IEM Journal September 2025

Call for Papers

How Engineers Advance the SDGs

IEM Journal September 2025

Call for Papers

How Engineers Advance the SDGs

The Engineering profession serves the community, in many ways, fire fighting, if need be, to operate infrastructure daily. Can we improve the approach or technology used? Are new thinking, new approaches applicable to the development of Mauritius?

The 2030 Agenda for Sustainable Development was adopted at the seventieth session of the General Assembly of the United Nations, held on 25 September 2015. The goals that were developed are elaborated further below.

For the forthcoming issue of the IEM Journal, we invite contributions on the theme '**How Engineers Advance the SDGs**' within the context of planning and operation and management for the future. Many engineers have probably brainstormed about possible developments for the future of Mauritius. Why not share them through the IEM Journal! It is our duty and mission to advise society including the authorities, the government on societal problems and propose solutions. It is important that nobody should be able to point fingers at the Engineering profession by saying that "You proposed Nothing!!"

We encourage engineers and scholars to submit work which showcases the achievements and exciting innovations being generated across the world (and Mauritius) where engineers have contributed to the economic, social and environmental development of the country.

Target Dates

Abstract submission (300 words):	13 June 2025
Draft paper submission	16 July 2025
Final paper submission (maximum of 6,000 words):	31 July 2025
Publication of the IEM Journal:	13 September 2025

Contributions with details of the author(s) should be sent to the Chief Editor by email on the address below.
The Editorial Committee reserves the right not to publish or to edit, in consultation with the authors, any contribution received.

Dr Virendra Proag
Chief Editor, IEM Journal
Tel: +230 454 3065
Email: virenproag@gmail.com

We welcome abstracts (300 words) and full-length papers (maximum 6,000 words).
You will find some background material on SDGs in the following pages.

Submission guidelines

- Times New Roman 12pt, single spacing
- Include a separate one-page document with author details
- Harvard style referencing
- No changes in the paper title, abstract, authorship, etc. after the submission deadline
- All papers will be double-blind reviewed

Table 1: The Sustainable Development Goals (SDGs)

Goal	Brief Description
1	End poverty in all its forms everywhere
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
3	Ensure healthy lives and promote well-being for all at all ages
4	Ensure inclusive and quality education for all and promote lifelong learning
5	Achieve gender equality and empower all women and girls
6	Ensure access to water and sanitation for all
7	Ensure access to affordable, reliable, sustainable, and modern energy for all
8	Promote inclusive and sustainable economic growth, employment, and decent work for all
9	Build resilient infrastructure, promote sustainable industrialization, and foster innovation
10	Reduce inequality within and among countries
11	Make cities inclusive, safe, resilient, and sustainable
12	Ensure sustainable consumption and production patterns
13	Take urgent action to combat climate change and its impacts
14	Conserve and sustainably use the oceans, seas, and marine resources
15	Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
16	Promote just, peaceful, and inclusive societies
17	Revitalize the global partnership for sustainable development

Goal 1: End poverty in all its forms everywhere

Although extreme poverty rates have been reduced drastically since the beginning of this century, some 15-20% of people in developing regions still have to manage with less than $2 daily. Some more millions of people have barely more than this daily amount, notwithstanding that many people risk falling back into poverty.

Poverty is not just a lack of income and resources to support a sustainable livelihood. Poverty manifests itself through also hunger and malnutrition, little or no access to education and some other elementary services, societal discrimination and marginalization as well as being unable to participate in decision-making. Sustainable jobs and equality can only be promoted when economic growth is inclusive.

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

Is food grown, shared and consumed in a proper way? If properly practiced, agriculture, forestry and fisheries should be able to provide sufficient nutritious food for everybody and generate reasonable incomes, while encouraging people-centred rural expansion and protection of the environment.

Presently, soils, freshwater systems, forests, oceans, and biodiversity are being quickly degraded. Climate change is affecting even further the resources we depend on, producing further risks linked with weather extremes such as droughts and floods. Many rural people can no longer earn a living on their land, compelling them to move to cities looking for opportunities.

Thus, a deep change of the global food production and agriculture system is required if we wish to nourish today's 800 million hungry people and the 2 billion more persons anticipated by 2050. Core solutions for development are available in the food and agriculture sector, which is a central hub for hunger and poverty eradication.

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

Safeguarding a healthy life style and encouraging the well-being of everybody at all ages is necessary for sustainable development. Important strides have helped to increase life expectancy and reduce some of the usual killers linked to infant and maternal mortality. Significant progress has been achieved to improve access to clean, potable water and sanitation, to reduce malaria, tuberculosis, polio and to minimise the risks of HIV/AIDS. However, much more effort is required to totally eliminate a wide variety of diseases and tackle many different tenacious and emergent health problems.

Goal 4: Ensure inclusive and quality education for all and promote lifelong learning

Getting a quality education immediately improves people's lives and provides the stepping stone to sustainable development. There has been much progress to improve, at all stages, access to education and to increase school enrolment rates, in particular, for women and girls. Although this has increased basic literacy skills considerably, more efforts are required to achieve greater strides reach universal education goals. For example, although gender equality has been achieved in primary education, few countries have reached that target at all education levels.

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

Apart from forming part of fundamental human rights, gender equality is necessary to maintain peace, prosperity within a sustainable world. The Millennium Development Goals has enabled much progress towards this end. However, the feminine gender still suffers violence and discrimination in every country. Does part of the problem lie in men's inability to talk as easily and fluently as women during an argument?

Providing both genders with similar access to education, reasonable pay for equal work, health care, and participation in political and economic democratic forums will energise sustainable economies and generally help societies and humanity.

Goal 6: Ensure access to water and sanitation for all

Access to clean and potable water to everybody is important for everybody in the world. There is enough fresh water available to achieve this. However, because of inadequate infrastructure or poor economics, several millions of people, in particular children, die yearly, from diseases linked with improper hygiene arising from inadequate available water and sanitation facilities.

Lack of water, or poor water quality, together with inadequate sanitation already affect food security negatively. Furthermore, across countries, this limits livelihood choices and opportunities for education in poor families. In some of the world's poorest countries, drought occurrence further worsens the problems of hunger and malnutrition. It is likely that by 2050, at least 25 % of people will be living in countries affected by regular shortages of fresh water.

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

What happens in today's world when there is a power cut? All daily activities depend on energy being available, be it for jobs, food production, security. Whether to generate more income, or to tackle climate change impacts, access to energy for everybody is vital.

Access to modern energy services, improved efficiency and increase availability and use of renewable sources would an important step towards creating a better social welfare.

Goal 8: Promote inclusive and sustainable economic growth, employment, and decent work for all

About 50 % of the world's population still survives on the daily equivalent of about US $2. Unfortunately, even having a job does not ensure escaping from poverty. It is therefore essential for societies to rethink and update our economic and social models designed for poverty eradication.

A continuous dearth of reasonable work opportunities, inadequate investments and under-

consumption entail an erosion of the fundamental social contract essential to democratic societies: that all must participate in progress. Creating quality jobs will continue to be the main challenge for nearly all economies, well beyond this decade.
A sustainable economic growth implies that societies need to create the basic conditions that permit people to work in quality jobs that kindle the economy without harming the environment. Job prospects and reasonable working conditions are also needed for the entire working age population.

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

Infrastructure investments - transport, information and communication technology, irrigation, and energy, *inter alia* - are crucial to accomplish sustainable development and empower communities in many countries. There is certainly a link between productivity growth, incomes and infrastructure investments which also enhance improvements in health and education.
Inclusive development is a basic income generator which permits rapid and sustained improvements in standards of living for all people, and offers the technological possibilities to accelerate environmentally sound industrial development.
Technological progress may help to attain environmental objectives, for example, increased resource and energy-efficiency. Development can only happen through industrialization encouraged by technology and innovation.

Goal 10: Reduce inequality within and among countries

International aid has benefited many countries by helping them to lift people out of poverty. Vulnerable nations, such as SIDS, landlocked developing countries, and the LDCs (the least developed countries) have not stopped their progress towards poverty reduction. None the less, inequality still continues and access to health, education facilities, and other infrastructure services still show some large disparities.
However, although globalization may have reduced income inequality between countries, it has not always done so within the countries. If economic growth is not inclusive, nor involves the three sustainable development pillars - economic, social and environmental aspects - it will not suffice in reducing poverty.
Inequality can only be reduced if policies apply universal principle giving due attention to the requirements of underprivileged and ostracized persons.

Goal 11: Make cities inclusive, safe, resilient, and sustainable

Villages grow into towns and cities by becoming production centres, commercial, and cultural hubs for ideas, science, social development and so much more. At their apogee, cities have empowered people to progress socially and economically.
However, many challenges hinder maintaining cities on the way to prosperity through job creation, without stressing land and resources. Typical urban challenges comprise congestion, a scarcity of funds to offer basic services, a lack of proper housing and deteriorating or insufficient infrastructure.
Cities can face the challenges in several ways that permit them to continue to flourish and blossom, while refining resource use and decreasing pollution and poverty. The future we wish for, most probably, includes cities with opportunities for everybody, with access to all the basic infrastructure services, as a minimum.

Goal 12: Ensure sustainable consumption and production patterns

Sustainable consumption and production tries to stimulate resource and energy efficiency, allow access to basic services and encourage sustainable infrastructure services, create green and reasonable jobs and generating a better standard of living for everybody. Its realization helps to accomplish overall development plans, to decrease economic, environmental and social costs in

the future, to reinforce economic competitiveness and to diminish poverty.
Sustainable consumption and production tries to "do more and better with less", to increase net welfare benefits from economic activities by decreasing resource use, deterioration and pollution along the entire lifecycle, while improving the quality of life. Overall, different stakeholders are concerned, comprising, *inter alia*, policy makers, researchers, scientists, business, retailers, media, consumers, and development cooperation agencies.
The different actors - from producer to final consumer - functioning in the supply chain, should also use a systemic approach and cooperate. Consumers need to be engaged through raising their awareness, by educating on sustainable consumption and lifestyles, providing them with sufficient information through standards and labeling practices and informing them on sustainable public procurement rules, etc.

Goal 13: Take urgent action to combat climate change and its impacts
Climate has been changing over millennia. However, during the last few decades, the change has been more visible in its extreme impacts - hurricanes, droughts or floods - affecting most countries and their economies, and affecting infrastructure assets or services negatively, for more years to come.
People are feeling the impacts and undergoing the profound effects of climate change, which comprise modified weather patterns, sea levels rising more quickly, and more weather events with sharper extremes. Greenhouse gas emissions arising from human activities seem to be the driving force behind climate change and, do not show any signs to decrease. If there is no corrective action, daily temperatures are likely to increase by some 3 degrees Celsius this century. Once again, the most affected are the poorest and most vulnerable people.
Countries can, not only access, but even leapfrog to better, more resilient economies through affordable, scalable technological solutions.. The rate of change is accelerating as more people turn towards renewable energy and a variety of other measures that should reduce emissions and improve adaptation efforts.
However, climate change is not limited to national borders, but represents a global challenge. Emissions (natural from volcanoes, man made from human activities) from anywhere can upset and harm people everywhere. Solutions to such an issue require international level coordination and needs international cooperation to assist developing countries transit towards a low-carbon economy.
There have been several international conferences and Agreements at international level, with mitigated success, sometimes with disagreements from important groups of people (America, India, China, etc.). Is it possible to go blindly towards danger without taking any corrective action?

Goal 14: Conserve and sustainably use the oceans, seas, and marine resources
The world's oceans - sea currents, tidal movements, fish life, their chemistry and temperatures - provide the driving systems making the planet Earth habitable and its climatic variations.
Our climate, changing weather patterns, coastlines, rainwater, drinking water, an important fraction of our food, and the atmosphere's oxygen that we inhale, are all ultimately supplied and regulated by the sea. Throughout history, the oceans and seas have served as important routes for trade and transportation, and are an essential resource that requires sustainable management.

Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
Forests cover nearly one third of the Earth's surface, and further to providing shelter and ensuring food security, forests play a critical role in mitigating climate change, biodiversity protection and safeguarding the habitat of the indigenous population. Every year, some 130,000 km^2 of forests are being lost while the consistent deterioration of drylands has entailed the desertification of 36 million km^2.

Certainly, deforestation and desertification - produced by human activity and climatic change - present significant challenges to sustainable development, while negatively influencing the livelihoods of millions of people in the battle against poverty. Efforts have been made and are still ongoing to manage forests and fight desertification.

Goal 16: Promote just, peaceful, and inclusive societies

This goal tries (1) to promote peaceful and inclusive societies to encourage sustainable development, (2) to provide easy access to justice for everybody, and (3) to build accountable and effective institutions at all levels.

"If you want peace, prepare for war." People can learn karate as a means to exercise, or as a means of self-defense should they be attacked. So long as countries adopt this attitude, there is no reason why this goal could not be attained. But history has rarely shown us a period, when there was no war, between at least two countries, going on.

Goal 17: Revitalize the global partnership for sustainable development

The success of sustainable development agenda heavily depends on partnerships between governments, the private sector and civil society. These inclusive partnerships erected upon principles and values, a common vision, and collective goals that are centred on people and the planet are necessary at the local, national, regional and global level.

The objectives of sustainable development are known. Money in terms of trillions of dollars (1 trillion = a million million) of private resources can be raised. However, urgent action is required to mobilize, redirect and unlock this potential.

These substantial private resources can help in ensuring long-term investments for developing countries, particularly in critical sectors comprising sustainable energy, transport infrastructure services, and information and communications technologies.

The public sector will require establishing a clear direction in order to appeal to such investors for reinforcing sustainable development, with new models for reviewing and monitoring frameworks, new regulations and motivating structures that support such investments. It will be necessary to brace national overviewing mechanisms such as supreme audit institutions and supervisory functions by legislatures.

USING INFRASTRUCTURE TO ACHIEVE SDGs

Table 2 lists the facilities that infrastructure can provide. When a child is born, the baby comes with all the organs necessary for a complete and proper functioning of the body. As the child grows up, the different organs of the body grow in size, such that there is no need to add any extra component, as would happen when somebody wishes to add a room to enlarge his house, etc.

It would indeed be wonderful, if it were possible to design a town which can grow up, a bit in the same way, as a body - it would be necessary to add rooms or buildings, or enlarge/increase the existing infrastructure asset - provided that some prior planning had been carried out, and the necessary space, already provided for.

Thus, when we examine the **Sustainable Development Goals**, there are very few which have no link at all with infrastructure. (Compare Tables 1 and 2).

The planning should, therefore, include having a vision which encompasses the **Sustainable Development Goals** and devote the necessary time and technical staff to move forward towards implementation, bearing in mind the pitfalls that other nations have suffered in the past.

Table 2: Different categories of infrastructure in a country

Category	Details
Agriculture	Different crops cultivated Irrigation systems
Buildings	Materials, new environmentally friendly building material and method of construction Public and private buildings (hospitals, fire stations, prisons, schools, government offices, police stations, car park structures) Other buildings (public, residential, commercial, multipurpose complexes) Public and private housing facilities Industrial, manufacturing, warehousing and supply chain facilities Propose that all future buildings should be self sufficient in terms of water and energy security.
Communication	Telecommunication networks (land telephone/optic fibre networks, telephone exchange stations, transmission towers) Cable television networks Wireless/satellite networks Information technology (IT) infrastructure networks: (cable distribution, computer networks, backup and recording mediums, cloud computing infrastructure).
Education	Primary and secondary schools, universities, other training institutions Value of OBEs; benchmarking with international standards, train for mobility
Energy	Hydroelectric plants (turbines, penstock, surge tower) Thermal plants (gas, oil, coal fuelled power generation), nuclear Gas pipelines (gas production at landfills, storage tanks) Petroleum/oil distribution (pumping stations, truck/pipe transport, storage tanks) Renewable energy (infrastructure for solar power, wind power, biofuels) Electric power distribution grid networks
Health	Public and private health facilities (hospitals, clinics) Teaching and Research hospitals Private nursing homes
Housing	Houses, apartments; where to build? Should we not stop building on fertile agricultural lend? Should we not build on marginal land?
Industry	Factories, equipment, logistics, industrial estates for specific purposes with appropriate infrastructures.
Recreation	Parks and playgrounds, recreational facilities, swimming pools, picnic areas National monuments and Icons Lake and water sports, fishing facilities Theme parks, restaurants, security facilities, casinos
Tourism	Hotels, transport and recreation facilities (fun parks, safari tours, ecotourism)
Transportation	Vehicles, bridges and tunnels, access roads. parking areas Airports, helipads, air traffic control, ground facilities, Seaports, dry docks Mass transit (monorail, trams, bus, platforms, stations) Coherent policies to encourage use of public transport. Use of economic instruments to enhance use of public transport
Waste Management	Solid waste (transport, landfills, transfer stations, recycling facilities) Minimising, Separation and collection of waste at source. Pros and Cons of Incineration of waste to produce energy? Hazardous waste (transport, storage facilities, treatment plants, security) Nuclear/radioactive waste(transport, storage facilities, security)
Water Security Safe disposal Wastewater	Water supply (pumping stations, treatment plants, service reservoirs, trunk mains, boreholes, mechanical/electrical equipment) Structures (weirs, dams, impounding reservoirs, tunnels, aqueducts) Irrigation water distribution (rivers, canals, weirs, gates) Sewerage (sewerage pipes, septic tanks, treatment plants) Stormwater drains (roadside gutters and drains, canals)