L–17: Sustainable Development: Concept and Environmental Ethics

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Lesson – 17

Sustainable Development: Concept and Environmental Ethics

> **Learning Outcome:** At the end of this lesson, you will be able to explain the concept of sustainable development and the impact of environmental ethics.

Contents

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1.0   INTRODUCTION

Almost every sector of Indian Economy today is considering the concept of sustainable development and sustainability whether it is education, construction, energy, transportation textile and such others for all its future endeavours. The same is being done world over by developed and developing economies in tune with the Sustainable Development Goals (SDGs) which were adopted by the United Nations General Assembly in September 2015, with the 2030 Agenda for Sustainable Development. National Board of Accreditation (NBA), the accreditation agency for undergraduate engineering programme has also included environment and sustainability as one of its Programme Outcomes (POs). In this context, it is essential that all teachers should be trained in this area so that they plan and implement the various courses integrating the concept of sustainable development and environmental ethics. This will help in achieving the programme outcome PO-7 of Engineering Undergraduate Programme i.e. *'Environment and sustainability':* Students should *'understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development'*. Although the term 'Sustainable Development' has become popular yet fiercely queried by professionals due to its vagueness. Jonathon Porritt, past Chairman of the UK Sustainable Development Commission said, 'Sustainable development is a notoriously slippery term that can mean practically nothing to people, or practically everything'. It therefore becomes imperative to go through various definitions to focus on that is applicable in technical education system, as discussed in this lesson.

2.0   SUSTAINABLE DEVELOPMENT

The concept of sustainable development is on a high note the world over and is also on the international development agenda, enshrined in the Sustainable Development Goals (SDGs) and the 2030 Agenda for Sustainable Development. Since, September 2015, this concept has entered into almost every sector of the economy and has now become ubiquitous. In one form or the other sustainable development and sustainability is one of the themes in majority of international conferences, country reports, company manuals and advertisements of products and utilities such as cars, appliances, energy production, consumer goods and other places.
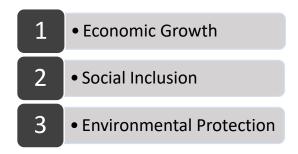
The most quoted definition of 'sustainable development' is from Brundtland Report (WCED, 1987) which says *'Sustainable development is that which meets the needs of the present without compromising the ability of future generations to meet their own needs'.* This definition was commented by many authors due to its limitation towards the human needs and wants mainly social and economic needs in nature. Moreover, it does not mention

explicitly about the natural environment. However, the report as a whole makes it clear that these 'needs' include the conservation of the natural environment (Daley).

According to Diesendorf, *Sustainable development comprises types of economic and social development which protect and enhance the natural environment and social equity.* This definition conveys explicitly about three aspects: economic, ecological, and social with emphasis on ecological and social equity (Diesendorf, 2000). In other words, social and economic development is sustainable, provided that it protects and enhances the environment and social equity.

According to Ben Daley, *sustainable development is the critical relationship between environment and development, as well as the choices we make – collectively and individually – about these things, and this is at the heart of what sustainable development is about*. The first definition quoted in Brundtland report does not explicitly mention about role of economic, social and environmental factors towards sustainable development. Whereas, these are mentioned explicitly in the other two. All the above three definitions emphasize on two problems faced by humans viz. global poverty (social and economic) and global environmental change. These two issues led to the emergence of the idea about sustainable development. Thus, development that focuses on social and economic aspects together with environment must be considered together for promoting sustainable development.

To summarise what has been discussed so far, it is essential that for Sustainable Development in any sector of economy whether education, energy, housing, transport and others, government and private planners and implementers, need to focus on the three interconnected elements within their sector. These are ***economic growth***, ***social inclusion*** and ***environmental protection***. Integrated actions taken in this direction will help in reducing poverty, inequality and climate change.

1	• Economic Growth
2	• Social Inclusion
3	• Environmental Protection

Thus sustainable development may be defined as a process in which an organization, group of organizations or individuals plan and implement their course of actions in all forms of work for economic, social and environment development. Development in any one of these whether positive or negative will usually have a *knock-on effect* on the other two elements. So, for 'sustainable development', proper balance between social, economic and environment

is essential. In real sense, it is difficult to achieve but, not impossible. Engineering education can play a key role in promoting and understanding the issue of sustainable development through its various courses being offered to students.

3.0   INTEGRATING CONCEPT OF SUSTAINABLE DEVELOPMENT IN ENGINEERING EDUCATION

In order to make the engineering education meaningful and responsive, it is now necessary to adopt a transformative learning approach together with an adaptive process that equips students with new knowledge and also promotes new ways of thinking. This is essential, when they are working on real life problems in laboratories, projects and during internship and providing sustainable solutions that are economically viable, socially relevant and environmentally friendly. It is therefore your responsibility to promote such learning skills among your students which are resilient in the sense that they fulfil the demands of future as well. Alvin Toffler says, '*The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.' So prepare your students for the future, where they can apply the skills already learned, remain ready to learn the new skills and unlearn the skills that are not relevant'*.

4.0   SUSTAINABLE DEVELOPMENT GOALS

Sustainable Development Goals (SDGs) were adopted by the United Nations General Assembly in September 2015, with the 2030 Agenda for Sustainable Development. There are 17 Sustainable Development Goals (SDGs), which are an indivisible set of global priorities that incorporate economic, social and environmental aspects and recognise their inter-linkages in achieving sustainable development. Following is the list of 17 SDGs. Brief description about these can be read by accessing :

https://www.undp.org/content/dam/undp/library/corporate/brochure/SDGs_Booklet_Web_En.pdf

GOAL 1:	No Poverty
GOAL 2:	Zero Hunger
GOAL 3:	Good Health and Well-being
GOAL 4:	Quality Education
GOAL 5:	Gender Equality
GOAL 6:	Clean Water and Sanitation
GOAL 7:	Affordable and Clean Energy
GOAL 8:	Decent Work and Economic Growth
GOAL 9:	Industry, Innovation and Infrastructure
GOAL 10:	Reduced Inequality
GOAL 11:	Sustainable Cities and Communities
GOAL 12:	Responsible Consumption and Production
GOAL 13:	Climate Action
GOAL 14:	Life Below Water

GOAL 15:   Life on Land

GOAL 16:   Peace and Justice Strong Institutions

GOAL 17:   Partnerships to achieve the Goal.

The purpose of including 17 SDGs in this lesson is for identification of the course relevant micro and major projects for engineering students that are in some way associated with these 17 integrated SDGs and 169 associated targets. A brief outline of these is given in Annexure A. Make your students aware of these goals and associated targets so that they start thinking and appreciate the need for sustainable development and contributing in this direction.

Activity - 1

A suggestive list of topics that has potential to address issue of sustainable development in engineering education is given. Prepare a write up of maximum 600 words (on 3 topics) covering economic, social and environment aspects for inclusion of these in the course curriculum. You may even add new topics of your choice.

     a) Sector specific design solutions

     b) Ethical considerations

     c) Transportation

     d) Construction

     e) Energy solutions

     f) Recycling

     g) Waste Management

     h) Rainwater conservation.

5.0   ENVIRONMENTAL ETHICS

The fast depletion of natural resources, extinction of species, habitat destruction, climate change is the cumulative effect of impact of modern technology, population growth and increased consumption. These are detrimental to humans having dependency on environment. One of the major concerns of educationist today is that the young generation is drifting away from nature and is willingly engrossed in non-human materialistic world. The need for environmental ethics in engineering education has been felt so as to bring changes in young minds in making decisions about interaction with the natural environment. Most of the choices made by human have ecological repercussions like choice of food, mode of travel, recreation practice, type of home, waste disposal practice, energy usage, family size (number of children) and many more.

At this stage, you might be wondering why focus now is shifted to *environmental ethics* from ethics, in general, which were discussed in preceding lessons. The purpose of including this is 'Environmental Ethics' to include non-human world as well, as they surpass the traditional boundaries of ethics (which solely include humans). Holmes Rolston III pointed that environmental ethics stretches *Classical Ethics* to its breaking point. By *Classical Ethics* Rolston

means system of morality that apply only to humans and such ethical systems are A*nthropocentric.* Environmental ethics go beyond humans (anthropocentric) to include the moral concerns for other mammals, perhaps lower animals and plants (biocentric) and finally even entire ecosystem (ecocentric) (Gudrof & Huchingson, 2010).

If you consider that only humans have intrinsic value, then it is known as anthropocentric environmental ethics. If non-human animals and plants are considered to have intrinsic value, then it is biocentric environmental ethics and when you consider that biological and ecological entities have intrinsic value then this is eco-centric environmental ethics.

Environmental ethics thus broadly relates to value of nature and ecological relationship covering ethical significance for non-living (e.g., landscape); living but not sentient, i.e. having feelings (e.g., plant); sentient but not human (e.g., animal); and collectives (e.g., species and ecosystems); [Sandler, 2018]. Thus, *environmental ethics* may be considered as a bigger umbrella within which inter-personal ethics is one component.

It is the ethical belief, that humans alone possess intrinsic value. In contra-perspective, all other beings hold value only in their ability to serve humans, or possess instrumental value. This is not true in all circumstances. The *instrumental value* is the value of things as means to further serve some other ends. Whereas, the intrinsic value is the value of things as ends in themselves. Intrinsic value is a non-relational property i.e. its value depends on the existence of nothing else. For example, a certain wild plant may have instrumental value because it provides the ingredients for some medicine or as an aesthetic object for human. But if the plant also has some value in itself then the plant also has intrinsic value. When something has intrinsic value, then it is moral duty to protect it or at least refrain from damaging it.

Now think about the earth or other living forms. In your opinion whether these have intrinsic value or instrumental value. If you consider that the earth also has intrinsic value, then you have a moral duty and obligation towards it, independent of its usefulness. Philosopher Richard Routley devised a 'Thought Experiment', which is referred to as the *'Last Person Experiment'*. Now read the Last Person Experiment given in the Activity-2.

Activity – 2
Last Person Experiment

Select five colleagues, students or friends who can spare about thirty to forty-five minutes for this activity. You read the activity to them:
Imagine an Earth where everyone has died except for one man. Before this man dies, he goes on eliminating animals, plants and every living thing he can. In your opinion has he done anything morally wrong or objectionable. If you were the last man, then how you would have reacted in this situation.
Observe how the different persons react and answer differently. Discuss with peers.

6.0   SUMMARY

In this lesson, brief description about the concept of sustainable development, outline of 17 Sustainable Development Goals (SDGs), 169 associated targets and concept of environmental ethics have been discussed. This will help you in identification of projects and tasks that need to be given to students. Focus of tasks and projects should channelize the thinking of students while working on these, towards sustainable development comprising of social, economic and environment aspects. You can also plan for *Thought Experiments* which will help in development of environmental ethics.
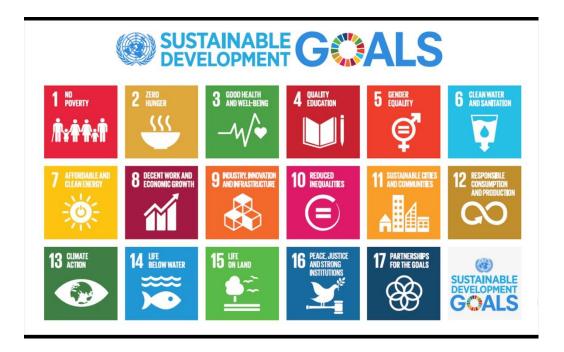
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BIBLIOGRAPHY

[1]   Daley, B. (n.d.). Understanding Sustainable Development. London: Centre for Development, Environment and Policy, University of London.

[2]   Diesendorf, M. (2000). Chapter 2 Sustainability and Sustainable Development. In The Corporate Challenge of 21st Century (pp. 19-37). Epping NSW Australia: Sustainability Centre Pty Ltd.

[3]   Gudrof, C. E., & Huchingson, J. E. (2010). Boundaries - A Casebook in Environmental Ethics . Washington D C: Georgetown University Press .

[4]   Sandler, R. L. (2018). Environmental Ethics Theory in Practice. New York: Oxford University Press.

[5]   Sustainable Development Goal Knowledge Platform. (n.d.). Retrieved from Transforming our world: the 2030 Agenda for Sustainable Development: https://sustainabledevelopment.un.org/post2015/transformingourworld

17 GOALS IN TRANSFORMING OUR WORLD:

The 2030 Agenda for Sustainable Development

Reference: https://sustainabledevelopment.un.org/post2015/transformingourworld

Goal 1. End poverty in all its forms everywhere

1.1. By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day

1.2. By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

1.3. Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.

1.4. By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including micro-finance.

1a. By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

1b. Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions.

1c. Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions.

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

2.1. By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.

2.2. By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.

2.3. By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.

2.4. By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

2.5. By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.

2a. Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries.

2b. Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round.

2c. Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

Goal 3. Ensure healthy lives and promote well-being for all at all ages

3.1. By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births.

3.2. By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.

3.3. By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

3.4. By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.

3.5. Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.

3.6. By 2020, halve the number of global deaths and injuries from road traffic accidents.

3.7. By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes.

3.8. Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

3.9. By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

3a. Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate.

3b. Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all.

3c. Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States.

3d. Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

4.1. By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

4.2. By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.

4.3. By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

4.4. By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

4.5. By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

4.6. By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.

4.7. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

4a. Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

4b. By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries.

4c. By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

Goal 5. Achieve gender equality and empower all women and girls

5.1. End all forms of discrimination against all women and girls everywhere.

5.2. Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation.

5.3. Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation.

5.4. Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.

5.5. Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

5a. Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences.5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.

5b. Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women.

5c. Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels.

Goal 6. Ensure availability and sustainable management of water and sanitation for all

6.1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

6.2. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

6.3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

6.4. By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

6.5. By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.

6.6. By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

6a. By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

6b. Support and strengthen the participation of local communities in improving water and sanitation management.

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

7.1. By 2030, ensure universal access to affordable, reliable and modern energy services.

7.2. By 2030, increase substantially the share of renewable energy in the global energy mix.

7.3. By 2030, double the global rate of improvement in energy efficiency.

7a. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.

7b. By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

8.1. Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries.

8.2. Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.

8.3. Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.

8.4. Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.

8.5. By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

8.6. By 2020, substantially reduce the proportion of youth not in employment, education or training.

8.7. Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms.

8.8. Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.

8.9. By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.

8.10.   Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.

8a.   Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade-Related Technical Assistance to Least Developed Countries.

8b.   By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

9.1. Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

9.2. Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries.

9.3. Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.

9.4. By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

9.5. Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.

9a. Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.

9b. Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.

9c. Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.

Goal 10. Reduce inequality within and among countries

10.1. By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average.

10.2. By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.

10.3. Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard.

10.4. Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.

10.5. Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations.

10.6. Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions.

10.7. Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies.

10a. Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements.

10b. Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes.

10c. By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent.

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

11.1. By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

11.2. By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

11.3. By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

11.4. Strengthen efforts to protect and safeguard the world's cultural and natural heritage.

11.5. By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

11.6. By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

11.7. By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

11a. Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.

11b. By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.

11c. Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

Goal 12. Ensure sustainable consumption and production patterns

12.1. Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

12.2. By 2030, achieve the sustainable management and efficient use of natural resources.

12.3. By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

12.4. By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

12.5. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

12.6. Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

12.7. Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

12.8. By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

12a. Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.

12b. Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.

12c. Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.

Goal 13. Take urgent action to combat climate change and its impacts*

13.1. Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

13.2. Integrate climate change measures into national policies, strategies and planning.

13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

13a. Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible.

13b. Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

14.1. By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

14.2. By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

14.3. Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.

14.4. By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.

14.5. By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.

14.6. By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least

developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation.

14.7. By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.

13a. Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries.

13b. Provide access for small-scale artisanal fishers to marine resources and markets.

13c. Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want.

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

15.1. By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

15.2. By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

15.3. By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

15.4. By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.

15.5. Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

15.6. Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed.

15.7. Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.

15.8. By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.

15.9. By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.

15a.   Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

15b.   Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.

15c.   Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

16.1. Significantly reduce all forms of violence and related death rates everywhere.

16.2. End abuse, exploitation, trafficking and all forms of violence against and torture of children.

16.3. Promote the rule of law at the national and international levels and ensure equal access to justice for all.

16.4. By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime.

16.5. Substantially reduce corruption and bribery in all their forms.

16.6. Develop effective, accountable and transparent institutions at all levels.

16.7. Ensure responsive, inclusive, participatory and representative decision-making at all levels.

16.8. Broaden and strengthen the participation of developing countries in the institutions of global governance.

16.9. By 2030, provide legal identity for all, including birth registration.

16.10. Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements.

15a.   Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime.

15b.   Promote and enforce non-discriminatory laws and policies for sustainable development.

Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development Finance

17.1. Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection.

17.2. Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of ODA/GNI to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries.

17.3. Mobilize additional financial resources for developing countries from multiple sources.

17.4. Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress.

17.5. Adopt and implement investment promotion regimes for least developed countries.

Technology

17.6. Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism.

17.7. Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed.

17.8. Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology.

Capacity-building

17.9. Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation.

Trade

17.10. Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda

17.11. Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020

17.12. Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access.

Systemic issues

Policy and institutional coherence

17.13. Enhance global macroeconomic stability, including through policy coordination and policy coherence.

17.14. Enhance policy coherence for sustainable development.

17.15. Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development.

Multi-stakeholder partnerships

17.16. Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries.

17.17. Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.

Data, monitoring and accountability

17.18. By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts.

17.19. By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries.

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