

# **CIRCULAR ECONOMY**

## **KEY TO SUSTAINABLE DEVELOPMENT**

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## **Sustainable Development and Environment**

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Anamika Nisha Runda\*

### **Introduction**

The economic development that we have attained so far has come at a very huge price- at the cost of deterioration of natural assets. As we move towards globalization, development and higher economic growth, we have to face unfavourable outcomes of the past path of development on our environment and deliberately go for sustainable development. Sustainable development is meeting human needs without compromising the integrity and balance of natural resources. It also means finding possible solutions to the problems caused by industrialization and population growth.

Sustainable Development can be done on the environmental, social and economic levels. The challenges faced by humankind such as global warming, water scarcity, inequality, and hunger could be resolved globally. The United Nations approved the 2030 Agenda, which contains the Sustainable Development Goals such as the end of all forms of poverty, quality education, gender equality, sustainable industrialization, use of terrestrial ecosystems can uphold the deterioration of forests, etc., to protect the planet and global well-being of the people.

In India, factors like population boom, industrialization, urbanization, and poverty are to blame for harming nature. Some of the environmental issues prevailing in the country are- Increasing Air pollution, Loss of Biodiversity, No Proper Waste Management, Growing Water Scarcity, etc. The Indian government has taken several measures to protect the environment like Swacch Bharat Abhiyan, Namami Gange Programme, Compensation Afforestation Fund Act and many more. Several measures are taken by the Indian government to put into action the Sustainable Development Goals. To implement these goals NITI Aayog is formed by the Indian government. Various challenges are faced in attaining Sustainable Development Goals in India, some are - defining key indicators, despite India's poverty alleviation, there is a large number of people still living under the poverty line, etc.

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## Sustainable Development

Sustainable development is a notion that first came into existence in 1987 with the publication of the Brundtland Report, giving warnings of the adverse environmental outcome of economic growth and development, and trying to identify possible solutions regarding issues resulting from industrialization and population growth.

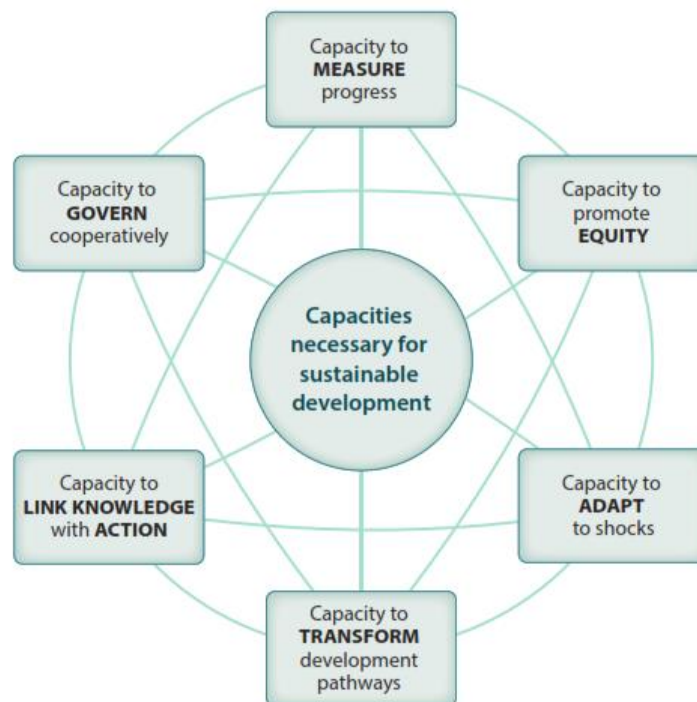
Sustainable development is meeting human developmental goals and sustaining the potential of nature to render the natural resources and services provided by ecosystems on which the economy and humankind depend (Wikipedia, 2022). Sustainable development means meeting the need of the present generation in such a way that the requirements of the future generations are not compromised.

The main features of sustainable development include:

- Increase in per capita income
- Sensible use of natural resources
- Preserving the resources for future generations (Career Launcher, n.d.)

## Requirements for Sustainable Development

Six interdependent capacities are necessary for the successful pursuit of sustainable development-



(Wikipedia, 2022)

**What is Sustainability?**

Sustainability refers to the fulfilment of present requirements ascertaining that the potential requirements of the future generations can be met with ease. In addition to natural assets, society also needs social and economic resources. Sustainability is not limited to environmentalism but it also concerns social equality and economic development (Mcgill).

**Pillars of Sustainability**

- **Environmental Sustainability:** is done at the environmental level, where sustainability ensures protection and rational use of inexhaustible sources of natural resources. Aspects such as safeguarding the environment, investments in inexhaustible energies, saving drinking water, supporting sustainable mobility, and sustainable innovation in construction and architecture, supporting and contributing to achieve this environmental sustainability on multiple fronts (Acciona, 2020).
- **Social Sustainability:** is to promote the development of humankind and society to help attain a reasonable, rational and evenly-distributed quality of life, adequate medical facilities, and education worldwide. The fight for gender equality, especially in developing countries, is another aspect that in the coming years will form the basis of social sustainability.
- **Economic Sustainability:** focuses on economic growth without affecting social, environmental and cultural aspects, and promoting equal distribution of wealth. Investment and fair distribution of the economic resources will reinforce the other pillars of sustainability for complete development (Acciona, 2020).

**How to attain Sustainable Development?**

Humankind is facing many challenges, such as climate breakdown, drinking water scarcity, inequality and hunger, which can be resolved globally and by fostering sustainable development: a promise to social progress, environmental balance, and economic development (Acciona, 2020). As a part of a new sustainable development guideline, the United Nations passed the 2030 Agenda, which contains the Sustainable Development Goals which is a request to protect the world and assurance of global well-being of people. These ordinary goals require the active participation of individuals, businesses, administrations, and nations around the globe (Acciona, 2020).

**Sustainable Development Goals**

- No poverty in any form
- End starvation, attain food security and improved nutrition and encourage sustainable agriculture

- Safeguard healthy lives and encourage well-being for all ages
- Ensure unprejudiced and comprehensive quality education, and incite lifelong learning opportunities for all.
- Accomplish gender equality and empowerment of all women and girls
- Ascertain availability and sustainable management of drinking water and sanitation for everybody
- Ascertain the availability of inexpensive, reliable, sustainable, and advanced energy for everybody
- Promote sustained, comprehensive, and sustainable growth in the economy, productive employment, and adequate work for all
- Build adaptable infrastructure, encourage inclusive and sustainable industrialization, and nurture innovation.
- Minimize unevenness within and among countries
- Provide inclusive, safe, resilient, and sustainable cities and other human settlements
- Ascertain sustainable utilization and production patterns
- Take immediate action to tackle climate change and its impacts
- Conservation and sustainable use of seas, oceans and marine resources for sustainable development
- Protection, restoration, and promotion for sustainable use of terrestrial ecosystems, while sustainably managing forests, combating desertification, termination and rejuvenation of land degradation, and termination of biodiversity loss
- Encourage peaceful and comprehensive societies for sustainable development, provide availability of justice for all, and build effective, responsible, and comprehensive institutions at all levels
- Strengthen the means of implementation and revitalize the global partnership for sustainable development (Career Launcher, n.d.)

### **Sustainable Development and Environmental Problems in India**

Environment: the term 'environment' means the natural surroundings in which we live, which are given to us by our ancestors. It surrounds the interconnection between biotic (the living organisms) and abiotic components (land, air, water.) that exist together to create this natural setting. The environment serves four major functions such as availability of resources, sustenance of life, providing value to life, and proper treatment of waste generated by numerous production and consumption activities.



## **Human Impact on the Environment**

Since all-natural resources are obtained from the environment air, water, and the climate are of special interest. Environmental sustainability needs society to plan human activities in such a way that while meeting human needs we are preserving the life support systems of the planet. An unsustainable condition arises when natural resources are consumed faster than they can be renewed. Sustainability requires human activity to consume natural capital at a pace at which it can be renewed naturally (Wikipedia, 2022).

- **Impact of Agricultural Activities on the Environment:** environmental problems associated with industrial agriculture, and agribusiness are now being addressed through approaches such as sustainable agriculture, organic farming, and more sustainable business practices. Afforestation, sustainable forest management, and reducing deforestation are the most cost-effective options to tackle climate change. On a community level, various groups are working towards sustainable food systems which include less meat consumption, locally produced food, and sustainable and organic gardening.
- **Materials and Waste:** As the global population has increased, so has the affluence and also the use of various materials has increased in volume and diversity. This leads to the huge consumption of raw materials, minerals, and synthetic chemicals including harmful substances, foods, manufactured products and living organisms thereby generating lots of waste.
- Sustainable materials management has chosen the idea of dematerialization, converting the straight path of materials to a circular material flow that reuses materials as many times as possible.
- **Biodiversity and Ecosystem Services:** the human development needs a transformation, including sustainable agriculture, sustainable consumption and waste disposal, fishery quotas and combined water management, preserving natural ecosystems, fire management and soil conservation, and reducing the competition for land all these can create positive impacts on our environment, and contribute to sustainable development.
- **Impacts of Human Consumption and its Management:** the environmental impact of a community depends on both population and impact per person, which means several complex ways on what resources are being consumed and whether those resources are renewable or not. Cautious management of resources can be applied in various aspects, from economic sectors such as manufacturing, agriculture, and industry, to work organizations, patterns of household consumption and individuals, and the demands of resources for individual goods and services.

Sustainable development includes improvements in the quality of lifestyle for many but should also demand a decline in resource consumption (Wikipedia, 2022).

### **Environmental Problems in India**

In India, factors like rapid population growth, poverty, urbanization and industrialization, are the main factors responsible for damaging the environment. Some of the serious environmental problems prevailing in India are-

- Increasing Air Pollution
- Rampant Environmental Degradation
- Loss of Biodiversity
- Rapid Development in the Himalayas
- Absence of Resilience in Ecosystems
- No Proper Waste Management
- Over Consumption of Natural Resources
- Water Shortage

There are many more such problems that are required to tackle to maintain a sustainable environment and establish consistent economic development.

### **Governmental Measures to tackle Environmental Degradation**

Every citizen of the country should come together to safeguard the environment. Governments have a huge responsibility to find solutions to these problems. The government of India has implemented various schemes to protect and conserve the environment. Some of them are as follows:

- Swacch Bharat Abhiyan- is a campaign by the Government of India on the national covering 4041 towns to clean the streets, highways and architecture of the country (ENVIS Centre on Hygiene, Sanitation, Sewage Treatment Systems and Technology, 2022).
- Green Skill Development Programme (GSDP)- by the Ministry of Environment, Forest and Climate Change (MoEF&CC) has taken an initiative for skill development in the environment and forest sector to enable India's young generation to achieve gainful employment or self-employment. This programme develops green skilled workers who are committed to sustainable development and have technical knowledge. This will help in achieving SDGs, Nationally Determined Contributions (NDCs), National Biodiversity Targets (NBTs) and Waste Management Rules as well(2016) (vikaspedia, 2022).
- Compensation Afforestation Fund Act (CAMPA)- provides a suitable institutional mechanism for efficient utilization of forest expeditions and transparent use of forest land diverted for the non-purpose which would impact the diversion of such forest land. CAMPA is also known as Compensatory Afforestation Fund Management and Planning Authority Act (Arise, 2021).

- National River Conservation Programme (NRCP)- is a scheme sponsored by the Central Government and implemented by this Ministry to end the pollution of rivers in India, excluding rivers in the Ganga basin. Under this scheme, technical and financial aid is provided to the States\Union Territories on a cost-sharing basis (Delhi, 2021).

NamamiGange Programme- is a programme launched by the Union Government with the main objective of subsiding pollution, conserving and restoring of National River Ganga (National Mission for Clean Ganga, 2022).

### **Indian Government initiative toward Sustainable Development**

The 65-year-old Planning Commission of India is replaced by NITI Aayog (National Institution for Transforming India) and given the responsibility to implement Sustainable Development Goals in India.

State Governments are also recommended to take a similar route- visioning, planning and budgeting measures to implement SDGs. And State Government should also form implementation and monitoring systems for state-sponsored schemes. Furthermore, the Ministry of Statistics and Programme Implementation (MOSPI) is constructing key indicators to observe the implementation of SDGs. In 2015 the United Nations with other countries adopted SDGs, the Indian government then launched various schemes that are at the epicenter of SDGs. Some of the schemes are Skill India, Swachh Bharat Mission, Digital India, Make in India, etc.

### **Challenges in Implementing SDGs for India**

India is facing four major challenges in implementing SDGs, which are mentioned below:

- Defining the key indicators- one of the major hardships for India is to formulate suitable indicators to monitor the progress of SDGs. The problem of hunger, poverty, the inadequacy of drinking water, and education need to be amended to effectively implement the SDGs.
- Financial Sustainable Development Goals- despite India's best efforts in poverty alleviation which was a priority since the Fourth 5-year plan. Still the highest number of people living below the poverty line because of insufficient funds which obstruct the progress of attaining SDGs.
- Observing the implementation process- NITI Aayog is formed to take ownership of the implementation process and to monitor and coordinate the progress of SDGs, the members of the Aayog have expressed their concerns over time about the limited personnel to handle Herculean task.
- Measuring the progress- the government of India has acknowledged the non-availability of data, especially from the territorial division. Insufficient administrative data is another factor that has hindered the measurement of the progress of SDGs.

## Conclusion

Economic development aims at increasing the production of goods and services to fulfil the needs of a rising population, putting great pressure on the environment. In the early stage of development, the demand for natural resources was less than the supply. Now the world is facing increased demand for natural resources but the supply is limited. This is due to overdose and misuse of natural resources. Sustainable development focuses on encouraging the kind of development that reduces environmental issues and fulfil the present requirements ascertaining that the potential requirements of the future generations can be met with ease.

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## **Waste Management & Circular Economy**

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Dr. Sneha Suman\*

### **Introduction**

Every year, ninety trillion kilos of main tools are extracted and used over the world, with just 9% being recycled. While this is frequently unsustainable, the goal of make-take-dispose consumer initiative has a lot of negative consequences for human health, change in climate, and the environment.

The word circular economy has long been known and recognized as a very important and critical opportunity of business or an organization or a Nation, that will continue to support the development of new sectors and jobs, therefore lowering greenhouse gas emissions and constantly increasing the efficiency of valuable resources which we have got for free from nature. The circular economy strengthens the entire economy by increasing resource utility and applying the disc form concept across production and consumption.

### **Main Content**

*We are going to discuss about the issues, the drawbacks, how they process and about the performance of the circular economy along with waste management.*

*Circular economy is a new type of methodology that helps in thinking about the betterment of natural resources. It is important as well as necessary to take care of our natural resources as we have to not only be selfish and think about us but also for the upcoming generation that is going to be there in future and who will be eagerly needing this all-natural resources. Let us see what are the issues in the economic sector that needs to be resolved.*

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- **Issues**

- The physical growth of the economy is formed by the resources of tools. They have a lot of differences specifically related to physical and chemical as well as quantity and cost to countries.
- Economic growth normally entails and takes an increase in demand and requirement for the products and materials along with some other natural resources, as well as an increase in the number of tools that becomes trash if not effectively handled.
- The raw materials that we use are derived from our beautiful nature and its natural resources, as well as the related creation and utilization processes, has negative ecological, financial, and social results in nations and past public boundaries.
- The magnitude along with the goals and aims are determined by the type and quantity of the resources and technologies utilized, level of the natural resource and their stage at which they are showing up, the unique and different ways by which fabric resources are used, and other factors.

- **Drawbacks**

The key disadvantage is that it is more difficult to improve resource potency and production, also to ensure and make them believe that tools are consumed quickly at all the levels and stages of their whole process of lifecycle and across the supply chain. This necessitates have increased the area of scope of managing the waste policy according to the waste levels and hierarchy, which ranks and orders the waste and tool management options by arranging them from most popular to least popular.

Strategies of policies for devices, item and synthetic administration, and life-cycle waste and apparatus the board, as well as related arrangements.

Property tool management, property producing, resource potency, and circular economy policies are only a few examples. There are many examples of waste interference like Eco-design, refurbishment, producer responsibility initiatives etc.,

Once we decide to move towards the circular economy, it is actually very critical from many perspectives one being security and the other one environmental point also to provide with the very fundamental thing for a productive and ruthless kind of economy. The plan should be to create a circular economy with better tools and better waste management device for the sake of tackling the problem in environment.

Circular business efforts include recovering sick equipment from many different waste streams for the purpose of use or reuse or repair, extending the life of items, and growing the utilization intensity of all the products and raw materials through contributing economy techniques such as sharing of cars and many more

things to add on. A circular economy always aims and targets to maximize and increase the value of the tools that flows and passes into the system while minimizing tool intake, with special emphasis paid to virgin tools, plastics, chemicals etc.

- **Progress and Performance**

Environmental performance is frequently compared to local goals and commitments as well as international goals and obligations. Goal eight is to "Promote comprehensive and property economic levels as well as processes, employment, and strict work for all," Goal twelve "Make sure property intake and production patterns," and Goal fourteen "Save and economically utilize the seas, oceans, and marine assets for the expansion in the property " are all part of the 2030 Agenda for Property Growth. Directives of the EU Union, choices, and proposals, and thus the urban center Convention, which was updated in 2019 to hide plastic garbage, are among the agreements and laws on waste that has been stated in general and trans frontier movements of dangerous and unbearable waste in the public. Many programmers and procedures are connected to the resource processes and lifecycle, manufacturing of resources, and the way it processes were also implemented.

Complete waste generation and powers; metropolitan waste age generation, forces, recuperation, exercise, and removal shares are all important for squander the board. Tool intake combinations and intensities, tool manufacturing, and tool footprint intensities are all examples of how fabric resources are used.

## **Waste Management**

- **Overview**

Most nations continue and carry their aim as well as goal to create increasing volumes of garbage; however, only a few of them have been really successful in decoupling total waste creation from population and economic processes. Municipal solid waste growth is even more encouraging, as it has suddenly appears to have peaked and raised around the turn of the millennium. An individual who is living in the space makes 520 kg of civil trash each year overall; this was 20 kilos in 1990, yet thirty kilos in 2000. even though the trash is progressively being recovered for work out, land filling stays the essential type of removal in certain countries.

- **Related Growths**

In most nations, total trash generation (i.e., garbage from all sources) continues to rise in tandem with population and economic growth. Very few countries have been able to separate their overall trash creation from their sociosocio-economicness. The quantity of trash produced, its content, and its origin varies by country; they are related to the economy's structure and, as a result, the stage of investment that has been done in inventing new and innovating the cleaner technologies.

Few years back, amount of municipal solid waste and trash created in the area or in the city has significantly grown in lockstep with non-public consumption spending. This upward trend has slowed since the early 2000s. The amount and nature of municipal garbage differ greatly between nations, and this may be connected to consumption levels and the patterns of it.

The amount of municipal waste and solid garbage created today is estimated to be more than 675 million kg. An individual living within the area creates 520 kg of garbage per year on average; this was twenty kilos in 1990, but thirty kilos in 2000. Europeans produce around a hundred and ten kilograms on average, whereas people in the Americas produce one hundred kilograms more than those in Asia-Oceania. It's estimated that roughly two trillion kilograms of municipal garbage were created globally in 2016, with this number likely to rise.

Waste and garbage are being removed from landfills at an increasing rate and put the things back into the economy through recovery and exercise. Bio-physical pre-treatment is assisting with further developing recovery, increment consuming strength, and lessen the amount of land filling. Through so-called "extended producer responsibility" or "product stewardship," makers and the one with importers are heavily rising and increasingly motivated or forced to simply assume responsibility for their items once the purpose of sale has passed. Exercise objectives have been established by the EU Union and alternative nations.

Between 1995 and 2017, the percentage of municipal solid waste land filled inside the space fell from 61 percent to forty-second, with certain nations no longer using landfills. Landfilling, on the other hand, is still one of the most well-known waste disposal methods in many nations.

Since 2000, waste recovery through exercising, composting, and burning with energy recovery has increased in a positive way across the space. Several countries are presently recycling nearly a third of their municipal garbage.

- **Elucidation**

Waste is produced at the earliest phases of human activity. Its composition and quantities are mostly determined by consumption and production trends. Most nations provide waste area unit information, although the quality of that information varies significantly.

Although municipal solid waste accounts for a small percentage of total trash created, its management and treatment often comprise a significant portion of the public sector's costly efforts to reduce and manage pollution.

Municipal waste definitions, waste types included, and measuring methods used to collect data differ from nation to country and throughout time. The most important issues in terms of data comparison are the coverage of household-like waste from commerce and trade, as well as separate waste collections, which will



include hazardous waste from tools such as waste batteries or waste electrical and electronic equipment, as well as waste collected by the private sector under extended producer responsibility schemes.

- **Importance**

The global tendency is for countries to produce more tools and use fewer tools per capita. However, as compared to other world regions, fabric consumption per capita remains greater.

When indirect flows of tools necessary to meet ultimate demand are included, manufacturing benefits become less meaningful. In certain nations, the fabric footprint, combined with tools extracted from outside and reflected in international commerce, has been exaggerated.

- **Related Growths**

In the 1990s, the number of tools consumed in nations, measured by domestic tool intake, and their certain amount of levels increased along with the rise in economic growth, although at a slower rate in the 2000s. The total amount of tools utilized in the area is over nineteen Gt per year, with nearly half of that amount consumed in the Americas region. Non-metallic minerals dominate the fabric mix, which is mostly used for building, constructing followed by transporters of the fossil energy and also the biomass; 15% is represented by the metal industry of the whole blend market.

Since 2000, most nations' DMC per capita has decreased. In certain nations, like as the Baltics, the too, consumption as per capita has increased because of the sudden rise and growth in economic and which leads to the infrastructural expansion due to a huge shrinking problem of population. In general, the space maintains greater levels of fabric consumption per capita than other globe areas. In any case, later many years, rising populaces with further developed livelihoods and expectations for everyday comforts will probably cause a critical expansion in worldwide item and administration interest. As a result, emerging and developing economies are likely to increase their tool consumption per capita faster than the rest of the area.

## **Conclusion**

Since the year 2000, most countries have improved their tool manufacturing. In comparison to USD one.7 per weight unit of tools consumed in 2000, the nations now create USD two.6 per weight unit of tools consumed nowadays. This advancement is due to improvements which are happening in production methods, not only in production but also changes in tooling and the substitution of native output with imports. It also shows a drop in tool demand following the 2008 financial crisis. Following the 2008 financial crisis, domestic tool consumption slowed and then stabilized, although economic development returned in some nations.

When all tools necessary to meet ultimate demand in nations are considered, such as tools extracted overseas and incorporated in foreign products, progress is slower. In general, the per capita tool footprint exceeds according to per capita. Countries who have relatively high import rates along with high-income levels reveal more higher tool footprints.

This was all about the circular economy and how it works along with some knowledge on the waste management.

If the citizens decide to religiously follow this method of economy, it will a real benefit for the people as well as the nature and will get good results in economy too.

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## Principles of Circular Economy

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Dr. Mita Malkhandi\*

### Introduction

Before we go into the principles of circular economy, we need to understand what exactly is the circular economy and how does it work. The circular economy demands and motivates the market that believes in reusing the existing products and materials. As we already know, how rapidly the population around the world is increasing and, in this case, it is a very bad idea to waste products and raw materials which can be saved for the future population and upcoming generation. Reusable products wasted and scrapped are just indicated not letting our future generation grab the advantages which we benefitted from. Looking at the current situation, mostly everything is important and all forms of not needed or waste products can be successfully reused and contribute to the economy to use more efficiently.

The idea of a circular economy is a great concept in contributing to the betterment of the environment as well as the economy. This idea of a circular economy will assist us in saving a lot of our natural resources and our expenditure. So that where it is necessary, we can spend our resources and economy there. This will steer us in developing new sectors where we are behind, and create new opportunities for young youth in terms of jobs, education, etc. It is rightly said that today's savings of goods and resources will prove to be the best savings for the future generation. This is a good way to say goodbye to our old and traditional linear economical model which is purely based on Take-Make-consume-Throw away scenario. The old model was completely based on cheap raw materials and easily accessible energies.

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Talking about how it works the circular economy's working pattern is very easy to understand for anyone. The main idea of how it works is that the circular economy analyses and takes care of resources including raw materials, products, etc which are saved in the economic system for as much time as possible. Value increases of the product once they are manufactured using the insertion of materials and energy. It is important to find different ways to reuse old products to increase the value of the product.

### **Main Content**

We have seen in the introduction part about the proper definition of circular economy as well as how does it exactly work. So, now it is important to know what are the 3 principles based on which the circular economy works. As slowly and gradually we are moving and shifting towards the new model which is the circular economy, it will prove to be more beneficial after some time. Beneficial in terms of stress and pressure will be reduced on the nature and surrounding, improving the safety and security of products and materials, competitive attitude increases and also it helps in boosting economic growth. Consumers will also be provided with more durable and innovative products that will increase their quality of life and save their money in the long term. Now it is time to understand our 3 principles.

### **Minimization of Waste and Pollution**

This concept is a phenomenon act that suggests producing minimal waste as much as possible by reducing the destruction from all the activities by the economic sector. This is a very important factor and principle to minimize the waste, hazardous waste, and different kinds it generates. It is the responsibility of all the citizens to consider this important thing to start minimizing waste as much as possible. All citizens should take this up as their responsibility and start contributing towards waste minimalization. We should look into the things which can be used but are just dumped as waste. Lots of chemicals that can be used for any other things are being wasted. It is good to order large quantities to save cost and get benefits but along with that one should also sneak into the wastage caused by these products and take some measures to prevent them from getting wasted.

- **Control on Inventory Part**

This is a good way to save our unused waste from getting wasted. In this case, we will control the inventory of the chemicals that are already existing with us. It will help us in decreasing and utilizing time, the cost which is a purchase cost and also wastage cost. This idea has a huge potential of saving a lot of time, and inventory in the whole department so that we can get huge savings in terms of money and time. Labs should contact the waste managerial people to let them know about the unused chemicals that can be reused and can help in developing greater products. They can reuse them and help in saving the wastage of unused products.

- **Reduction in the Volume Produced**

From the heading itself, we can understand that we need to produce the only essential things. Producing things in huge volumes and then throwing some unused is just a waste of money and time. We should produce as much as we need. We can start by producing volume in the micro quantity. This will definitely help in reducing the overall cost. It is also important to bifurcate the hazardous and non-hazardous waste so that we can reuse them carefully depending upon each category and also can be kept aside to reduce the total hazardous waste generated.

- **Change**

Probably the best technique to limit squandering is to change the cycle that creates the waste. Such cycle changes might include: changing from dangerous to non-unsafe synthetic substances, changing centralizations of profoundly perilous synthetic compounds, or changing to hardware whenever the situation allows. Supplanting mercury-containing hardware, for example, thermometers or gauges with electronic gear is a model previously used.

Many amazing environmental programs help in contributing the better for the circular economy. The chemicals which are packed and not yet opened are together collected and made accessible to the distribution again were needed for free or for minimal cost. Talking about the prevention of pollution, is a very essential element in terms of practicing sustainable manufacturing. We can also manipulate our chemicals at the source itself. All the waste which is generated from various means which can be industrial, electronic, household, etc, are preferred and advised to go into recycling for the betterment of our economy which is also followed by combustion for recovery of energy, various kinds of treatment as well as disposal or releasing other chemical disposals and garbage waste in the environment is a very secure and safe manner.

**Extension of the Useful Life of Products and Materials**

This principle is the 2<sup>nd</sup> and most important principle in the circular economy which aims and targets to extend the important and useful life of all the materials and products which is circulating within the economy. We can only achieve our goal and aim by continuously reusing the products which we can reuse and if the product can be extended to more life line we can repair and reuse it again and also by manufacturing the products again which is remanufacturing again a very good thought on helping the environment as well as the economy. In the old model which is linear economy model, a manufacture used to mention the end date of the product but which was totally wrong, as it is better to use one product and material as long as we can to become environment friendly and to contribute in our circular economy. The use and throwaway model are totally wrong and should not be supported any more instead everyone should follow the reusing and recycling products to save environment from getting polluted. The extension life of products and materials is an excellent principle

in circular economy which everyone should be aware of. A model in view of delivering and producing new every day is draining the planet's restricted assets, which likewise has a developing population: from 1950 to now we've almost significantly increased the quantity of occupants of the Earth and it is assessed that in 2100 we will outperform the eleven billion.

This indemonstrable model is creating and reaching problems which includes environmental, economic and various other issues. That is the reason the circular economy was proposed thinking of the benefits of the environment and usages, in which dependable types of cooperative utilization and to extend the existence pattern of items to keep away from expendable are picked. The main question is, how we can contribute in extending the useful life of products?

Linear economy model is mainly to remove and discard and also immediately replace the product that too without even trying to know the possibility and probability of extending the life of product.

- **Fix, Repair, Recover**

The 1st and most important rule are to fix, repair, and recover so that the life cycle and self-life of a product continue to stay for a longer period. Whatever things we can repair and fix at home and our own pace should be done without wasting time or if the work is a little tricky take the help of a professional.

- **Share, Exchange, Barter**

Assuming there is an item that we use infrequently and someone else needs a similar item or administration, is it conceivable to agree to share it? For instance, assuming we realize that will utilize the bicycle just at the end of the week, we can impart it to somebody who necessities to go to work from Monday to Friday. Likewise, while voyaging imparting the vehicle to more individuals is more capable to the climate and our economy.

- **Rent And Land**

Some items may be loaned or leased when we are not utilizing them, similar to a subsequent home or a method for motion. For instance, a loft that we don't utilize beyond what a couple of months a year can fill in as impermanent lodging for individuals who are keen on visiting the region.

- **Sale of Second Hand**

On the off chance if we are not going to utilize it any longer however is in great condition, we can expand its life by offering it to another client. Correspondingly happens while buying another item, we should inquire as to whether the essential is new. For instance, when we need to outfit our home, we can use it to purchase a piece of recycled furniture and consequently increment the valuable existence of the item and keep away from the creation of another one.

- **Reuse and as a Last Resort Recycling**

At the point when there is no chance of broadening the existence of an item, attempt to search for alternate use and capacity. For instance, a messed-up bag can in any case be reused as a support for our pet or a unique nursery for blossoms and plants.

### **Regeneration of Natural Systems**

Last but not least comes the 3rd principle which is the Regeneration of natural systems. This is one of the basic and important concepts of a circular economy. It assists in increasing the natural capital and the conditions to help in the regeneration of natural systems. In laymen language it simply means being protective towards your natural environment and initializing the loop in the system to supply the natural resources back to the planet. We all know for a fact that Nature performs in a very centric loop. When old resources die then-new resources take place allowing the new life on the earth to grow. We also should learn from it and become part of such a looped system, rather than disrupting it.

Below mentioned are a few techniques that can help us in regenerating our natural systems.

- Beginning to go for renewable energy instead of fossil fuels
- Supporting regenerative cultivating - this could include projects like further developing watersheds, biodiversity levels, and environment administrations
- Composing
- Get together and join hands with the organizations and brands that excel in regeneration

So, this was all about the three principles of circular economy which are very crucial and necessary for our system, and also all individuals should know about it.

### **Conclusion**

Following the three principles of Circular economy, it will help the environment and the economy to sustain for more time and give us good results in the future. Looking at the above principles of circular economy we come to a conclusion that encourages the individuals and the system to follow these 3 amazing principles and implement them in their daily life. This will help us in saving a lot and helping the economy to grow. Future generations need to be saved from the scarcity of these natural resources, to protect the future, we need to start saving it from now. All of the things, materials, and products can be saved if follow the principles of the circular economy so that everyone can get a chance to use these naturally given resources. It will be a great help to the environment if we pass these things to our near and dear ones so that they can be alert and use the resources carefully. Nature has given a lot to us, now it is time to give them back.

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## **Sustainability and Circular Economy**

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Jaishree\*

### **Introduction**

The Circular economy means an economy in which the main aims are to rely on renewable energy, zero-emission and eliminate the use of toxic chemicals, and optimize the resources with maximum output and minimum inputs used, it is also known as an industrial economy or nonlinear systems. Under the circular economy production design prepare as products will be durable and life long used and also raw material used as such manner it's can be reuse and repairing and recycling. Under the circular economy on a global level, it resolves mainly three challenges, one is the climate change another is the loss of biodiversity, and also manages the problem of waste and pollution because the circular economy can resolve these problems. So another word used for the circular economy is "sustainability + productivity" because it is contradicting a traditional linear economy which is a product processed like "take, make and waste" which is work as a hurdle for sustainable development of countries at the world's level. many developed countries like Netherland, Italy, Germany, etc, and others have already adopted the concept of a circular economy and recently several developing countries like India convert from a linear model to a circular economy slightly. because it is creating financial, social, and environmental benefits to countries. sustainability concept is also similar concept is similar to the circular economy, as per Brundtland report (1987)" sustainability means as development that meets the needs of the present without compromising the ability of future generation to meet their own needs". these both two terms are main work for the protect environment and resources optimally used.

### **History and Background**

The concept of circular economy was introduced firstly by Kenneth E buildings as a "cyclical system of production". After that in 1988, it was the first time the term circular economy has been used by 'the Economics of natural resources, and in 2020, it has been launched as an action plan which has been aiming to protect the climate and natural resources with economic development and encouraging the consumption.

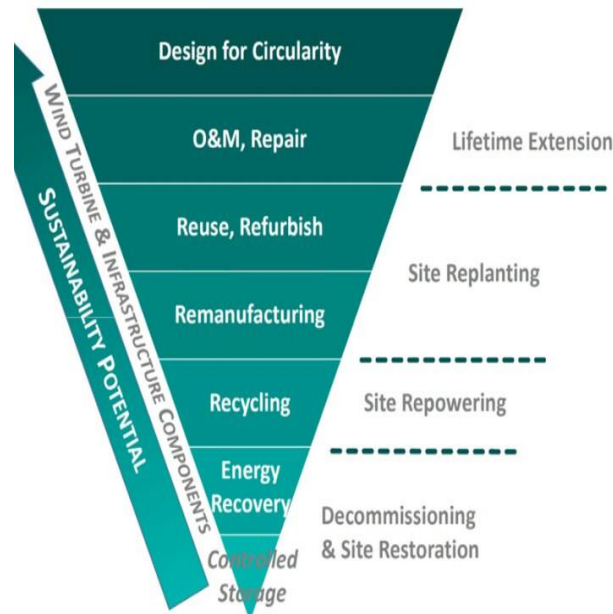
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### Correlation between Circular Economy and Sustainability

There is a closed relationship between the circular economy and sustainability, these two terms main aimed to optimize the resources and minimize the climate change and environmental protection. Achievement of the goals of the sustainable circular economy needs to work on mainly two-sector of economy, one is the production and another is consumption changes together, in production sector-main focus on retaining the functional value of products rather than simultaneously producing New products, so by remanufacturing or reuse material by industries, this process can provide the opportunity of increasing the reinvestment as well as National income. And under sustainability the second important sector is consumption, in which consume the goods in such manner like consume the goods on demand based and on lease rather than purchase and restyling also a good option for achieving the goals of sustainability and circular economy. " the core ideas of circular economy are the elimination of waste by design, respect for the social, economic and natural environment, resources conscious business conduct built on the backbone of these principles, the circular economy has demonstrated to deliver tangible benefits and viability to address the economic environment and social challenges of our day"(strictly .F 2017). , Under traditional linear model follow the only "3R" (reduce, recycle and reuse ) but the new circular economy model used a more sustainable and efficient "6R" model these are (reduce, reuse, recycle and recover, redesign and remanufacture), it contains to grow and scale new heights.

The new circular economy 6R Model represent under this diagram follows:



**Needs and benefits of Sustainable Circular Economy**

For job creation:-Circular economy should be provided the opportunity for job seekers, by adopting the circular economy a country will be able to minimize the costs of production and increase the investment with these it provides the new jobs opportunities also, so this process will be able to resolve the problem of waste as well as reduces the problem of unemployment in economy simultaneously.

To Tackles the climate challenges:- this approach also be needed to use for resolve the problems of climate at the global level like changes in climate global warming, greenhouse effects, and biodiversity loss and also helps to reduce the problem of pollution and waste management, for helping to reduce these problems this economy is known as waste management economy

**Need to Resist the Rising Toxic Materials**

Due to improper management it could be unfavorable or harmful results arise from the waste of toxic materials, it may be harmful to soil fertility or animals and human health badly affected, for the correct management of toxic waste circular economy must be needed.

Needs for resources optimization:- under the circular economy model efficient changes in production and consumption from downstream process to upstream are reached, because while the production chain needs to change mainly for cost-effective opportunities, so under the sustainable circular economy allows the collection of waste and processing and optimize the resources use.

Needs for the welfare of society:-circular economy have needed as well beneficiary for social welfare, it's very useful for society's different dimensions, like for policymakers, consumers, and also for the production. It becomes changes in the instructional and social challenges.

Shortcomings of circular economy:- in this modern World new technologies will be used with its environment protection issues also be raised simultaneously, so for dealing with these types of problems a vital role has been Played by the circular economy, while then it's also been some limitations which are described follow as,

Under a circular economy studied the concept of waste management and optimization resources but on the ground level it has been specific guidelines provided for implementation of this concept, so it's a very difficult and time-consuming process implementation in the sectors.

There are no specific rules and regulations recognized at a global level or by the country's level, due to the lack of international standards or regulations this approach not be more popular in countries, especially in developing countries it has been implemented in a few sectors of the economy. and some countries like Cyprus, Malta Bulgaria, etc are at the bottom of the circular economy List of countries.

Under the circular economy system process of goods used as reuse, recycle, and redesign or (6R) model, but like the linear model it also ignores the feature of Semi- recesses at the time of choosing a raw material for the production process.

The developing countries in the initial phase of development their main foci on rising the investment rather than restoring the products, so the implementation of a circular economy system wants to much more time for these countries.

### **Conclusion**

This study to try to understand and well define the concept of circular economy and sustainability as an enhance the natural resources to benefit the present generation and future as well .this study is to correlate the sustainability with a circular system in a meaningful manner, both of these two-term goals are achieving through the waste management system and long-lasting consuming goods concept, this study finds that sustainable circular economy will be needed for generating new employment opportunities and reduce emission inputs, narrow and least non-toxic material, waste and eco -friendly process used in production and institutional and social changes.it concluded that some loopholes also be present under the new circular system are like as no legal norm or standard and lack of semi- recycle and it is also a time-consuming process, till then this model will provide several positive impacts on the environment and economic development also which is attract or push the countries for adopting the concept of a circular sustainable economy.

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## Analysis of Sustainable Development Goals in India

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Mousumee Banerjee\*

### Introduction

*The sustainable development goals (SDGs) are collections of 17 interconnected worldwide goals that achieved better and more sustainable future for all. It was established in 2015 by United Nations General Assembly and intended to be achieved by 2030. It is called AGENDA 2030.*

*The present study is a modest attempt to focus the sustainable development goals in India and highlight 17 SDGs have played an important role in meeting the progress of countries in the world economy. It also shows how the COVID 19 impacted the life of human being in different field of life.*

The Sustainable Development Goals (SDGs) were established in 2015 by the United Nations General Assembly (UN-GA) and deliberated to be executed by 2030. It is naturally called Agenda 2030. The Sustainable goals are a collection of 17 interconnected global goals drafted to be “blueprint to achieve a better and more sustainable future for all”. The Government of India authorized the NITI Aayog to promote sustainable development goals. Haryana was the first state to include its annual budget attentive on the promotions of SDG with a 3-year action plan and 7-year strategy plan to execute sustainable development goals in 2018. The Finance minister of Haryana, Captain Abhimanyu revealed ₹ 1,151,980 lakhs invested in the fulfilment of sustainable development goals in annual budget 2018-19.

- There are 17 sustainable development goals as follows- No Poverty
- Zero Hunger
- Good Health and well being
- Quality Education

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- Gender Equality
- Clean Water and Sanitation
- Affordable and Clean Energy
- Decent Work and Economic Growth
- Industry, Innovation and Infrastructure
- Reduced Inequality
- Sustainable cities and communities
- Responsible consumption and production
- Climate action
- Life below water
- Life on Land
- Peace, Justice and strong Institutions
- Partnerships for the goals



- **No Poverty**

It is one of the 17 Sustainable Development Goals set up by the United Nations in 2015. The goal has seven purposes and 13 pointers to measure growth. The five purposes are: elimination of excess poverty; devaluation of all poverty by half; execution of social protection systems; securing equal rights to ownership; constructing of resilience to social environmental and economical disasters and basic services, technology and economic resources. The two purposes based on achieving SDG are marshaling of resources to end poverty and the establishment of poverty removeable policy structure at all levels.

In spite of, all the proceeding progress, about 10% of world's total population live in poverty and daily fight to fulfill their basic needs such as food, clothes, shelter, health, education & acquire to water and sanitation. Due to Covid 19 pandemic, poverty rate increasing more rapidly. Lockdowns led to a slump in economic and social activity that decreased sources of income and increased poverty. A study published in September 2020 found that poverty increased by 7 percent in just a few months, even though it had been steadily decreasing for the last 20 years.

- **Zero Hunger**

It is also one of the Sustainable goals promoted by the United Nations in 2015. In the present scenario nearly 690 million people are hungry. The reality is that the world is not on the way to attain Zero Hunger by 2030. If the situation continues, about 840 million people affected by hunger by 2030.

According to the World Food Programme, 135 million suffer from acute hunger largely due to man-made conflicts, climate change and economic downturn. The Covid 19 pandemic could the situation more [pathetic. Due to this situation, billion of people faces starvation.

We need to overcome the situation, aintense change of a global food and agriculture system is needed to nourish about 690 million people who are hungry today. To solve the problem of hunger, we need to increasing agricultural productivity and distribution of food in the needy people.

- **Good Health and well-being**

The essential goals of sustainable development are assuring healthy lives and boosting well- being at all ages. Recently, the world is facing a global health crisis as the form COVID-19. It is spreading in human and billions of people suffering and loss of life.

Lots of growth-oriented programs were started in improving the health of millions of peoples before the pandemic. But more and more attention-seeker to stop the spreading the disease and emerging health issues.

- **Quality Education**

According to Swami Vivekananda, “Education is the manifestation of the perfection already in man.” It is a key to comprehensively human development and departing poverty. Last few decades, huge improvement was made to increasing quality of education and school enrollment rates are increasing especially for girls.

In 23<sup>rd</sup> March, 2019, as the Covid 19 pandemic spread majority of school announced to closure, impacting more than 91 % of students. By the April 2020, the second wave stuck, above 1.6 billion children were out of school and nearly 369 million children who depends on school mid- day meal needed to look to other sources for regular nutrition.

- **Gender Equality**

It is one of the important SDGs. Gender equality is one of the fundamental rights. Man and woman are two pillars of the society. Half of the world’s population are women and girls. They also prove herself in every field. It is also necessary to attain identical opportunities to all in different fields to generate employment.

- **Clean Water and Sanitation**

While significant success has been made in rising approach to clean drinking water and sanitation, billions of people—mostly in agrarian areas—still lack these basic services. Worldwide, one in three people do not have approach to safe drinking water, two out of five people do not have a basic hand-washing facility with soap and water, and more than 673 million people still practice open excretion.

The COVID-19 pandemic has signified the analytical importance of sanitation, hygiene and adequate access to clean water for intercepting and restraining diseases. Hand hygiene saves lives. According to the World Health Organization, handwashing is one of the most useful actions you can take to decrease the extend of contagious and avoid infections, including the COVID-19 virus. Yet billions of people still lack safe water sanitation, and funding is insufficient.

- **Affordable and Clean Energy**

Renewable energy suspension is becoming affordable, more genuine and more systematic every day. Our current interdependence on fossil fuels is unverifiable and injurious to the planet, that is why we have to replace the path we build and absorb energy. Accomplishing this new energy suspension as soon as possible is important to jetton climate change, one of the biggest warning to our own constancy.

Expanding use of fossil fuels without effort to reduce greenhouse gases will have global climate change involvement. Energy efficiency and use of raising renewables grant to climate change alleviation and disaster risk depletion. Preserving and securing ecosystems permit using and further growing hydropower root of electricity and bioenergy.



- **Decent Work and Economic Growth**

Economic development should be a useful force for the whole world. This is why we must make sure that financial improvement generate reasonable and executing opportunities while not hurting the surroundings. We must save labour rights and once and for all put a cease to modern bondage and child labour. If we encourage job creation with enlarge explosion to banking and financial services, we can make definite that everybody gets the advantages of entrepreneurship and innovation.

- **Industry, Innovation and Infrastructure**

A working and flexible armatures is the basis of every prosperous section of the society. To adjoin future provocations, our industries and armatures must be improved. For this, we require to encourage innovative sustainable technologies and insure equal and worldwide ingress to information and financial markets. This will prefer prosperity, create jobs and make sure that we construct strong and prosperous societies across the planet.

- **Reduced Inequality**

Reducing inequalities and assuring no one is left behind are important to performing the Sustainable Development Goals.

Inequality within and among countries is a enduring brings about for concern. Despite some positive signs toward diminish inequality in some extent, such as diminish relative income inequality in some countries and special business status helping lower-income countries, inequality still continues.

- **Sustainable Cities and Communities**

The world's population is constantly rising. To co-ordinate everyone, we need to construct modern sustainable cities. For all of us to persist and comfortable, we need new, intelligent urban planning that creates secure, cheap and flexible cities with green and culturally motivating living conditions.

- **Responsible Consumption and Production**

The power impact of the world economy are Universal consumption and production rest on the usage of the natural habitat and resources in a way that continues to have disastrous effect on the globe.

Economic and social progress over the last decades has been escort by environmental deterioration that is threaten the very systems on which our future growth indeed, our very survival hang on.

- **Climate Action**

The second warmest year on record was 2019 and the end of the warmest century (2010- 2019) ever recorded.

Carbon dioxide (CO<sub>2</sub>) levels and other greenhouse gases in the atmosphere rose to new records in 2019.

Climate change is influencing every country on every continent. It is discomposing worldwide economies and effecting lives. Weather motifs are transforming, sea levels are increasing, and weather events are becoming more supreme.

- **Life below Water**

"Life below water" and is one of the 17 Sustainable Development Goals established by the United Nations in 2015. The Goal has ten purposes to be fulfilled by 2030. Growth towards each purpose is being measured with one scale each. The first seven purposes are : Decreasing marine pollution; secure and reinstate ecosystems; diminish ocean acidification; sustainable fishing; preserve coastal and marine areas; end subsidies granting to overfishing; rising the economic advantage from sustainable use of marine resources. The last three purposes are : To raising scientific knowledge, research and technology for ocean health; help small scale fishers; execute and impose international sea law.<sup>[1]</sup>

- **Life on Land**

A prospering life on land is the base for our life on this globe. We are all part of the global ecosystem and we have caused severe damage to it through deforestation, loss of natural habitats and land degradation. Promoting a sustainable use of our ecosystems and preserving biodiversity is not a cause. It is the key to our own survival.

- **Peace, Justice and Strong Institutions**

Conflict, insecurity, weak institutions and limited access to justice remain a great threat to sustainable development. The number of people fleeing war, persecution and conflict exceeded 70 million in 2018, the highest level recorded by the UN refugee agency (UNHCR) in almost 70 years.

In 2019, the United Nations tracked 357 killings and 30 enforced disappearances of human rights defenders, journalists and trade unionists in 47 countries. And the births of around one in four children under age 5 worldwide are never officially recorded, depriving them of a proof of legal identity crucial for the protection of their rights and for access to justice and social services.

- **Partnerships for the Goals**

The Global Goals can only be met if we work together. International investments and support is needed to ensure innovative technological development, fair trade and market access, especially for developing countries. To build a better world, we need to be supportive, empathetic, inventive, passionate, and above all, cooperative.

## **Conclusion**

All the 17 Sustainable Development Goals are the foundation of the development of every country. The member country of UN-GA has to equal opportunity to develop their basic infrastructure and construct to the world a better place to live. If a country fulfil all the 17 SDGs, they are achieving all the prosperity and success in their citizen.

All goals have different dimensions to build the better environment for human beings. Life has been better scope to live their own life with better opportunities.

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## **Circular Economy and Holistic Approach**

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Rina Kumari\*

### **Introduction**

The basic goal of the circular economy is to keep the quality of goods, services, and resources as long as humanly feasible within the economic structure. It is aimed at achieving more sustainable intake and manufacturing networks through continual and regenerating processes in this way. As a result, it is possible to reduce raw material and energy consumption, as well as waste and pollutants generated during the manufacturing process.

The circular economy concept is essentially a concept of achieving sustainability that differs significantly from the straight market model. The Extraction – manufacture – consumption – discard is the basis of linear economy. This does not guarantee the same level of well-being for future generations as it does now. In the current economic model, pollution generated at each phase receives little or no attention.

and several drawbacks emerge, such as:

- Materials and products have lost their value
- shortage of supplies, cost fluctuations
- Pollution generation, ecological deterioration, and global warming are all issues that need to be addressed.

The necessity to consider the environmental ecosystem while taking commercial and economical decisions was never greater. Since 2020, the World

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Economic Forum's Annual Risk Report, which analyses company perceptions of economics security, has ranked environmental and ecological threats just at front. By 2017, global warming has caused the globe more than \$150 billion each year. Agricultural trade networks will be disrupted by habitat degradation. Due to exceptional storm activity, heavy rainfall, and floods, weather patterns countries such as South Asia even see thousands of domestic deformations every year.

The circular economy involves a shift in economic, geographical, and individual perspectives, as well as a rethinking of how we produce and consume. Just 5 percent of the total worth of the fuel and minerals utilised is utilized in Europe. This illustrates the importance of implementing circular economics solutions, especially given the scarcity of supplies. As more businesses and organizations commit to decreasing waste, finding ways to collect and recycle packaging, resources, and goods has never been more important.

### **Main Content**

According to standard national income accounting, gross domestic product (GDP) is the total worth of all finished products and services that are generated in a country over a given period of time, with output wastage having zero significance. Economics theory is based on the linear economy paradigm.

The rise in overall output value across different measuring intervals is estimated as growth. The flow of raw materials enters the front end of the economy for each GDP measuring period. At the tail conclusion of the manufacturing line, the stream of outputs garbage occurs. The outputting stream trash from the prior period and the flow of raw resources for the new time. The following periods are unrelated and unconnected.

Institution economies and the circular economy are in conflict. Product wastage has a quasi value in the circular economy since it may be repurposed and produced for new manufacturing. As an example, consider a neighborhood of chicken farms. To encourage green animal farming, the farmers decide to gather discarded equipment components from adjacent furniture firms and utilise the treated discard materials to build hog barns after some modifications. To nourish the hogs, the owners also collect hygienic fruit and vegetable waste from local shops. After installing an anaerobic digestion system to manage the manure, the hog waste is successfully converted into a valuable supply of power.

### **Fundamentals of Circular Economy**

- **Resources and Energy:** The goal of a circular economy model is to eliminate waste at its heart. A circular economy, in fact, is founded on the concept that there is no such thought as wastage. To do this, items are built to survive (high-quality components are utilised) and tailored for a deconstruction and recycling process that makes them easy to manage, change, and regenerate.

Finally, these short production rotations distinguish the circular economy system from dumping and reprocessing, which waste enormous energy and labour. Managing limited supplies and managing renewable power flows are the ultimate goals for preserving and enhancing global assets.

- **Interconnection between Elements of Nature:** Technological and ecological cycling are distinguished in the circular economy paradigm. Consuming occurs exclusively in natural loops, in which biologically-based resources (such as foodstuff, cloth, or wood) are meant to flow it into the ecosystem via bacterial fermentation and decomposition.

These phases restore biological ecosystems, such as soils and seas, that provide economic with inexhaustible materials. Technological rotations, in turn, use tactics including reuse, repair, remanufacture, and recycling to recover and rehabilitate items (e.g. washing machines), components (e.g. motherboards), and materials (e.g. limestone).

At the end of the day, another of the goals of the circular economy is to maximise source returns by cycling goods, elements, and resources that are in utilization at the greatest usefulness at all moments in both technology and ecological processes.

**Regenerative Resources:** The final concept of a circular economy is that the power needed to power this circle must come from regenerative sources, in order to reduce commodity reliance and increase system durability. In this view, this approach is about improving the efficiency of systems by identifying and eliminating unfavorable consequences.

### **Advantages of CE**

Humanity has followed a linear pattern of manufacturing and consumerism since the industrialization. Raw resources have been changed into things, which are then sold, utilised, and eventually turned into garbage, which is often thrown and handled carelessly.

The circular economy, on the other hand, is an industry structure that is regenerating by purpose and spirit, with the goal of improving resource performance and combating the instability that changing climate may cause to organisations. It provides practical as well as tangible advantage, and it puts combined a massive capacity for worth generation across the financial, commercial, ecological, and society realms.

- **Reducing Carbon Foot Print**

Another of the circular economy's aims is to provide a beneficial impact on the earth's environmental habitats while also combating unsustainable organic material extraction. The circular economy has the ability to minimise pollution of carbon gases

and input materials consumption, as well as improve agricultural output and eliminate adverse consequences caused by the linear model. A circular economy can aid in the fight against climate change as it employs renewable energy, which is less harmful than conventional sources in the longer - term. Less resources and manufacturing methods are required to produce excellent and functioning items as a result of recycling and dematerializing.

- **Soil Replenishment**

The concepts of the circular economy on the agricultural sector guarantee that key minerals are restored to the soils via fermentation mechanisms or decomposition, softening land and natural ecosystem utilization. As "trash" is restored to the soil, the soil becomes stronger and more robust, enabling for better equilibrium in the ecosystems that surrounding it, in addition to having less leftovers to cope with.

Furthermore, because soil deterioration costs the global economy an estimated \$40 billion per year and has hidden costs such as increased fertiliser consumption, loss of biodiversity, and loss of distinctive vistas, a circular economy might be extremely beneficial to both soils and the economic.

- **Economic Growth**

Decoupling financial development from energy usage is critical. Increased income from additional circular operations, along with lower manufacturing costs achieved by making items and components more useful and readily dismantled and recycled, has the potential to boost GDP and hence economic expansion.

- **Limiting Material Utilization**

When contrasted to the linear strategy's primary resource harvesting, the circular economy concept has the ability to save more resource (up to 70%) than the linear approach. Given that overall consumption for resources is expected to rise as the planet and middle classes develop, a circular economy reduces resource consumption by avoiding dumps and reprocessing and concentrating on ensuring commodities' cycles endure indefinitely. On the ecological front, it also prevents the increased waste that would result from the extraction of new resources.

- **Employment Generation**

Increased community employment in entrance and semi-skilled occupations can be achieved by combining the establishment of a circular economy paradigm with new legislation (especially taxes) and labour market structure.

In addition, the ExTax tax analysis, which was compiled by experts from many major consulting organisations, determined that the circular economy had the potential to create new jobs. An August 2018 study on the advancement of practises to incorporate a circular economy came to the same ending, estimating that 50,000 new positions could be created in the UK and 54,000 in the Netherlands.

Other research undertaken by the Ellen MacArthur Foundation and McKinsey showed that a transition to a circular economy would lead to alterations in employment growth.

### **New Revenue Generation**

Companies that adopt the circular economy system can save costs of production and, in certain situations, develop totally fresh revenue sources. Potential profit in this cyclic globe may arise from entering new industries, reducing costs through wastage and resource savings, and ensuring redundancy.

### **Reduced Variability and Shielded Supply**

Lowering the amount of primary resources utilised is a key component of transitioning to a circular economy concept. Instead, corporations would utilise more recyclable (and even disposable or readily changed) supplies with a bigger percentage of labour expenses, reducing their reliance on basic resource pricing instability. This would also shield businesses from geopolitical crises and defend their supply lines, which are increasingly likely to be harmed or degraded as a result of global warming disasters. Finally, the circular economy model would make firms more robust, or more resistive to and ready to handle with unforeseen events.

### **Innovative Products are in Short Supply**

A circular economy method has the ability to stimulate desire for new products and jobs, such as:

- "Collecting and reversal logistical firms that promote the reintroduction of final items into the network Products marketing and selling systems that enable things to last longer or be used more efficiently"
- "Information it contains in components and equipment reprocessing and device refurbishing"
- These additional services can be recognized by senior executive judgement or by people at all ranks and sectors in a ecosystem.

### **Befriending Your Consumers**

The circular economy concept appears to attract economic strategies in which clients borrow or leasing things for varying durations, regardless of the type of commodity. Businesses will be able to understand more about their consumers' use habits and behaviours when they connect with them more frequently.

Finally, this new partner may boost consumer happiness and devotion, as well as help to the creation of better goods and services for clients. Communication and comprehending the customers' interests and demands are more crucial than ever in a market where providers are liable for the goods delivered for a longer length of time.



**CE Business Structure**

Circular economic practises explain how businesses may generate, produce, and bring benefit while reducing environmental and societal consequences. It's all about achieving more now and greater with very little in order to enrich everyone.

The major business goal of circular organisations is no longer profit maximisation or price via increased effectiveness in distribution networks, manufacturing, and activities. Rather, they focus on rethinking and rebuilding Merchandise from the ground up to assure company sustainability and economic efficiency in the long term.

**Circular Economy Variables**

Industries is just now starting to capitalise on the circular economy's ecological, financial, and welfare impacts - and doing it successfully. Businesses who engage in good social impact capture financial possibilities that their rivals ignore. While general acceptance of the circular economy may take time, several industries have already made substantial progress by implementing circular programmes and operations. For example, There are several possibilities in the automobile sector, which is undergoing a significant transformation at all stages, from basic design through manufacturing new to alternate owning patterns and car-sharing. Although renting is not a new idea in the car business, it is becoming increasingly popular. Plastic's ease has come at a huge cost to the environment. Household products makers, on the other hand, are developing waste-free alternatives to the standard plastic items we do on a daily basis. The firm has invented an all-purpose cleaner made from common organic chemical components technically extracted from food waste by using trash as a source.

While high fashion has contributed to high levels of excessive usage, sustainable companies like as For Days are helping to close the trash cycle. Consumers may return used things and receive credit for a new purchase through their 100 % pure recycled clothes and SWAP programme. Every item that is traded is utilised to create innovative brands.

Restaurant, catering, resorts, and other companies can also drop off extra food to be securely distributed in the neighborhood. Over 6.5 million pieces of meals have indeed been spread throughout the world as a result of this circular distribution network. This invention maximises the use of natural crops and enhances system provides and very well in addition to decreasing trash going to landfills. Companies focus on prolonging the lifespan of material in the furniture industry, where the majority of goods are robust.

**Conclusion**

In the face of a pressing need for change, the transition to a circular economy can seem to be delayed. However, the concept has been spreading naturally because to potential larger technologies and developing cities. Across the whole manufacturing

industry, we're also witnessing extraordinary technical breakthroughs. We're on the edge of Industry 4.0 while we deal with some of the most pressing socioeconomic and ecological concerns of our day. With current production and disposal technology, the "fourth industrial revolution" has the potential to advance the circular economy.

The shift to a circular economy may be scaled up tremendously if it begins modestly. Whereas the linear economy of the old did help create employment, raise economic conditions, and lower death rates around the globe, it also caused global warming, species extinction, and trash heaps. As we all know, Resources are limited, human wants are not.

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## Circular Economy vs Linear Economy

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Sadhna Kumarisingh\*

### Introduction

Every single thing that is produced, everything we own from the dress you are wearing to the mobile phones you are using has been produced in the **traditional linear economy** with the resources. Resources that are scarce. Every economy faces the problem of scarcity. Scarcity refers to a basic concern of an economy to allocate its resources to the best possible use in the face of unlimited wants. According to a report, India needs 2.5 countries' resources to meet its demand. India faces a serious challenge to safeguard its future as rapid urbanization takes a toll on the critical natural resources of the country. Resource extraction in India is 1580 tonnes /acre which is much higher than the world average of 450 tonnes/ acre. This situation requires people to decide how to allocate resources efficiently to meet the present need without compromising the need of the future generation. This situation forces us to go towards a circular economy. The concept of circular economy is not new, almost 80 Years ago, Lionel Robbins defined economics as

*“the science which studies human behavior as a relationship between ends and scarce means which have alternative uses”*  
(Robbins, 1935, p.16)

If we examine the definition, it says economics is about deciding, how we allocate resources efficiently to satisfy the basic needs and as many additional wants as possible. Simply means satisfying many wants from a single resource which can only be possible through determining the highest value reuse of resources but we have adopted a linear approach where we take raw materials out of the ground such as mining, cutting trees, sheering it off a sheep's back turn it into a usable good and then after using, it is being disposed of in landfills. We ditch our old phone for the new one, our air conditioner packs up, and we buy another. Each time we do this, we are

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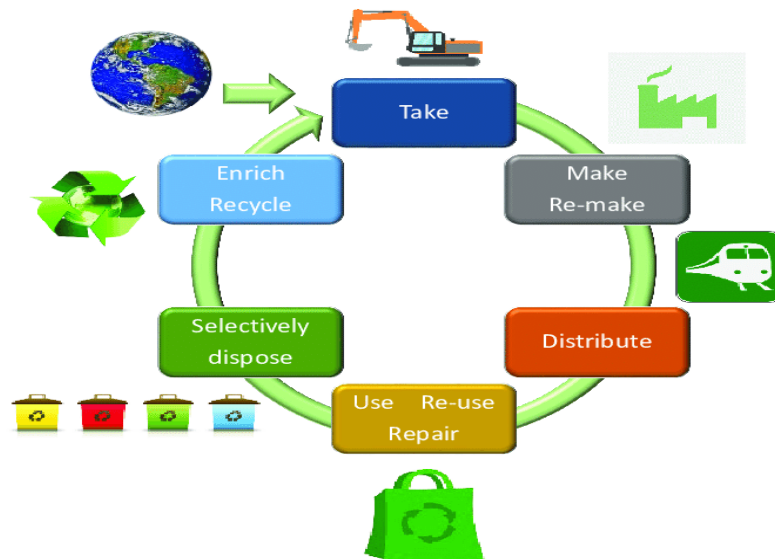
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consuming our scarce resources and producing toxic waste. But it can't work in the long run as we are ending the resources. We have to adapt nature's circular model to not only protect the ecology but the economy too. For this, we need to go circular rather than linear and use appropriate 'Rs' strategies, strategies to Rethink, Reuse, Repair, Recycle and Recover the resources as much as possible. It is like running the economy like nature runs its own business. Plants use carbon dioxide and nutrients to grow and produce oxygen, animals use oxygen and create carbon dioxide and nutrients. Nothing is wasted. It is a closed-loop system.

## LINEAR ECONOMY



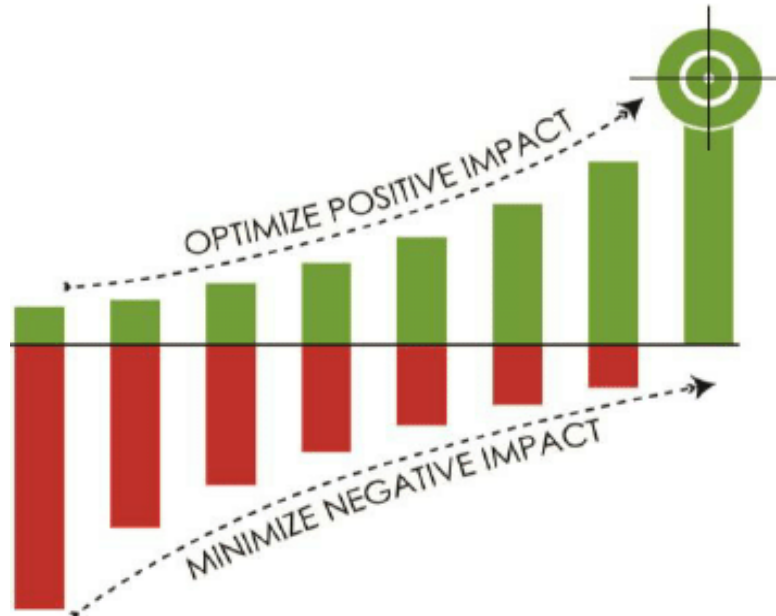
## Circular Economy



A **circular Economy** keeps the resources in the economic system as long as it is possible to keep or reuse. It uses resources in such a way that it not only optimizes the production process but creates the highest economic value and least damage to the environment. The circular economy does not only recycle products but maintains ownership of them all along, so the model works on the make, use and return model. Based on the reuse of resources, it creates value for the resources which are not in use or only used 20% to 30% in their entire lifespan. For example, cars are being used only 2-3 hours a day, for the rest of the time we can lend them to a person in need and generate revenue too. It optimizes the use of resources,

reduces waste, improves environmental health and also generates income for the owners of the resource if he wishes. So, the circular economy is like targeting multiple problems with just one arrow.

### Difference between Linear and Circular Economy



### Eco-efficiency to Eco-effectiveness

Eco-Efficiency in the traditional approach is about reduction and minimization while eco-effectiveness is improving the total impact on the environment by evaluating the cause and creating a value for it. Being eco-efficient means adding value to a good and services while using less pollution. This will result in smaller amounts of useless waste.<sup>6</sup> Eco-effectiveness seeks to create an industrial system that emulates a healthy natural system. This would be a system that would produce more energy than it consumes.<sup>7</sup> The effectiveness in relation to product development is “Doing the right thing” and efficiency is “Doing things right”. Efficiency is getting the most output for the least inputs. The difference between eco-efficiency and eco-effectiveness is like between ‘doing good’ and ‘doing less bad’. We should achieve a situation where we don’t want to focus on less bad because less bad is not good in the end. Eco-efficiency analyzes the effect and reduces the impact on the environment. Instead of minimizing the negative externalities, we should create a positive one because in long run this eco-efficiency of only reducing the negative impact is not enough. A very common example is ants and humans. Ants all together actually have more biomass than humans together have, still ants don’t have any negative impact on the planet because they convert biomass into nutrients and we as humans are not able to do the same.

### Product Logic to Service- Logic

Businesses nowadays changing from product logic to service logic. The purpose of the Product logic companies is to produce and sell goods economically. Value is added to these goods during the manufacturing process and making the product more attractive and marketable. This is the process of a linear economy. Instead of being a product-based economy circular Economy focuses on services. A service economy is an economy where the primary activity of the economy is to provide services rather than the production and selling of more and more goods. For example, a bulb company takes resources, like glass or metal, to manufacture its products. The company makes the bulb and sells it to a consumer and when the light bulb burns out, we dispose of it and buy another. In a linear economy, every company tries to buy materials for the lowest cost possible and to sell as many bulbs as possible. This model operates as if there are infinite resources, like glass or metal, in the world. But this is not the case, resources are finite and we should use them precisely. Instead of buying bulbs, lighting can be leased from any company for some periods for their services. With this ownership remaining with the company only he has to provide the maintenance and replacement when needed. It gives the company incentives to produce energy-efficient and long-lasting bulbs and also save money with fixed lighting costs. It makes companies service providers rather than sellers of a physical product. The point is not just to become greener and create environmental benefits, there could be economic benefits too.

### Cradle to Grave Principle to Cradle to Cradle Principle

We use earth as a source, for raw materials, as if natural resources were infinitely available. We extract them, make products from them and then dispose of them. This is called the cradle to grave principle. As living beings, we will produce emissions, because it is in our nature.



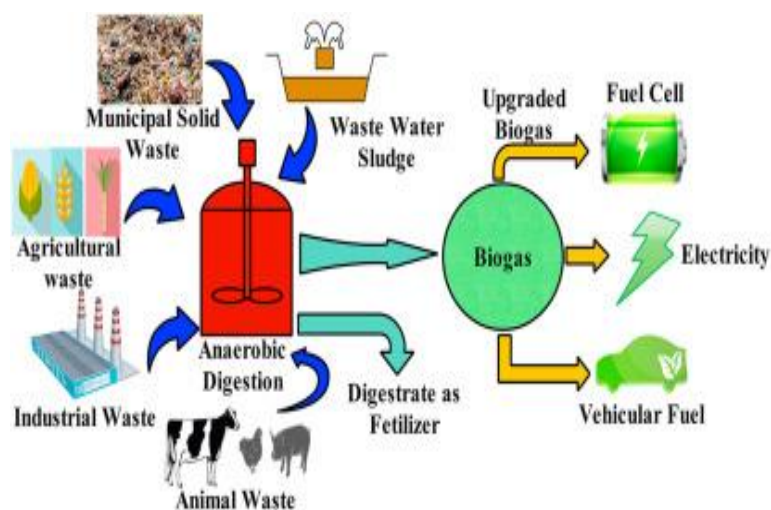
Nature shows us there is no waste, there are only nutrients. Thus, waste is simply a valuable resource in the wrong place. We should see nature as a role model and try to keep our material flowing in cycles. This principle is called cradle to cradle. In Cradle-to-Cradle approach, we cannot only reduce our negative ecological footprint but, extend our positive footprint.

### Downcycling to Upcycling

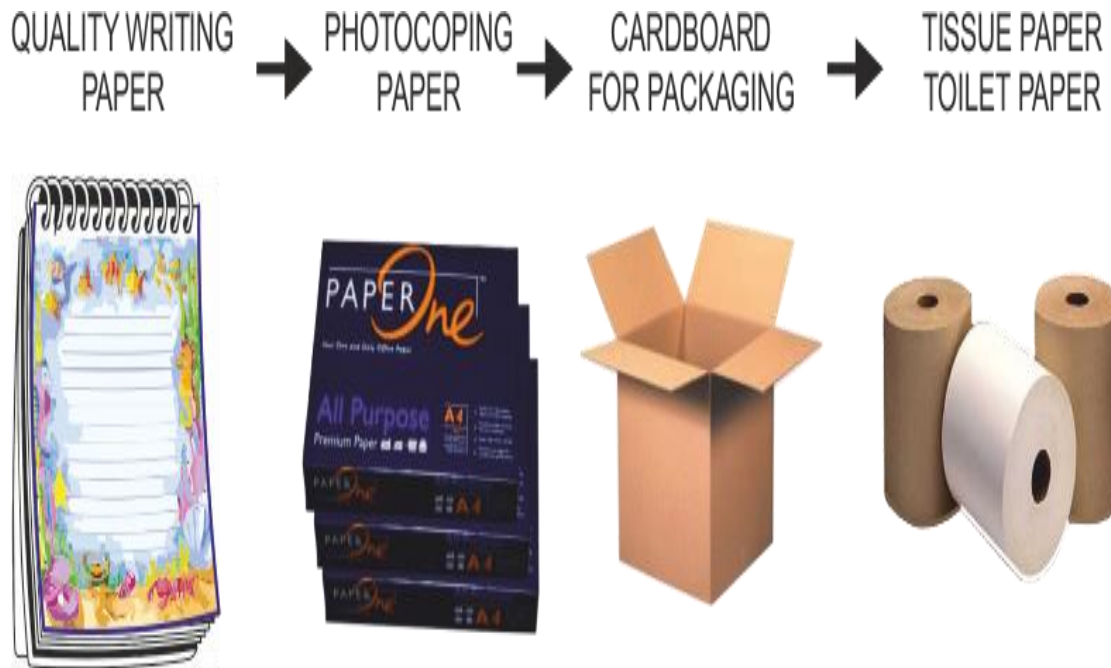
Downcycling is the process of converting waste materials or useless products into new materials or products of lesser quality. It aims to prevent wasting potentially useful materials, and reduce the consumption of new fresh materials. Upcycling and downcycling both reuse the resources but the former provides us greater value than the original and later lesser value than the original.



**A chair is made by upcycling waste tires**



**Upcycling biogas to produce Fuel, and electricity**



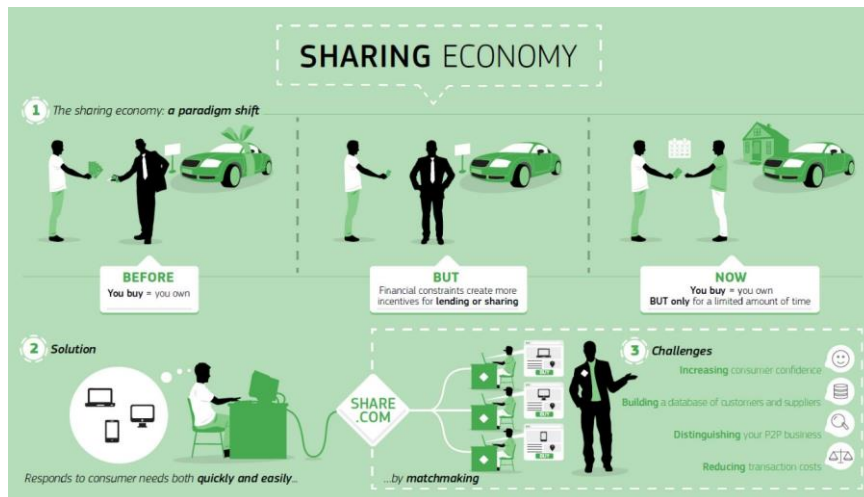
### A quality paper is downcycled

A circular economy is not only about recycling or reusing. It reduces waste by preserving the value of resources. Rather than working on the downcycling cyclical economy is more related to upcycling. Upcycling is when you take a product or material that typically be thrown away and turn it into something useful. For example, turning old used car tires into seats, Bio Gas, which is made from waste resources is being utilized to produce electricity and it can also be upgraded to natural gas and can be used as fuels.

### Self-Economy to Sharing Economy (Ownership vs Access economy)

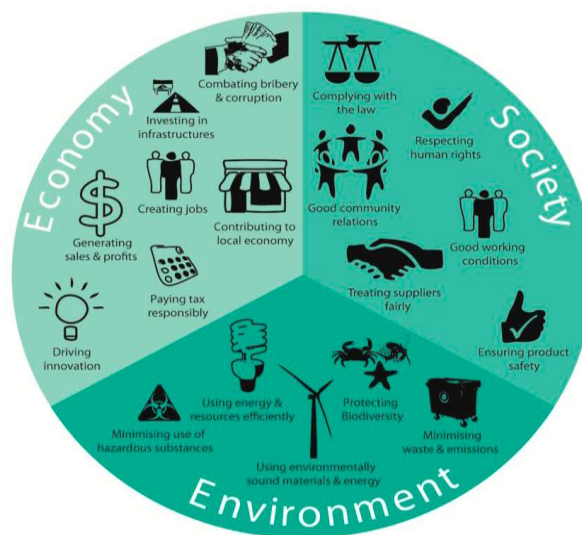
We have been sharing things for thousands of years with neighbors lending each other's foods, borrowing vehicles, allowing friends to stay whenever they need, this is not a new thing and with the new technology the sharing economy gives the advantage to access the asset without having ownership of that particular asset. Technology, on the one hand, provides easy access to services and allowed anyone to be a service provider at the same time. Taxi Hailing apps like ola and uber led to simplification of finding a ride to whoever and whenever in need much more economically. Self-drive car companies like ZOOM Car allow you to rent a car to travel within or outside the city. Similarly, Airbnb allows anyone with a house/room to rent it out to holidaymakers. This means enjoying the benefits without owning them. This will not only be economical it also reduces the material consumption of resources and more efficient and better use of resources.





### One-Dimension to Three Dimension Approach

Linear economy focuses on only one dimension which is more output, more profit. A circular economy works in three-dimension which are Economic Benefit, Cleaner Environment, and Security of resources (Sustainable Development). A sustainable future depends on a more harmonious relationship between business, society, and the environment. Today, we are experiencing a wide-ranging sustainability problem, partly because of the activities of business generating large negative externalities for society and the environment, while the positive externalities thereof are not extensive enough to compensate for the company's shadows.<sup>5</sup> This is based on a simple, but important, premise for understanding how the economy, society, and environment are interrelated. So, just not focusing on the finances, approach should be like that that not only benefits the economy but society and the environment as a whole.



**Table of Differences**

<b>Basis of Differences</b>	<b>Linear Economy</b>	<b>Circular Economy</b>
<b>Working Model</b>	Take-make-dispose	Reduce-reuse-recycle
<b>Focus</b>	Eco-Efficiency	Eco-Effectiveness
<b>Life Cycle</b>	Short term (Purchase to sell to dispose of)	Long Term (Multiple life cycles)
<b>Reuse</b>	Downcycling	Upcycling
<b>Business Model</b>	Focuses on Products	Focuses on Services
<b>Focus on</b>	More Production	Economy, Environment, and Sustainability.
<b>Loops</b>	Open-loop	Partially closed loop
<b>Environment Cost</b>	High	Less
<b>Principle</b>	Cradle to Grave	Cradle to Cradle

**Conclusion**

It is estimated that a circular economy path adopted by India could bring in annual benefits of 40 lakh crores or approximately US\$ 624 billion in 2050. The greenhouse emission would reduce by 44% along with a significant reduction in congestion and pollution. Thus, contributing to the health and economic benefits to the society<sup>8</sup>. As Mahatma Gandhi says- Nature offers for our needs but not for our greets. We need to think before throwing. We need to work on minimizing resources input and maximizing waste prevention. Despite all these, we know that in India majority of the population is middle class (Working-class people) and it is difficult for them to choose eco-friendly products rather than conventional ones because of higher prices. So, there has to be a Recycle India Movement for this like Swachh Bharat Movement to increase awareness among people about the eco-friendly products.

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## **Environmental Benefits of Circular Economy**

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Sarita Kumari\*

### **Introduction**

The concept of Circular Economy is not new to us. It is been going on for decades. It basically defines an economic system which follows the pattern of Circulatory Economy under which a cyclical system of production, consumption and recycling of the existing resources takes place so long as possible. "A Circular Economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible."<sup>[1]</sup> In the subject of Economics we often studies about the two major problems related to human life. First, the resources are limited in relation to human wants. Second, the resources have alternative uses. These two problems can be solved by how the resources are fully and efficiently utilise in the economy so as to avoid the creation of waste, pollution and carbon emission. By adopting this model we can reuse the waste materials as a new raw material. Environmental Protection is very important to have a healthy ecosystem. Today, most of the countries are adopting the model of circular economy in order to make their economy strong in all aspects. But the matter of fact is that, India still relies on the Linear Economy model.

The idea of Circular Economy was originated by Kenneth E. Boulding in 1966 in his book where he explained that we should be in a "cyclical" system of production. For its part, the term "circular economy" appeared for the first time in 1988 in "The Economics of Natural Resources".<sup>[2]</sup> Designer William McDonough, is known as the "father of the circular economy" and co-creator of "Cradle to Cradle" design, which represents a vision for resources that benefits the society with safe materials, water and energy and which eliminates waste, discussed the dark "Secret of Wall Street."<sup>[3]</sup>

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### **Circular Economy and Linear Economy**

Unlike Linear Economy model, Circular economy model aims at the sustainable development in the economy. The linear model, follows the concept of 'take-make-waste' which means that the raw materials are collected from the environment, manufactured into a product and then throw them as a waste after its use, which definitely pollutes the environment. By following this model for a long time, will eventually result in shortage of limited resources and the future generation will suffer a huge loss of sustainability and ecosystem.

The Circular Economy model, on the contrary, works on the concept of sustainability and productivity. The circular economy works on the basis of three basic principle<sup>[4]</sup> i.e., elimination of waste and pollution, to keep the products and resources in circulation and regeneration of the natural systems. In this the products are designed for durability, it means they can be used for the long time.

In order to minimise the use of resources inputs, waste, pollution, emission and energy effusion it follows a closed loop system of energy and resources. It consist of the process in order to benefit the environment and make the economy a Green economy – Reduce (minimise waste), Reuse (use the product again), Recycle (covert the waste into a reusable material), Recover (regain the product), Redesign (design again), and Remanufacture (remaking the products using repaired materials). Here, we can observe that the resources are more efficiently utilising in the economy over and over with zero wastage of resource.

### **Environmental Benefits of Circular Economy**

The prior goal of the circular economy model is to bring productivity and sustainability with a positive impact on the environment and it's ecological system.

Thus, this model is beneficial for the environment in the following manner:

- It encourages the use of renewable resources and reduces the use of non-renewable resources: As a result of facts, the adoption of circular economy can reduce the environmental degradation on a large scale. As we know that non-renewable resources such as- fossil fuel, oil, metal ores etc are limited in amount and if we continues its use in an unwise manner it will reduce sustainability of the resources. In order to avoid this problem, the economy must have to practice recycling, remanufacturing and reusing of resources model.
- It reduces the greenhouse gas emissions: "According to the European Environment Agency, material management, including the production, consumption and disposal of materials, products and infrastructure, contributes a major share of global green house gas emission – up to two thirds by some accounts (UNDP, 2017)"<sup>[5]</sup> According to the Circular Economy

calculations, about 62% of global greenhouse gas emissions comes from product use and manufacturing. According to the Circularity Gap Report 2021 we need to double global circularity from 8.6% to 17%, Circular economy strategies can cut the greenhouse gas emission by 39% <sup>[6]</sup> and plays a crucial role reducing the impact of climate change.

By increasing the efficiency of the resources management, can benefit the environment in many ways:

- It provides better services to extend products lifespan.
- Cleaner production process using fewer materials always results in lower the carbon emission due to less use of fossil fuels, oil etc.
- Recycling waste, reusing resources as a new resources helps in minimising the waste and also makes the environment toxic free by producing green products.
- It creates a vital ecosystem: By adopting the circular economy, it creates a vital ecosystem such as air, water, wind, soil, temperature, rainfall and all the biotic components. These ecosystems provides many of the basic services to human life such as clean air, filtered water, fertile farmlands, pollination and many more services. In linear economy model these services are continuously deteriorating by following the 'take-make-use-dispose-pollute' plan and the dumping of waste in the environment. If these services and products are used in a cyclical system or way it will create a healthy ecosystem through 'take-make-use-recycle-remake-reuse' plan.
- It conserves the natural reserves: Conservation of nature reserves means to protect, preserve and restore biodiversity. The planet takes 1.5 years in the process of regeneration of the natural resources we consume in a year.<sup>[7]</sup> By following the ways listed below we can conserve our nature reserves:
  - By reducing the ecological footprints
  - By recycling the products we have used once
  - By using less plastic products
  - By using eco-friendly products
  - By burning less fossil fuels, etc

Besides benefiting the environment, the circular economy also provides various opportunities to the economy. A growing number of businesses, governments and civil society organizations are coming together to derive the change through the Platform for Accelerating the Circular Economy (PACE).<sup>[8]</sup> More than 200 experts from 100 organizations helped to develop the Circular Economy Action Agenda<sup>[9]</sup> for 5 key sectors: plastics, textiles, electronic, food and capital equipment.

This Action Agenda demonstrated the opportunities for the economy to shift from linear to circular economy model. These benefits the environment in the following ways:

- **Make better** and efficient use of the limited resources: Each year a huge amount of fossil fuel used in production of cloths. Approximately 4% of global freshwater withdrawal for this production. Meanwhile, people throw away still-wearable cloths worth an estimated \$460 billion each year.[10] Creating circular economy for textiles means to reduce the amount of land, water, fossil fuels used in the production. It ensures increase lifespan of cloths as they are collected and recycled into new ones, further reducing resource use.
- **It Protects Human Health, Life and Biodiversity:** Pollution is the world's largest cause of environmental loss- disease and deaths. It has estimated that pollution is the major reason behind environmental degradation and over 9 million premature deaths.[11] Thus by adopting the circular economy we can protect our environment by reducing the waste, pollution.
- **It Aims at zero Waste:** 'The zero waste system helps too conserve natural resources. Implementing its policies in China's electrical appliance industry could reduce its reliance on the virgin materials by 14% in 2014. Globally, zero waste could help save materials worth up to \$700 billion a year.'<sup>[12]</sup> The United States Conference of Mayors adopts a definition of zero waste and set the hierarchy of material management as follows:<sup>[13]</sup>
  - Extended producer responsibility and product design
  - Reduce waste, toxicity, consumption and packaging.
  - Repair, reuse and donate.
  - Recycle
  - Compost
  - Down cycle and beneficial reuse
  - Waste based energy as disposal
  - Landfill waste a dispose
- **The Circular Economy in Controlling and Reversing the Environmental Crises:** Circular Economy proved to be an excellent model in controlling and reversing the environmental crises in most of the countries, especially in European countries. 'The European Union has adopted the Circular Economy Action Plan in 2015 to shift the Economy from the linear economy model to the circular economy model and now the European Union is recognized as a leader in the Circular Economy Policy making globally. According to the Eurostat, the circular economy model has increased the jobs in the circular economy field by 6% between 2012 and 2016.'<sup>[14]</sup>

Now we can see that how this model helps in reversing the environmental crises:

- This concept of circular economy pursued to reuse and recycle the resources and also for the effective utilization of the waste and expired products to control the environmental pollution and degradation and to promote the sustainable development. It also extends the service life of the products such as plastic, gas cylinders, electronic gadgets etc.
- It creates more job opportunities thus imparts more value to the economy. 'According to the World Employment & Social Outlook 2018, International Labour Organization, 6 million jobs could be created by adopting circular model from activities like, recycling, repair, rent and remanufacturing. [15]
- In order to promote the circular economy, the government helps the manufacturing companies with the tax incentives and also ensures the higher rate of interest for the availability of the cheap raw materials.

### **The Indian Government Initiatives for Transition of the economy from Linear Economy to the Circular Economy.**<sup>[16]</sup>

Adoption of the circular economy model is an important step towards the sustainable development and ultimately towards the self-sufficient economic development. There are some initiatives taken by the Government of India in order to work on the circular economy model and to make the economy a green economy. With only 2% of global landmass and 4% of the freshwater resource, a Linear Economy model of 'take – make - dispose' would obstruct the manufacturing sector and consequently, the entire economy. Therefore, for a rapid growing population, rapid industrialization, rapid urbanization, climate change and environmental pollution the transition toward the circular economy is essential. As it not only reduces the resources dependency but also gain competitiveness. 'According to the Ellen MacArthur Foundation, by adopting the circular economy, India could create an annual value of Rs. 14 lakh crore (which is US \$218 billion) in 2030 and Rs. 40 lakh crore (which is US \$624 billion) in 2050 and in addition would reduce the negative externalities. It could also reduce the greenhouse gas emission by 44%. ' <sup>[17]</sup>

The government of India has been proactively formulating the policies and promoting projects to drive the country towards a circular economy. Following rules have be initiated in this way to achieve the aim of sustainable development and economic growth:

- Plastic Waste Management Rules
- e-Waste Management Rules
- Construction and Demolition Waste Management Rules
- Metals Recycling Policy
- Hazardous Waste Management Rules
- Municipal Solid Waste Management Rules, etc

The Central Pollution Control Board (CPCB) which regulated under the Ministry of Environment, Forest and Climate Change (MoEFCC) has mandated the Extended Producer's Responsibility (EPR) authorization for the waste-prone industries to keep e-waste under control and to ensure that the producers must take the responsibility for minimising the impact of waste on the environment, generated by the products.

The Government has formed 11 committees to be led by the concerned line ministers and comprising officials of MoEFCC and NITI Aayog, domain experts, academic and industry representatives for 11 focus areas which will carry out the necessary measures to ensure an effective implementation of their findings and recommendations. Beside this, NITI Aayog has also organized an international conference on 'Sustainable Growth through National Recycling' along with the EU delegation to India.

### **Conclusion**

The Circular Economy provides benefits to the economy and the environment as well. This model basically works on the concept of circular flow of materials in an economy with the objective of sustainability and zero waste. In order to protect the environment, the government has taken various initiatives through which this model could bring a tremendous change in the entire economy and ultimately on a global scale. As it encourages to reversing the environmental crises through various instruments regarding environment such as green tax reforms, environmental taxation, EPR authorization, proper waste management rules and many more. The environmental friendly products are manufactured so as to ensure that the entire service life of the product increased and it's life cycle of the products leaves no negative impact on the environment.

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## **Circular Economy and Waste Management**

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Chiranjeet Adhikari\*

### **Introduction**

With exponential population growth, the generation of waste is also rising. The generation of municipal solid waste all over the world is around 2.01 billion tonnes<sup>[1]</sup> annually, out of which, a major portion is not managed in a way considered to be safe for the environment. The major reasons for the generation of such a huge amount of municipal solid waste all over the world are the constant increase in population, exploitation of natural resources, rapid increase in technological dependence, generation of e-waste, and inclination towards consumerism. With the economic development of the countries from low-level income to middle or high-level-income countries, growth in prosperity and movement of people to urban areas becomes a major contributor to the rise of per capita generation of waste. Thus, the rapid urbanization and constant urban agglomeration are also contributing to the generation of an enormous quantity of solid waste worldwide. Effective Solid Waste Management is a major challenge in urban areas where they are already facing problems for the lack of availability of land space and the huge population in these areas resulting in high population density. This high population density leads to the municipal solid waste generation of thousands of tons on daily basis. When we discuss solid waste management, it is not just about the disposal of solid waste from the main population area to a distant place. Such improper disposal of waste not only causes pollution, but it also affects underground water suitable for basic consumption, local flora and fauna which maintain the ecological balance, also causes many diseases and has huge environmental and economic costs. Waste management techniques need to adopt scientific and environment-friendly methods.

### **Waste Generation in India**

India is going through a vast population explosion and rapid economic growth, the outcome of which is ultimately giving rise to urbanization. According to the world bank, the population of India has been showing a constant rise from 87.33 crores in

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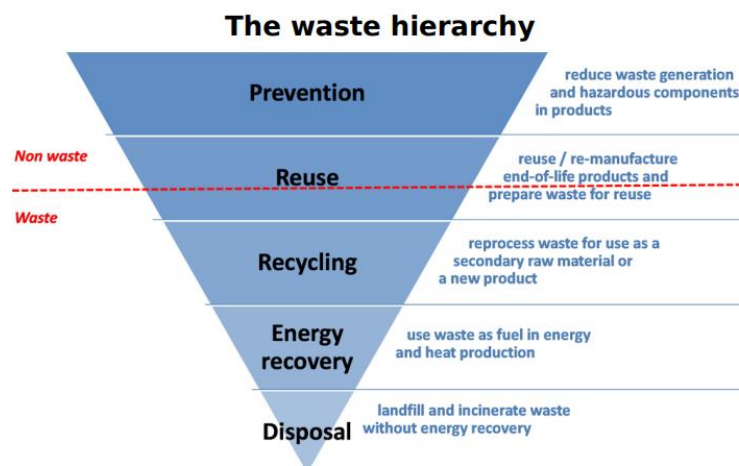
1990 to nearly 138<sup>[2]</sup> crores in 2020. Out of this, almost 34.93<sup>[3]</sup> percent of the total population of India is referred to as the Urban population of India which is expected to rise to nearly 40 percent by the end of 2030 considering the population growth trend of India. High rate of population growth, industrialization, rising living standard, educational opportunities, declining opportunities for livelihood in rural areas, and shift from the slow-growing and low income-generating agriculture sector to better income opportunities through a large variety of urban occupations are also considered as the major contributor in the rising growth of urbanization. The outcome of increasing urban population growth led to a direct correlation with the rise in solid waste generation. As the population increases, the demand for resources also leads to an increase in the generation of wastes as their by-products. Mostly the rural wastes are of organic and biodegradable nature whereas urban society generates wastes in the form of industrial waste, construction, and demolition waste, biomedical waste, household waste, etc. The management of solid waste in rural areas is the responsibility of Gram Panchayat whereas, in urban areas, solid waste management is the responsibility of Urban Local Bodies (ULBs) also known as Municipal Bodies.

In the last few years, the generation of solid waste in India has shown a rapid increase. According to the “Swachhata Sandesh Newsletter January 2020” by the MoHUA, 147,613 metric tonnes (MT) of solid waste is generated per day from 84,475 wards<sup>[4]</sup>. Based on the data provided by the Swachhaa Bharat Mission regarding waste generation by wards of different states, The per capita waste generation is 450 grams per day and there has been a constant increase at a rate of 1.3 percent per annum. The amount of waste generated from all the wards varies from 32 Metric Tonnes to 22,080 Metric Tonnes per day, as of January 2020. Among all the states of India, Maharashtra is the highest waste generating state, at 22,080 MT per day (from 7,322 wards), whereas Sikkim is the lowest waste generating state, at 89 MT per day (from 53 wards). Amongst the Union Territories (UTs), Delhi is the highest waste generator, at 10,500 MT per day. And out of all the states and UTs, Daman & Diu has been recorded as the lowest waste generator.<sup>[5]</sup>

### **Current Scenario of Waste Management in India**

Municipal solid waste is mostly categorized into three groups. The first one is biodegradable waste or organic waste (which consist of food and kitchen waste, residuals of fruits and vegetables, flower, leaves, fruits, paper, etc.). Second is inert and non-biodegradable waste (construction and demolition waste, dirt, debris, etc.). And, last is recyclable waste (plastic, paper, bottles, glasses, etc.). According to the report by the Task Force of the Planning Commission, in the total waste generation, the biodegradable waste component is placed at 52 percent, followed by inert and non-biodegradable components placed at 32 percent, and the share of recyclable waste is placed at 17 percent and has seen a constant rise over the years.<sup>[6]</sup>

In India, municipal authorities are vested with the responsibility of municipal solid waste management according to the Solid Waste Management Rules, 2016 laid down by the Ministry of Environment, Forest, and Climate Change. The main purpose behind setting up these rules is to ensure proper collection, storage, transport, treatment, and disposal of waste throughout the country. For the collection of waste by collectors from waste generators, methods such as door-to-door, house-to-house, or community bin services are implemented regularly from houses, restaurants, hotels, shops, local vendors, hospitals, etc. The new rules have also provided much importance to the segregation of waste. Waste generators are required to segregate dry wastes comprised of paper, plastic, glass, and metal for recycling and reuse, and to utilize wet wastes mostly of biodegradable nature for composting or bio-methanation. The rules pay emphasis prohibiting burning, littering, and non-segregation of waste. It is the responsibility of Municipal authorities to provide sufficient storage facilities for sorting the recyclable waste, to ensure that biodegradable waste is processed by composting, vermicomposting, and anaerobic digestion, or any other appropriate biological process for stabilizing waste, and to restrict land-filling to non-biodegradable and non-recyclable waste.



### Adoption of Circular Economy Model in India

The world is facing disruptive changes at every level. To develop a sustainable approach to economic growth, a new paradigm of economic development is needed to be implemented. The circular economy model is an approach that is distinctive from the traditional economic approach i.e., the linear economy model which is based on the take-make-consume-dispose pattern. The circular economic model of production and consumption is majorly concerned with sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible so that the product life cycle can be extended.<sup>[7]</sup> For the implementation of such an economic

model, elimination of waste and continual use of resources should be given utmost priority which can be done by having a new outlook regarding the production and consumption processes. Waste management is one of the most crucial pillars to establish the foundation of the circular economy model. From shift to 3R policies (reduce, reuse, recycle) of waste management, circular economy derived a new paradigm for waste prevention by encouraging eco-design, reuse, repair, refurbishment, re-manufacturing, and extended producer responsibility (EPR) schemes.

In India, the government is taking multiple initiatives for the adoption of the circular economy model. Considering solid waste management as the most important component of circular economy, the Government of India has introduced various rules, such as the Solid Waste Management Rules, Plastic Waste Management Rules, Construction and Demolition Waste Management Rules, and e-Waste Management Rules, Metals Recycling Policy, etc. NITI Aayog is constantly making several efforts to adopt sustainable economic growth. For the utilization of waste as resources and the evolution of the recycling industry, the Government of India is taking several initiatives and best practices for bringing efficient changes like:

Swachha Bharat Mission – Urban (SBM-U), Swachha Survekshan (An annual survey conducted to rank cities based on cleanliness and sanitation in cities and towns across India under the Ministry of Housing and Urban Affairs), Swachhata Hi Sewa Campaign (for ensuring massive cleanliness drive in iconic spots by various stakeholders), Compost Banao, Compost Apnao Campaign (aims to encourage people to convert their kitchen waste into compost to be used as fertilizer and to reduce the amount of waste disposed to landfill sites), Promotion of Waste to Energy (Ministry of new and Renewable Energy launched Program to produce energy from the waste or disposable residue generated from Urban, Industrial, Agricultural activities and to provide central financial assistance) Extended Producer Responsibility (under E-waste and Plastic Waste Management Rules, 2016 to fulfill the objective of circular economy).<sup>[8]</sup>

## **Conclusion**

Despite implementing numerous laws and rules like Solid Waste Management Rules, Plastic Waste Management Rules, e-Waste (management) Rules, Bio-Medical Waste Management Rules, Construction and Demolition Waste Management Rule, the government failed to manage the waste management system efficiently. Managing waste generated by such a vast population by all the concerned authorities is challenging. For instance, Solid Waste Management Rules 2016 mandate the segregation of waste into the three categories i.e., biodegradable, non-biodegradable, and hazardous waste at the household level, and such segregation of waste which is crucial for recycling requires a well-established system, and technology for the

collection and process of the different categories of waste separately. Solid Waste Management requires adequate funding and infrastructure, and that's why local authorities are unable to implement innovative and efficient technologies for the treatment of waste. Along with the efforts of the government, the efficiency of waste management can be enhanced in India with the participation of citizens mostly in the segregation and treatment process. Steps like minimizing waste, no use of plastic bags, avoiding littering and burning waste, and opting for consumption of those goods which are can be repaired and reused. Behavioral change among the people is the need to bring the approach of sustainability awareness and changing people's attitudes towards the generation of solid waste and its disposal will enhance the potential to shift towards the circular economy and the outcome of the waste management system drive the country towards sustainable growth.

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## Advantages of Circular Economy

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Priya\*

### Introduction

Disruptive changes in the way our society and business are organized are required for sustainable development. The circular economy concept creates new opportunities for innovation and integration among natural ecosystems, businesses, our daily lives, and waste management. Raw natural resources are extracted, processed into products, and then discarded in the linear economy. A circular economy model, on the other hand, tries to bridge the gap between manufacturing and natural ecosystem cycles, which human ultimately rely on. On the other hand, this involves reducing waste by composting biodegradable waste or reusing, remanufacturing and finally recycling non- biodegradable trash. On the other hand, it implies abandoning chemical compounds (as a means of aiding natural system regeneration) in favour of renewable energy. “A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models.”( According to World Economic Forum).

### Evolution of Circular Economy

The late Pearce and Turner established the concept of a circular economy in 1989, which tackles the interconnections of four Economic functions of the environment:

- Amenity values are the joys derived from nature's inherent beauty and the value of a species 'existence. These benefits are provided directly by the environment, without intervention from the economy.

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- A resource base for the economy-as an input, the economy requires resources, both renewable and non-renewable, which are provided by the environment. Renewable resources are usually biological and can be collected for commercial purposes with little or no impact, as long as the yearly output is not exceeded.
- A waste bin for residual flows- following economic activity, the environment serves as a waste bin for residuals (waterborne, airborne, or solid emission), and if the environment's assimilative capacity is exhausted, environmental harm emerges.
- A life-support system-the environment serves as a life-support system for people and Non-humans alike, acknowledging the environment's inherent biological character and the fact that its life-support function can be modified by economic activity (Anderson, 2007).

### WHAT IS THE CIRCULAR ECONOMY?



**Fig. 1: Concept of Circular Economy**

- **Meaning of Circular Economy:** The circular economy is a production and consumption paradigm that encourage people to share, lease, reuse, repair, refurbish, and recycle existing materials and products for as long as feasible. The product's life cycle can be extended in this way. In reality, this means eliminating waste to the absolute minimum. When a product reaches the end of its useful life, its materials are reused as much as possible. These can be put to good use over and over again, resulting in increased value.



**Need to Switch Circular Economy**

The world's population is increasing, and demand for raw materials is increasing along with it. The availability of critical raw resources, on the other hand is limited. Because of limited availability, certain our economy must rely on other countries for their raw materials. Furthermore, obtaining and using raw materials has a significant environmental impact. It also increases CO<sub>2</sub> emission and energy consumption. However, by making better use of raw materials, CO<sub>2</sub> emissions can be reduced.

- **Benefits of Circular Economy (Evidence in India):** In 2050, it is anticipated that might benefit from a circular economy path worth 40 lakh crores, or approximately US\$624 Billion. There would be a 44 per cent reduction in carbon emissions, as well as a major reduction in tariff and pollution. As a result, the society benefits from both health and economic gain. The government of India is aggressively developing regulations and pushing initiatives that use advanced IT and OT technologies to get the country closer to a circular economy. Electricity generated from recyclable materials and waste management are two such crucial sectors.

India's phenomenal economic and industrial progress, combined with its rapidly growing population, has fueled the country's desire for power. It is unviable, unsustainable, and environmentally devastating to meet this rising demand for power with conventional non-recyclable resources. As a result, the government is pushing electricity generation Vigorously using the country's plentiful solar power and the massive stockpile of solid waste generated on a daily basis in Urban areas.

Hitachi India, the Indian arm of the global technological leader Hitachi, is fully supporting the India government by providing critical state-of-the-art technology to harness solar power and waste to energy technology plants, which will help to build a healthier and low-carbon circular economy in the future. Hitachi's high- conversion-ratio inverters are supplying NTPC, India's largest energy company, with technology needed to convert photovoltaic DC power to AC power, which is distributed by the national grid and consumed at a point of consumption. With approximately 300 sunny days per year, solar power is unquestionably a priority in India, and Hitachi India is playing a key role in that story by assisting the country in meeting its 100 GW objective by 2022.

Similarly, waste management is an important part of a circular economy system. Individuals, residential societies, commercial, and educational organizations are now sorting waste into green and dry waste as a part of the government's ' Swachha Bharat' drive. The green trash is composted, which improves the soil, while the dry and solid waste can be reused and recycled. Although India's circular economy is still in its infancy, the purpose is clear, and Hitachi is a key partner in the

country's transformational journey toward long-term prosperity and a healthy society based on the principle of maximum output from minimal input. This leads to social innovation in how we reuse and recycle our resources, paving the door for a new road to wealth. Some important points which is clearly shown the advantages of circular economy.

### **Environmental Benefits of Circular Economy**

- **Use of Non-renewable resources is Reduced:** We continue to utilize non renewable resources, such as oil and metal ores, as though we have an infinite supply now, more than ever. This is not a sustainable practice. Reusing materials and repairing old products (rather than tossing them away) are commonplace in a circular economy. We will consume fewer Non-renewable resources as a result of this. There will be no waste in a genuine circular economy, meaning nothing will be thrown away. Essentially, it's more efficient use of the resources we have.
- **Fewer Negative Externalities:** Negative Externalities such as land use, soil, water, and air pollution, as well as toxic substance emission and climate change, are better handled when the circular economy's principles are followed.
- **Increased Economic Growth Potential:** Decoupling economic growth from resource usage is critical. The increase in revenue from new circular activities, along with lower production costs by making items and materials more functional and readily disassembled and reused, has the potential to boost GDP and thus economic growth.
- **It aspire to be waste-free:** There will be less ocean-bound plastics, rubbish in our oceans, and landfills if we achieve zero waste. It also means that we don't need to extract finite resources; instead, we reuse them. While many environmental models call for waste management reduction to attain zero waste, the circular economy model promotes growth. This makes it a perfect goal for businesses, individuals, and governments to work toward while still attaining important environmental objectives.

### **Provides Advantages to the Customer**

- A circular economy delivers numerous consumer benefits in addition to environmental benefits. Due to the reuse of resources, it prevents activities such as planned obsolescence, resulting in longer-lasting products. It also promises greater spare money because it encourages habits such as buying old products, leasing or renting instead of buying, and other more cost-effective methods.

- Another significant benefit to consumers is the creation of jobs. Many new industry kinds will need to arise in order to create a circular economy. As a result, there will be plenty of new work opportunities. A major global issue is that certain environmental measures may result in the loss of particular economic prospects, such as coal mining and other jobs involving Non-renewable resources.

### **Provide Advantage to Companies**

- **Provide Businesses with Fresh Opportunities:** The circular economy model has numerous advantages for businesses. Along with the above-mentioned increase in job availability comes an increase in business opportunities (such as refurbishing old items, collecting used resources like clothing or electronics, and so on).
- Existing businesses can also benefit from a more reliable resource supply since we reuse what we already have rather than relying on scarce resources. This could lower material costs, allowing businesses to operate more efficiently. Customer loyalty may be improved as a result of this technique.

### **Pillars of Circular Economy**

#### **Materials are Continuously Cycled at a High Level**

The preservation of material complexity is prioritised, with materials cascading in their most complex form for as long as feasible. Material cycles are intended to be of human-scale lengths, appropriate to the natural cycles with which they are linked, matched to material scarcity, and as geographically short as practicable. Unless materials can cycle eternally at high value in their mixed form, they are not mixed in such a way that they can no longer be separated and purely recovered. Materials are only used when absolutely necessary.

#### **Renewable Resources are used to Generate all Energy**

The system is built to be as energy efficient as possible without sacrificing performance or service output. Materials used in energy generation and storage systems are designed to be recovered and reused in the system.

#### **All Human actions Contribute to and Enhance Productivity**

The preservation of complexity is a major principle of functioning in a circular economy: natural diversity is a key source of resilience for the world. Habitats are not encroached upon or physically harmed as a result of human activity, especially unique habitats.

#### **Human Culture and Society are Preserved**

Human cultures and social cohesion are vital to sustain as another kind of complexity and diversity (and thus resilience). The requirements of affected stakeholders are reflected in processes and organizations. Activities that would jeopardize the well-being or existence of distinct human cultures are discouraged.

**Conclusion**

Achieving a circular economy is no easy task; it will take a concerted effort from individuals, corporation, and governments all across the world. However, given all of its advantages, there's no reason why we shouldn't begin moving toward this approach right now. By purchasing plastic credits, one can join the many businesses that are moving towards a circular economy model. It stimulate the number of people employed. It promoted the establishment of a new, more inventive, and competitive industrial model, as well as increased economic growth and employment. It encourage resources independence. Less reliance on imported raw materials can be achieved by repurposing local resources.

**Suggestions**

- We optimize resources and procedures so that trash can be repurposed in both our own- and third-party manufacturing processes.
- To make our products, we use sustainable energy sources and alternative residual raw materials.
- To encourage more sustainable consumption, we support projects that favour product rental over purchase.
- We employ criteria to reduce the amount of raw materials used in the manufacturing of our products, extend their useful life, and boost their recyclability.

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## **Circular Economy as Economic Model**

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Ranjana Kumari\*

### **Introduction**

Circular economy basically means by recycling reusing the raw material in production process again and again with no limits so that it doesn't goes to waste at any cost. The circular economy is a cycle of what and how to use the product in many ways. It is a method of using biological waste as raw materials and re using them for production process again. The nature takes more than a human life i.e., 100 and more years to produce raw materials. The raw materials that we are using for granted takes longer time to produce so it is necessary for us to use in limited form so that it doesn't takes longer time to produce so that we and our future doesn't suffer.

The UNDOJ is one of those convention that supports circular economy it has principles and the successful story of this organisation is making other countries to follow the key principle of the organisation and achieve recycle and reuse and save nature. The circular helps in the use of minimal amount of raw material.

Waste management is an important fundamental of every economy. Waste is one of the core reasons of corruption in the economy. There are huge number of waste products that are used for corruption in many ways. So, waste management is important in an economy to develop. There should be proper legislation governing the country or economy for not polluting the environment and safeguarding the nature from hazardous diseases. The legislation and organising development play a key role in managing the waste and sending it to production house for recycle so that it can be re used.

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The regeneration of nature system is the most important aspect of circular for economy it helps in regenerating the environment and finding the loops and activating the nature.

### **Meaning of Circular Economy**

The circular economy means a model of production and consumption used for recycling, reusing rebushing and again following the same routine till its limit. Its aim is to maximise the time span of using a raw material.

Its principle is to create zero waste and use the product again and again until it reaches its end. If it reaches its end also, they store for future use. It's a model where minimal materials and energy is used on large quantities.

### **Conventions**

- United Nations Industrial Development Organisation
- Circular Economy and Stockholm Convention Division

UNIDO is the most important convention on circular economy it helps in circulation of products. It helps in reducing the use of chemical and hazardous products and supports products which can be recycled and reused in many ways. Its aim is to promote sustainability development and eradicate poverty from developing economies.

UNIDO supports industrial development which enables low waste and more production of materials which can be used or recycle. It maintains economic, environmental and social outcome.

The Stockholm is a convention protects environment and human health from industry that uses hazardous chemicals which affect both human and environment it is particularly for environment protection. Stockholm Convention Development I.e., (SCD) promotes Persistent Organic Pollutants (POPs) to implement in economic development countries and practice it at its best level. It supports the countries in promoting zero waste and recycle product to reuse it.

The convention i.e., SCD helps in promoting eco- friendly products in business by reducing the use of POPs in their respective countries. SCD also keep a check on legal framework and statues of countries to check if principles are being followed or not in respective countries regarding health of people and environment from hazardous substances and POPs. The structural framework on legislation, good governance keeping a check on developing nations on environment related issues and the implementation of SCD makes the organisation and its objective successful.

### **Principle of Circular Economy**

- There are three principles
- Zero waste and pollution

The above stated principle is based on promoting of minimizing the pollution and waste by decreasing economic activities that harms environment is higher level.

- **Mere use of Raw Materials**

Mere use of raw material is one of the most important principles of circular economy. Its aim is to use very less materials and circulate the same in economy. The object is reuse, recycle and keep a target of zero waste in the economy for the environment. Remanufacturing products with waste and used products is good for environment as we are keeping raw materials for future too.

- **Regeneration of Natural System**

One of the most important concepts is regeneration of natural system. Due to increase of population and excessive use of raw material the concept of regeneration of natural system are important by protecting it and by regaining the greenery, bio diversity of the economy.

### **The Technological Cycle and Biological Cycle**

- The two most important loops are technological cycle and biological cycle.
- The technological cycle is based on man made goods or products which are harmful for environment as it can be made of hazardous chemicals which can affect both health issues of humans, animals and environment.
- The biological cycle is basically biodegradable raw or bio waste which is from the natural cycle.

The recycling is done by using bio- based raw material in production process. In energy production the bio waste is used and it is said in circular economy the materials that we use from nature is like a loan taken by the humans for production and it should be restored to nature in the form of bio-based. When we use a raw material, we should also know the fact that it takes more than 100 years to build back the bio-base by nature. So, we should use minimal number of raw materials so that we never have scarcity nor it takes long time to produce it. The release of carbon dioxide by burning fossil fuels helps plants to bind in the soil.

The human activity like agriculture is being a burden to the environment due to which soil erosion happens in parts of other countries. This affects the bed of the soil and also doesn't allow nutrients to flow efficiently by in its own nature. Not only agriculture other human activities are hampering the level of carbon dioxide and its being a problem to nature. There should be a decrease in monocultures, stock breeding and meat factory and production if it stops then their will be an improvement in the biodiversity and regeneration of nature will increase in rapid pace. It can only happen by respecting the nature and using raw materials thinking about all the circumstances if used more now and keep nothing for future use.

In technological cycle the raw material used are created by humans. First the raw material is used from nature and later due to processing and all it can't be send to nature back. This kind of raw material which cannot be returned to nature should be used in circular form efficiently with no limit so that there is minimal use of raw materials produce by nature. For instance: electronic dumbs are of great use. The extraction from these electronic dumb in landfills are used as raw material. More of extraction from electronic dumb should be used in further production of raw materials. The most important aspect is not to let technological cycle raw material including waste to come in contact with nature. The raw material produced from technological cycle will create pollution with microplastic.

The technological cycle is harmful for environment as it spread microplastic in nature. So, both the cycle i.e., technological cycle and biological cycle should not mix with each other. The materials that are used in both of the cycle in production can be combined and used in production commodities. the raw material used in production is called as mixed raw material and can be used for production process as long as they are being reused and recycle and avoid throwing them or dumbering them as waste material. A constant rotation or also called as circular should be there between production and recycle of raw material. Reuse and recycle should be the motive of every production house.

The technological cycle and biological cycle are only not the production that help us use recycle product we ourselves can do it at home by using things available at home as waste material or not in use for a very long time. According to the trend we can try DIY i.e., Do It Your Self art with plastic cups, spoon and other things and reuse it at home. Make use of plastic bottles for planting flowers, seeds, etc. recycle not only saves the environment but also money by recycling the used products daily at home in efficient way possible.

### **Benefits of Circular Economy**

- **Lowering the Use of Raw Materials**

We know from the above stated facts that it takes years for nature to produce raw materials and the excessive use of it has created a huge problem for imbalance of ecosystem. The scientist have always warned us for over usage of these raw materials. The usage of petrol, oil, metal ores, etc., it has created a supply chain for these raw materials and it is sufficient and never-ending process. So to stop this supply chain and over usage of raw materials circular economy is formed for recycling and re-usage of products with no limit to it.

- **Lowers Carbon Emissions**

Through circular economy materials are used efficiently and recycle, reusage is the key factor of it. The circular economy helps in lowering carbon emissions as its aim is sustainable development and encourages everyone to use these products for future too.



- **Zero Wastage**

Wastage comes totally on lesser use of plastic in land and ocean too. Reusing those small products that can be used for different products will help in mining less resources. The circular economy always grows and helps industries and other business.

- **Benefits for Consumer**

The circular economy not only is beneficial for environment but also consumers. The reuse of material helps in long lasting of products. Disposable income are increasing by renting, leasing the items.

**Conclusion**

The circular economy is a great phenomenon of saving the environment in many ways. It helps in reusing and recycling of products in its best form. The circular economy helps in eradicating wastage and hazardous health that affects human health in large number. This system is also to promote zero wastage in parts of the world for the environment. The global warming is increasing day by day and we use raw materials as we have got sufficient number of iron ore, metal and other mineral. So, we should save environment and our planet with circular economy and other possible models to reuse and recycle products.

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## The Obligations of Business in Sustainable Development

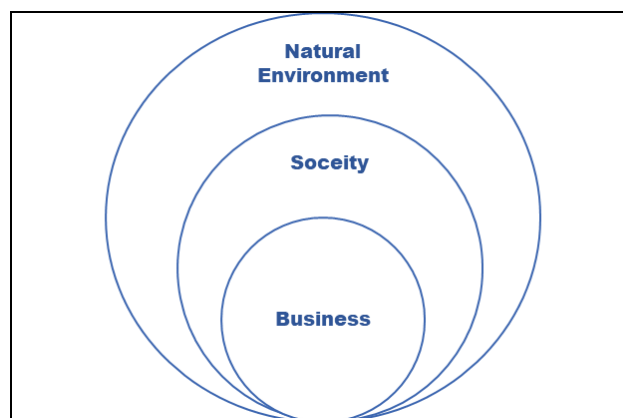
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Dr. Sonia Riyat\*

### Introduction

The primary aim of a business unit is to earn profit. It makes all the efforts to minimise cost and to maximise revenue. While minimising the cost, it should not compromise with the quality of its products and services. A businessman has to be very careful while taking any decision. If an action of the business harms the interest of the people, society or planet, it would impact negatively to its growth.

A business runs its operations within a society which exists in a natural environment (Figure 1). The inputs required by a business for operations, are acquired either from society or natural environment. For example, the labour is supplied by society and the water, gases, fuel etc. are procured from the natural environment. Therefore, it becomes the obligation of the business to operate not only to earn economic profit for itself but for the benefits of the society and the natural environment as well. A balancing approach of taking care of money, people and environment will always support the business to earn long-term profits.



**Figure 1: Relation between Business, Society and Natural Environment**

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## Sustainable Development

A business fulfils the needs of the customers by supplying the desired products and services to them within the timeline in consideration of money. The customers do evaluate the price, quality, features, life of the product; behaviour and after-sale service of the seller (Figure 2). The customers are the people who belong to the society within which the business is operating. They monitor each of the business activities. For example, to whom the business is employing, the methods of disposal of waste materials, the carbon emission rate etc. In other words, along with the government, the people watch the business practices. A business cannot be sustained for long run if it becomes conservative in earning its own profit. Alongwith the financial health of the business, it has to take care of the health of the customer, people and the environment. This approach of business will lead to sustainable development.

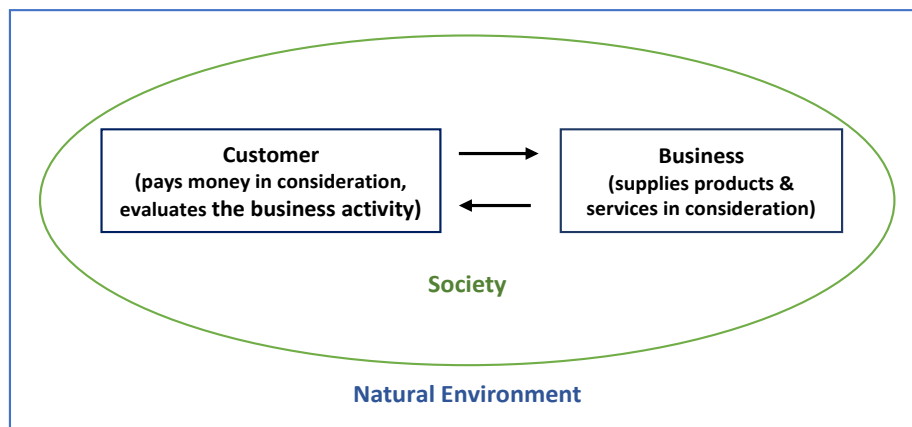


Figure 2: The transactions between Customer and Business

The term 'Sustainable Development' was introduced in the year 1987 in Brundtland Commission Report, also known as 'Our Common Future'. The World Commission on Environment and Development (WCED) described sustainable development as 'meeting the needs of the present generation without compromising the ability of future generations to meet their own needs'. This definition raises following points for the business:

- A business must try to meet the expectations of present generation customers.
- A business must be responsible for the future generations' ability to meet their needs.
- A business has to act responsibly towards the citizens.

To act responsibly, a business is required to consume natural resources sensibly, look for social and human development along with the economic development.

### Sustainable Development Goals

In the year 2000, eight Millennium Development Goals (MDGs) were adopted by United Nations and its member countries to eradicate poverty and hunger, achieve universal primary education, promote gender equality, reduce child mortality, improve maternal health, combat HIV/AIDS, malaria, ensure environmental sustainability, and global partnership for development, with a deadline of the year 2015. Subsequent to MDGs, 'Transforming our world: the 2030 Agenda for Sustainable Development' were adopted at the UN Sustainable Development Summit in New York in September 2015. The agenda includes 17 Sustainable Development Goals (SDGs) with 169 targets, all are woven to achieve economic, social and environmental dimensions of sustainable development.

In this chapter, the statistics of five countries on Goal 6, Goal 12 and Goal 13 are considered for the discussion.

#### Goal 6: Ensure Availability and Sustainable Management of Water and Sanitation for All

Access to clean drinking water, basic sanitation facility and hygiene are the essentials for a normal sustainable life. The Goal 6 targeted to provide these facilities to all by the year 2030. It was reported in 2020 that 2 billion, 3.6 billion and 2.3 billion people lack safely managed drinking water, sanitation and hygiene facility respectively. Table 1 presents the status of population of five selected countries using the unimproved or improved drinking water facility. With reference to data of the year 2020, it is found that people are still using unimproved drinking water which is not good for their life. In India, the proportion of people using non-piped drinking water is higher as compared to the other selected countries. Therefore, efforts on providing the improved drinking facility are expected to achieve the target.

**Table 1: Proportion of Population using Drinking Water Supplies of Selected Countries**

Proportion of population using unimproved/improved drinking water				
Countries	Year	Unimproved	Improved	
			Piped	Non-Piped
China	2015	7	74	19
	2020	5	80	15
India	2015	6	44	49
	2020	4	44	52
Japan	2015	1	98	1
	2020	<1	98	1
Russian Federation	2015	3	90	7
	2020	2	94	4
United States of America	2015	<1	99	<1
	2020	<1	99	1

Source: adapted from <https://data.unicef.org/topic/water-and-sanitation/drinking-water/>

Table 2 presents the status of sanitation facilities being used by the people of the selected countries. In the year 2020, the people of China, India and Russian Federation have still used Unimproved Sanitation Facilities. The proportion of people practicing open defecation is quite high as compared to other countries. It impacts the human health negatively. Efforts on providing basic sanitation facility and making people aware of using the improved facility is required.

**Table 2: Proportion of Population using Sanitation Facilities of selected Countries**

Proportion of population using sanitation facilities					
Countries	Year	At least basic	Limited (shared)	Unimproved	Open defecation
China	2015	84	3	12	<1
	2020	92	3	5	<1
India	2015	57	11	3	29
	2020	71	12	2	15
Japan	2015	>99	<1	<1	<1
	2020	>99	<1	<1	<1
Russian Federation	2015	88	<1	12	<1
	2020	89	<1	11	<1
United States of America	2015	>99	<1	<1	<1
	2020	>99	<1	<1	<1

Source: adapted from <https://data.unicef.org/topic/water-and-sanitation/sanitation/>

### **Goal 12: Ensure Sustainable Consumption and Production Pattern**

The growth of population, limited natural resources, the practice of using natural resources unsustainably is impacting the planet negatively. The level of global warming and increasing pollution level indicate the associated risks. Goal 12 aims to promote sustainable consumption and production patterns.

The solid waste generation is one of the major challenges. With reference to the [statista.com](https://www.statista.com), East Asia & Pacific region has the largest share of municipal solid waste generation in which 15.55% share was produced by China in 2018. The U.S. produced 11.65%. The food waste produced by the average Australian is more than 350 kgs per year whereas the Americans produce 300 kgs per capita food waste. Plastic waste share 12% in global municipal solid waste generation. It was estimated in 2016 that the U.S. has produced 42 million metric tons of plastic waste. The use of plastic drinking bottles is 1 million per minute and 5 trillion single-use plastic bags are thrown away each year.

With regard to E-Waste, as per the data of the year 2019, each person generates 7.3 kgs of e-waste out of which only 1.7 kgs are being recycled. The rate of recycling is too low which is required to be increased. Table 3 presents the data of volume of e-waste generated globally. There is a significant growth in e-waste generation from the year 2010 (33.8 million metric ton) to the year 2019 (53.6 million metric ton). It is estimated that by the year 2030, it will grow to 74.4 MMT. The steps are required to manage the e-waste efficiently as non-disposal of e-waste would release chemicals into the nature resulting risk on human health.

**Table 3: Global E-Waste Generated in Million Metric Tons**

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Volume of waste	33.8	35.8	37.8	39.8	44.4	46.4	48.2	50	51.8	53.6

Source: <https://www.statista.com/statistics/499891/projection-ewaste-generation-worldwide/>

### Goal 13: Take Urgent Action to Combat Climate Change and Its Impacts

With reference to the official data shown in the website of United Nations Development Program (UNDP), there is an increase in sea level by 8 inches since 1880 and an increase of 1 to 4 feet is estimated by the year 2100 due to global warming. It was reported that that the global average temperature in 2020 was 1.2 degree centigrade above the pre-industrial baseline. The rising greenhouse gas emissions is another concern that require the economies to shift towards carbon neutrality. The goal 13 of SDGs aims for drop of CO<sub>2</sub> Emission 45% between 2010 and 2030. It further aims to achieve a target of net zero by the year 2050.

Table 4 presents the data of selected five countries which shows an increase of 128% increase in the CO<sub>2</sub> Emission (tons) in the world from 1971 to 2016. The highest emission is by China followed by United States and India.

**Table 4: List of Top Five Countries Emitting Fossil CO<sub>2</sub>(Tons)**

	Fossil CO <sub>2</sub> Emissions (tons)				% share of world (2016)
	1971	1991	2011	2016	
<b>World</b>	<b>15,67,97,43,000</b>	<b>22,59,10,41,000</b>	<b>34,57,83,90,000</b>	<b>35,75,33,05,000</b>	
China	90,66,50,500	2,42,60,41,700	9,77,64,72,000	10,43,27,51,400	29.18%
United States	4,45,01,98,600	4,91,39,98,500	5,32,85,66,100	5,01,16,86,600	14.02%
India	23,21,97,160	69,88,28,070	1,95,81,93,900	2,53,36,38,100	7.09%
Russia	1,33,72,49,100	2,34,53,11,500	1,79,89,31,400	1,66,18,99,300	4.65%
Japan	85,43,42,000	1,16,62,01,900	1,25,94,73,290	1,23,95,92,060	3.47%

Source: adapted from <https://www.worldometers.info/co2-emissions/>

Referring to the data presented in Table 5, per capita CO<sub>2</sub> Emission has increased in the world from 4.15 tons (1971) to 4.79 tons (2016). Per capita emission (2016) in United States is highest as compared to other countries but a significant decline has been observed from the year 1971. In China and in India, there is regular increase in per capita emission since 1971.

**Table 5: Trend of Emissions of Fossil CO<sub>2</sub>(per Capita) of Selected Countries**

Fossil CO <sub>2</sub> Emissions (per capita)				
	1971	1991	2011	2016
World	4.15	4.17	4.91	4.79
China	1.07	2.03	7.10	7.38
United States	21.05	19.31	17.10	15.52
India	0.41	0.78	1.57	1.91
Russia	10.22	15.85	12.52	11.44
Japan	8.03	9.33	9.80	9.70

Source: adapted from <https://www.worldometers.info/co2-emissions/>

### Expectations from Business Organisations

It is the business organisations that have to take necessary action to:

- Provide improved drinking water facilities and improved sanitation facilities to all the citizens.
- Run awareness program for reducing food waste, no use of single-use plastic products,
- Initiate the projects of recycling of waste materials, preferably E-Wastes.
- Implement the process of operations impacting no adverse impact on the environment
- Avoid industrial wastes
- Treat the wastes before disposing into environment to reduce the harmful impact,
- Control the activities that emits carbon,
- Provide sustainable products and services to the customers

### Conclusion

Physical and mental health of human being, both depend on the quality of air in which he breath, the quality of water that he drinks, the quality of food that he eats. Any compromise with the quality will impact negatively to our health. Therefore, taking care of what we consume, is very important. Consumption depends on the quality of products and services that are available in the market, in other words, supplied by the business organisations. However, the natural resources like air, water etc. are freely available but, its quality is degrading due to man-made or industrial activities. In this connection, the obligations of business organisations towards sustainable development are highly demanded. It is essential to aim for sustainable development along with personal, professional and economic development. We are the people responsible to provide a safe future to the coming generation.

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## **Need for “Circular Economy” for Sustainable Development in India**

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Prasenjit Bhadra\*

### **Introduction**

In the present world of head to head competition among countries by exploiting its resources to produce the best output to sell in the global market, countries are ignoring the sustainability factors over the short term benefits in the form of revenue in the short run. The global problem in the world is Global Warming. The Intergovernmental Panel on Climate Change, an International Scientific body, always gives us the latest data's and warns all the countries' governments to take effective measures to control the Global Warming effect. It won't be wrong to say that low Life Cycle of products without proper recycling or reusing methods and its unplanned disposal definitely is one of the major sources of Global warming. Moreover, countries who doesn't take effective measures for the sustainable development, then there are chances that country soon needs to depends on other countries for their survival which ultimately means that country will be in economic crisis and the future generation population will starve to survive and grow, there will be more unemployment, poverty, low gdp rate, more migration of population to other countries, less financial resources etc. In simple words, country economy will be shuttered and will never be revived unless the country administration adopts some policy for the development of the economy. India is at present undergoing inflationary pressure and is likely to rise in coming years as the need for raw material will increase and the supplies will be dropping. Due to Increasing Population, the proportion of wastage to its disposal will deviate negatively and will impact the biodiversity and trigger pollution

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in various forms. The Government of India has been proactive in taking immediate measures in the form of Policies, budget allocation for promoting “Circular Economy” , Collaboration with the Industries to work on Innovative methods of Production, decentralizing powers to private authorities and civil societies to ensure that by 2050 the Linear economy will be completely shifted to Circular Economy.

### **Objectives of the Study**

- To evaluate the significance of “Circular Economy” for sustainable development in India.
- To understand various government policies, schemes & Government Initiatives to promote Circular Economy in India.

### **Need for “Circular Economy” for Sustainable Development in India**

In India, the present population as per Statista 2020 report is 1.38 billion out of which 34.93 % are urban population as compared to 30.58 % in 2010. Due to rapid increase in population and shifting of people in urban areas, the need for developing an effective waste management system by the Government and to promote a circular economy. Several studies indicate unplanned disposal of waste material into the environment causes serious harm to biodiversity and it also affects the sustainability of our future generation. In India, disposal of solid waste is given to municipal councils/Unions to each state as per the 74th constitutional Amendment Act 1992. However, majority of these municipalities have lack of resources in the form of financial constraints, lack of modern equipment's, lack of infrastructure etc. Government is providing them assistance in very [possible way but the way the wastage is rising could not match up with the efforts of municipalities who are few in numbers in each state. Municipalities also find it difficult to find new vacant land for disposal of solid waste which is away from cities and towns.

India generates almost 62 million tons of solid waste every year. About 70% out of 62 million are collected by municipalities out of which 12 million tons went to the treatment process before disposing and 31 million tons are directly dumped in the landfill sites. Consumers nowadays purchase more electronic items and companies launch updated products of the previous version within a few months which induces the consumers to purchase the updated one and scrap the previous gadget. As per The Sentinel Newspaper, India produces almost 3.2 million tons of E-Waste in 2019, one of the Third Largest e-waste generating nations after the United States and China, but out of which 10% is collected for recycling and rest is disposed of. NPE (National Electronic Policy 2019) was launched with a vision to make India a global Hub for Electronic System Design and Manufacturing (ESDM). This policy leads to the increase in the production of Electronic Products from 3.17 lakh crore in 2016-17 to Rs. 5.55 Lakh Crore in 2020-2021. The main problem in E- waste management is the improper disposal and low recycling rate. As per The Print Newspaper report, India

produces 277.1 million tons solid waste every year, which has a higher expectation to touch 387.8 million tons by 2030. As per the world bank reports, India is one of the world's highest waste - generation nations but it is below Bermuda and USA if we compare to per person waste generation every day which is 0.57 Kg per Indian. It is projected that per Indian waste generation will be increased by 900 gm. every day by 2050. Now if we compare waste generation of the semi-Urban areas with the urban areas, it is only 0.17 kg per Indian daily as compared to 0.62 kg per person daily. metropolitan cities like Delhi produce 30.6 lakh tons of waste followed by Mumbai with 29.4 lakh tons and followed by Chennai, Hyderabad, Bengaluru, Ahmedabad, Kolkata etc. domestic waste can be classified into: (a) recycle waste i.e. bottles, glasses. paper, metals, plastics etc., (b) Composite Waste i.e., Tetra packs, toys, waste clothes etc. (c) biodegradable waste in the form of vegetables and food waste, flowers etc. Inert waste() (d) Hazardous waste like chemicals, bulbs, e-waste etc. if we combine all these waste, India generates 1.50 lakh metric tons of solid waste(according to India Today report 2019) out of which 15000 metric tons of waste is exposed to the environment without any treatment.

**Table 1: Waste Generation by Wards under SBM, as of January 2020.**

States/UTs	Total Wards	Total Waste Generation (MT/D)
Andhra Pradesh	3,409	6,141
Andaman and Nicobar	24	90
Arunachal Pradesh	75	181
Assam	943	1,432
Bihar	3,377	2,272
Chandigarh	26	479
Chhattisgarh	3,217	1650
Daman & Diu	28	32
Dadra & Nagar Haveli	15	55
Delhi	294	10,500
Goa	217	250
Gujarat	1,427	10,274
Haryana	1,496	4,783
Himachal Pradesh	497	377
Jammu & Kashmir	1,081	1,489
Jharkhand	932	2,135
Karnataka	6,464	10,000
Kerala	3,536	2,696
Madhya Pradesh	7,115	6,424
Maharashtra	7,322	22,080
Manipur	306	174
Meghalaya	114	268
Mizoram	264	236
Nagaland	234	461

Odisha	2,024	2,721
Puducherry	122	415
Punjab	3,123	4,100
Rajasthan	5,389	6,500
Sikkim	53	89
Tamil Nadu	12,814	15,437
Telangana	2,112	8,634
Tripura	310	450
Uttar Pradesh	12,007	15,500
Uttarakhand	1,170	1,589
West Bengal	2,938	7,700
Total/Average	84,475	14,7613

Source: Central Statistics Office (CSO), Ministry of Statistics and Programme Implementation.

As shown in the table, the total number of wards in India was 84,475 and the total Metric tons per day as of January 2020 were 147613. Out of the total states, Maharashtra generates the highest waste of 22,080 MT from 7322 wards whereas on the other hand, Sikkim generates the lowest of 89 MT per day from 53 wards. If we see the union territory, Delhi generates the highest of 10,500 MT from 294 wards while Daman & Diu is the lowest waste generator in India.

### **Need for Circular Economy**

Linear Economy was the traditional economic paradigm prevailing in the early centuries to meet the demands of economic development during that time. But at present due to the rapid increase in the use of more goods and services as a result of increasing population worldwide, ultimately exploring more natural resources will cause imbalance in sustainable development. Linear Economy was based on the concept of "Take-Make-Dispose" which is extracting natural resources from Earth in the form of raw material, making finished products out of it and after using dispose in the environment. Here one vital factor is missed which is the need of the hour i.e., Recycling and Reuse.

All the countries want to minimize their solid waste to reduce pollution and to bring harmony in ecosystem. Governments always try to make use of maintaining and using green products and to utilize the resources very efficiently so that it lasts for a long duration of time. Governments at their level are also trying to shift their economy from Linear to Circular Economy.

The Circular Economic Model has started being implemented by developed countries and India should also take this path to achieve sustainability in the Economy. Circular Economy follows the principle of "Take-Make-Use-Reuse-Remake-Recycle" and the cycle continues till the recycling capacity of the goods is scraped to Nil and then it is disposed of after proper treatment. Circular Economy provides us the following opportunities or benefits which is needed for Sustainable Development:

- **Efficient use of Non-Renewable Resources:** The Circular Economy deals with efficacious use of natural resources like Water, minerals, forests, metals etc. there are many products which have a very short life span like Electronic Items, Edibles, Textiles which generally requires huge amount of Natural Raw Materials, Consumables, Financial Resources to produce these finished goods and later after producing they are used for short span of time and disposed of in the open environment. Out of these, certain waste is dangerous for the environment as it contains harmful substances, especially plastic items & E-Waste etc. Circular Economy discourages the short product life cycle and promotes reuse and recycling of products to use for a longer duration of time so the natural resources remain sustainable for future generations.
- **Protect Biodiversity:** Global Warming, Pollution has become a global issue in the world. According to WHO, 4.2 million people prematurely lose their life because of different forms of pollutions. In India if we consider 1.67 million people losing their life in 2019, Delhi is the worst affected area for air and water pollution. Pollution threatens our Biodiversity, as per Hindustan Times, nearly 3.1 million trees(2020-21) cut down every day in India for infrastructure projects and 34 lakh tons (2019-20) of plastic material waste production in India every years and E-Waste generation OF 3.2 million tons(2019-20) which are the main reasons for imbalance in the Biodiversity as more carbon dioxide gasses, fluorinated gasses, nitrous oxide gasses prevailing in the environment and rate of oxygen reduces due to cutting down of trees which causes smog, acid rain, natural disasters etc.
- **Improve Economies:** several studies have reveal that circular economy will boost our economy by generating 40 lakh crore annually by 2050 almost 30% of present GDP by creative and innovative production tools and produce a product that is technologically advance and which can be reuse, repair and remanufacture with the intention to reduce waste and generates more revenue and employment.
- **Indian Government Approach towards Circular Economy:** In the recent budget 2022, the budget was allocated keeping in mind the "Long-term, structured approach towards sustainability". The initiatives by the government like the various policies for clean energy Gati Sakti programme which include roads, railways, airports, water ways, logistic infrastructures, investment in the sunrise sectors and MSMEs, Sabka Prayas is launched with multiple solution in the form of logistics cost reductions, supply chain efficiencies through multimodal connectivity, more employment opportunities. Taxes on luxury goods are increased with the intention to use it wisely and purchase when needed, on the other hand giving tax holidays, subsidies, concessions on local

entrepreneurs promoting green sustainable products. Besides this, on world Environment day on 5th June 2017, the Government announces "National Strategy" to phase out all forms of single-use plastics to eliminate not only plastic bags and bottles but also plastic straw, cutlery, containers, coffee stirrers etc.

**Table 2: Major Landmarks in the History of Waste Management in India**

Year	Rules/acts/Policies/Schemes/Plans	Effectiveness
1989	The Hazardous Waste (Management & Handling) Rules	Partially
1994–95	Strategy Paper on MSW Management by NEERI	Effective
1998	Bio-medical Waste Handling Rules, 1998	Effective
2000	MSW (Management & Handling) Rules, 2000	Moderate
2005	Report of The Technology Advisory Group on SWM 2005	Moderate
2006	Strategy and action plan-use of compost in cities	Partially
2008	National Urban Sanitation Policy	Partially
2009	E-waste handling Rules-Draft document	Partially
2010	National Mission on Sustainable Habitat	Partially
2011	E-waste Rules, 2011 & Plastic Waste Rules, 2011	Needed revisions
2013	Draft Municipal Solid Waste Rules-2013	Moderate
2014	Draft Manual on Municipal SWM and Handling	Partially
2014	Swachh Bharat Mission (CIM-Clean India Mission)	Partially
2015	(AMRUT) Atal Mission for Rejuvenation and Urban Transformation	Currently running
2016	SWM (Solid Waste Management & Handling) Rules, 2016 (revised) published	Revised and Currently running

Source: Amrut 2015, # SWM 2016 (CPHEEO, 2016), (CPCB, 2017), (MoEF&CC, 2016c), Plastic rules 2018 (MoEF&CC, 2016a), C & D Waste (MoEF&CC, 2016b), Hazardous waste rules (CPCB and MOEF&CC, 2016), Biomedical waste (CPCB and MOEF&CC, 2018), (Pandey and Malik, 2015)

## Conclusion

As India is a diversified country, sustainable development via circular economy will be a difficult task to accomplish by the government. As it is a difficult task it should not be considered as an impossible task, the government with the help of private organizations, civil societies and citizens will be able to implement a circular economy in the coming days very effectively. Circular economy is the one stop solution of many major economic problems like Unemployment, Increasing solid waste generation, pollution, natural calamities, scarcity of natural resources etc. Complete shift of Circular Economy from Linear economy within two to three years seems difficult but the Government has already planned to shift the 100% Circular Economy by 2050. New policies and different schemes launched by the Indian Government are expected to act as a catalyst for a circular economy and also for the upcoming manufacturing transformations and opportunities. As per one study it is already forecasted that circular economy will lead to Rs. 40 lakh crore annual turnover value which will be 30% of the current GDP and 44% reduction in greenhouse gas emission by 2050.

In addition, the Indian Population is increasing and will likely increase. Let's not treat it as a ban as we all know that the Indian Market is a boom for the world but for its huge market and revenue generation capabilities. Private companies should not only focus on profit maximization by selling as much product as they can in one year but also should insist on re-use, repairs and recycle of products so that if a consumer purchase one electronic product in one year, he/she no need to purchase the 2nd version of the first product by scrapping the first one. Instead the company should update the first product through internal updates so that the consumer will not be indulging in frequent purchasing of the updated version of the previous one. In Simple, more life span of the product means less wastage and more sustainability. Civil Societies (Local Communities) which include local entrepreneurs, farmers, small scale enterprises etc. plays a vital role in increasing the growth cycle of the circular economy in India. Local Products should be long lasting, biodegradable or reusable and should serve the needs of the people. Lastly, we the consumers should believe in Consuming fewer resources that meet the needs and also consume better resources which means sustainable products that can be recycled or reused. A simple example is to always use a 5 star rating less electric consumption electronic device even though the price tag may be slightly on the higher side but it will give us benefit in the long run in the form of low electric consumption and also the product will last for a longer period of time.

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## **Circular Economy and Sustainable Society**

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Pragati Bakshi\*

### **Introduction**

The Concept of Circular Economy evolved from escalation of wilful and very relevant school thoughts that indicated the hazards of existing linear model of production in world economy. Growing consensus toward ecological imbalance due to resource exploitation and wasteful technique in linear model paved for emergence of new and earth friendly concept of Human Development. Hence sustainable development that is dully incorporated in concept of Circular Economy was looked as panacea for the holistic development of society ensuring the equilibrium of ecology and sustainability of life on ear

### **The Linear Economy**

Our socio-economic system is based on the concept of Linear Economy. The value chain of the material flow comprises initial value addition to raw resources, thereafter consumption and hence disposal of waste occurs. This system assumes a constant supply of natural resources. The entire system of production functions conceptualises “**Take, Make, Dispose**”. Consequently, the end product of linear model of economy emerges to be the ecological as well economic disequilibrium. Following are few End result of linear Economy

- Rapid depletion of non-renewable natural resources. as the consequences of excessive usages of natural resources
- Erosion of Ecosystem: Unmindful extraction of resources creates a negative externality in form of climate change and loss of biodiversity.
- The end of Life of product and creation of waste leads to accumulation of toxic in Biosphere leading a long-term destruction in environment.

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Underpinning, is the proliferation and resource depletion that negates the tenants of sustainable development. Though the Linear Economy propelled human development in many developed countries, yet it partook several detriments that compelled the policy makers worldwide to switch into a new concept of Circular Economy.

### **Evolution of Circular Economy Model**

The Concept of Circular Economy came into prominence in the decade of 1970s. The seminal work of Kenneth E Boulding influenced the many contemporary thinkers who subsequently assimilated the work of several school of thoughts. Boulding's (1966) work, which describes the earth as a closed and circular system with limited assimilative capacity, and inferred from this is that the economy and the environment should coexist in equilibrium. Stahel and Reday (1976) conceptualised loop economy for strategies for preventing of industrial waste, regional job creation and resource efficiencies. The idea of close loop, pertinent with this concept was incorporated by various school of thoughts on Circular Economy. Some of the most relevant theoretical influences are Cradle-to-Cradle (McDonough and Braungart, 2002), Laws of ecology (Commoner, 1971), looped and performance economy (Stahel, 2010), Regenerative design (Lyle, 1994), Industrial ecology (Graedel and Allenby, 1995), Biomimicry (Benyus, 2002), and the Blue economy (Pauli, 2010). Ellen Mac Arther foundation gave most sought after definition, introducing the Circular Economy as “an industrial economy that is restorative or regenerative by intention and design”.

Based on inputs as mentioned above the most relevant and comprehensive definition of Circular Economy can be given as a regenerative system in which resource input and waste, emission, and energy leakages are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuses, remanufacturing, refurbishing, and recycling. The concepts of sustainable development and Circular Economy share extreme closeness in perception and in practical implementations. However, it would be feasible if we explore a few of such similarities.

### **Similarity between Circular Economy and Sustainable Development**

Both notions emphasise on intra- and Inter-generational commitments motivated by environmental hazards and points at the importance of increasing agency and public contemplation upon the multiple and coexisting pathways for development. They also share an essentially global perspective, emphasising problems on a universal scale.

- The relevance of coordination between multiple agents for sharing the responsibility is centre to both the concepts.

- Both concepts frequently employ multi- or interdisciplinary approaches to better integration of non-economic aspects into development process.
- Innovations are the main drivers for attaining the goals of sustainability and Circular economy.
- They also describe not only potential costs and risks, but also the importance of diversification in taking advantage of distinct opportunities for value creation.
- Cooperation between stakeholders being imperative to reach their expectations. Thus, the concept of sustainability and Circular economy are greatly in tuned and require more or less same policy implication for efficient deliverances.

### **Benefits of Circular Economy Model**

Transition from Linear model to Circular model ensures opportunity for building better world though better uses of finite resources. The working pattern as such that it determines resources are not to be wasted in due courses of consumption, but recovered in the system that is continuous and long lasting. Resources are utilised with optimum efficiency and completion of usage phases do not indicate destruction in the value of resources instead the value is retained through recycling and replacing procedure in due of production

Circular economy strategies that reduce our use of resources can cut global greenhouse gas emissions. This can be achieved again through recycling and reusing resources. Working towards a circular economy helps protect human health and biodiversity in many ways, including by making better use of natural resources (e.g. protecting water and land), and by mitigating the climate crisis. The indirect positive impact of reduction in climate hazards is the food security to teeming million.

Model ensures Inclusion of policies that create more immediate financial incentives for businesses to develop innovative new business models and enable the efficient flow of reused and recycled materials across global value chains. A long-term investment in raw material and energy efficient industrial plants that guarantees reuses of renewable energy complies with the tenants of sustainability.

Following are the areas wherein the Circular Economy operates;

- **Industrial sector or Secondary Sector:** For production of infrastructure, Equipment and Services
- **Resources or Primary Sector:** Inclusion of technical resources: metals, minerals, fossil resources) and 'biological' resources (food, fibres, timber, etc
- **Monetary or Tertiary Sectors:** Role of money and ascertaining the concept of ownership too falls under the purview of Circular Economy.

- **Innovations:** Innovation in strategic management for ascertaining the different outcomes for potential uses and reuses application and waste management

### **Circular Economy and Developing and Developed Countries**

Universal recognition of Circular Economy Model as alternative to linear Economy model has gained momentum in Recent decades. The circular economy is a new way of creating value, and ultimately prosperity. Hence many developed and developing countries have made a paradigm shift in their policy implication towards incorporating the tenants of Circular Economy in their system of production function.

- In 2008, China was among the first to adopt a circular economy law promoting the recovery of resources from waste.
- In that same year, the G8 environment ministers agreed on adopting plan for policy of reduce, reuse and recycle for their countries. Following on that, the 2015 G7 Summit Leaders' declaration highlighted the need for "sustainable supply chains" that protect workers and the environment was landmark event in process of worldwide acceptance towards circular economy concept. Then, in late 2015, the European Union adopted an ambitious plan of incorporation Circular Economy in their policy framework of long-term package, including aims for food, water and plastics reuses.

### **Developing Economies and Circular Economy**

There is a growing need for material, water and energy because of both population growth and increased demand by infrastructure, industry and consumers in developing countries. Circular economy activities have the potential to address a significant share of this need—diminishing or, possibly, reversing the rise in resource use by developing countries, and in turn reducing resource depletion, climate change and the pollution of natural areas. In fact, a report from the McKinsey Global Institute estimates that up to 85 per cent of opportunities to improve resource productivity is in developing countries.

### **India and Circular Economy**

The concept of Circular economy is relatively new and difficult for a vast developing country like India for an Immediate incorporation in its production pattern.

However, a circular economy path adopted by India can bring in substantial annual benefits, along with significant reduction in congestion and pollution, which would consequently have a snowball effect on the economy. Our ability to maximize our resource efficiency, minimize the consumption of finite resources as well as the impetus to the emergence of new business models and entrepreneurial ventures will spur our transition towards self-reliance. The above-mentioned matter may only be harnessed if India goes for a long run investment and paradigm shift in the system of production functions

**Conceptualization of C E: A Way Ahead**

The production system based on linear Economy was however instrumental in making world more prosperous and escalating the standard of living in many countries. The material prosperity indicates towards the concept of consumerism. This caused disequilibrium in environment in form of climate change and accumulation of toxic substances. A long-drawn degradation in environment and ecological imbalance posed threat to life on planet and subsequently erosion of entire mankind. Hence the need of hour is an emphasis on amalgamation of Circular Economy in existing production pattern.

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