to income and gender, since these undermine the capacity for sustainability.
5. Every effort should be made to promote inclusive decision-making together with fair and equitable sharing of benefits and whole-hearted adherence to human rights in conservation decisions.
6. Both local economic activities and international trade should take into account the possible impacts on nature and its potential deterioration. This is in accord with *Laudato Si'*'s call (above) for an environmental impact assessment to be built into the planning of all business ventures and projects.

⁴⁷ Much that follows is drawn from IPBES (2019): *Nature's Dangerous Decline. IPBES Summary for Policymakers*, 6th May 2019, pages 7 and following.

7. The adoption of technological or social innovations should become dependent on their being environmentally friendly, re-echoing once again Pope Francis' call for an environmental impact assessment to be built into all business planning.
8. Firm steps should be taken to promote education, knowledge generation and the maintenance of different knowledge systems, including the sciences and indigenous and local knowledge regarding nature, conservation and its sustainable use.

In broad terms, *Laudato Si'* affirms that a "certain way of understanding human life and activity has gone awry, to the serious detriment of the world around us" (LS, §101). It further decries the way that humanity has taken up technology and its development according to an undifferentiated and one-dimensional model based on the false notion that an infinite quantity of energy and unlimited resources are available, that it is possible to renew these quickly, and that the negative effects of the exploitation of the natural order can be easily absorbed (LS, §106). The encyclical also notes that "whatever is fragile, like the environment, is defenceless before the interests of a deified market, which become the only rule" (LS, §56).

What Pope Francis states is very much in keeping with what the IPBES report identifies as the underlying causes of the deterioration that is taking place in our common home in this universe: production and consumption patterns; human population dynamics and trends; trade; technological innovations; and governance from the local to the global levels. Accordingly, the report suggests five main interventions that can help to generate the necessary transformative changes:

1. Develop strong positive incentives and widespread capacity for environmental responsibility and eliminate perverse incentives (such as subsidies for the extraction and use of fossil fuels).
2. Promote the integration of decision-making across sectors and jurisdictions.
3. Take the necessary pre-emptive and precautionary actions in regulatory and management institutions and businesses to avoid, mitigate and remedy the deterioration of nature, and monitor their outcomes.
4. In the face of uncertainty and complexity, manage for resilient social and ecological systems capable of delivering decisions that are robust in a wide range of scenarios.
5. Strengthen environmental laws and policies and their implementation, and the rule of law more generally.

Laudato Si' and the IPBES report are fully in agreement that the time has come to draw the line and to institute radical change. There is need to start at once at every level, from local to global, to bring about a "fundamental, system-wide reorganisation of the technological, economic, political and social features that govern the world today, including its ideals, goals and values". While massive global efforts must extend to the provision of food, water, energy, health and the achievement of human well-being for all, they must do so in a way that will conserve and

use nature sustainably. Because of the demands it will make, transformative change can expect opposition from those with interests vested in the status quo, but such opposition can be overcome for the broader public good. Unless the world adopts sweeping changes that will see a fundamental, system-wide reorganisation of its technological, economic, political and social features, the projected impacts of increasing land-use change, ocean degradation, exploitation of organisms and climate change will ensure that the condition of our common home will continue to deteriorate throughout the years ahead. It is only through urgent and concerted efforts, fostering radical, transformative change, that nature can be conserved, restored and used sustainably while simultaneously meeting other global societal goals (such as the SDGs, the United Nations' Sustainable Development Goals). Arresting the dangerous decline in nature, hearing the cry of Mother Earth who cries out to us because of the harm we have inflicted on her by our irresponsible use and abuse of the goods with which God has endowed her (LS, §2), demands radical global, national, local and personal action. This basic awareness of our mutual interdependency and belonging and of a future to be shared with everyone impels us to set out at once on the long path of renewal as we seek new convictions, attitudes and ways of living. "Many things have to change course, but it is we human beings above all who need to change" (LS, §202).

Clearly then, what humanity needs is an "ecological conversion" (LS, §217) which will see all of us assuming responsibility for the care of creation.⁴⁸ This conversion "begins by changing the habits of life promoted by an economic and cultural system based on the consumption of an irrational production of goods".⁴⁹ Bold decisions are required to avoid further damage and to bring about the lifestyle changes that are necessary so that the goods of creation are used for the benefit of all. A model of human life reconciled with creation will not be possible if we are not able to break out of individualism and inaction. It is absolutely essential, therefore, that we step out of ourselves and lovingly care for everything that is good for others. The extensive, rapid and dangerous decline in the condition of our common home challenges each one of us to participate actively in this process.

⁴⁸ In February 2019, the Jesuit Order worldwide, following a process that lasted for sixteen months and having received the express approval of Pope Francis, adopted for itself four 'universal apostolic preferences'. These 'preferences' are energising aspirations or statements of intent and purpose (Endean, 2019) that serve as signposts for the directions in which Jesuits are to move during the coming ten years so that they can make their best contribution to God's service and to the good of humanity and this world. Recognising that in common with all human beings they share responsibility for the care of creation, one of these guiding orientations for all Jesuits is to "collaborate in the care of our Common Home". Accordingly, Jesuits worldwide have resolved to "collaborate with others in the construction of alternative models of life that are based on respect for creation and on a sustainable development capable of producing goods that, when justly distributed, ensure a decent life for all human beings on our planet". *Universal Apostolic Preferences*. Letter of Father Arturo Sosa, Superior-General, to the Society of Jesus, 6th February 2019, page 5.

⁴⁹ *Ibid*, page 6.

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