PERIYAR UNIVERSITY

(NAAC 'A++' Grade - State University - NIRF Rank 56
State Public University Rank 25)

SALEM - 636 011

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

M.A. ECONOMICS

SEMESTER - II

ELECTIVE - IV:
ECONOMICS OF SUSTAINABLE DEVELOPMENT

(Candidates admitted from 2025-26 onwards)

PERIYAR UNIVERSITY

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

M.A Economics 2025 admission onwards

ELECTIVE - IV

Economics of Sustainable Development

Prepared by:

Dr.R.Asokan
Associate Professor
Dept. of Economics
Annamalai University
Annamalai Nagar- 608 002

Scrutinized & Verified by:

BOS Members,
Centre for Distance and Online Education (CDOE)
Periyar University
Salem - 636011

PERIYAR UNIVERSITY

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

M.A Economics 2025 admission onwards

Elective Paper – IV

Prepared by:

Centre for Distance and Online Education (CDOE)
Periyar University,Salem – 11.

ECONOMICS OF SUSTAINABLE DEVELOPMENT-SYLLABUS

Objectives

1. Understand the basic concept of Sustainable Development (SD), the environmental, social and economic dimensions

2. Be able to discuss the conflicts which are involved in the SD concept on the national as well as on the global scale.

Unit I: Introduction to Sustainable Development Meaning and Definition - Economic Growth and Progress- Environmental Threats- MDGS To The SDGS: Agenda 2030

Unit II: Economic Development Urban/Rural Inequality- Measuring Wellbeing- Convergence or Divergence - The Diffusion of Economic Growth- Economic Development Since World War II: The Making of Globalization The Role of Physical Geography: Transport, Energy, Disease, Crops

Unit III: The MDGS and Extreme Poverty The level of Extreme Poverty - South Asia: The Continuing Challenge of The Food Supply- The Origins of The Boundary Concept: Thomas Malthus- Neo-Malthusian Frameworks: Growth Dynamics

Unit IV: Human Rights and Gender Equality- The Ethics of Wealth, Poverty, And Inequality- Major UN Covenants and Declarations- Divided Societies- Life-Cycle Approach to Human Development- The Role of Higher Education in Sustainable Development

Unit V: The Proposal for Sustainable Development Goals The Sustainable Development Goals- Goal-Based Development- Financing for Sustainable Development- Principles of Good Governance- Is Sustainable Development Feasible

Text Book (Latest Editions): 1. Ian Goldin, And L. Alan Winters(2010), The Economics of Sustainable Development, Cambridge University Press

2. Anna SzelągowskaAndAnetaPluta-Zaremba, The Economics of Sustainable Transformation, 1st Edition, Routledge

Reference Book (Latest Editions):

1. James Robertson (1997), The New Economics of Sustainable Development A Briefing for Policy Makers, A Report for The European Commission

2. Tatyana P. Soubbotina (2004), Beyond Economic Growth an Introduction to Sustainable Development, Second Edition, The International Bank for Reconstruction and Development

3. David Zilberman, Renan Goetz, Alberto Garrido, The Economics of Sustainable Deve lopment, Springer

LIST OF CONTENTS

Unit-I

Sustainable Development

The natural resources of Earth are finite.Sustainable development is centered on the consumption needs of future generations.The goal of sustainable development is to ensure that present and future generations have a respectable quality of living; in other words, we should use natural resources properly. The economic decisions made by businesses, consumers, and society (laws and regulations) form the basis of a sustainable economy.One definition of "economic sustainability" is balanced growth that is not based on debt or resource depletion.Economic sustainability can be achieved through efficient recycling and the use of renewable resources.The carrying capacity of the environment must be long-term considered for the benefit of all generations and the global community.

sustainable Economy for society

Society is extremely important to support sustainable economic development. All investments need to take the environment into consideration. People seek goods and services to survive and thrive. One person uses production factors to create the necessary profits. Natural resources, workers, machinery and equipment (capital) are factors of production. Just create it. Ideas. Resources can be expensive if they are poor. Award winners usually rise when they have few resources and vice versa. For example, blueberries are more expensive than the year before the harvest year with limited care. Gross domestic product (GDP) is the total amount of goods and services produced. The periods are compared for one year. If economic growth output increased by 2% from the previous year. Balanced economic growth, excessive use of debt and production inputs, and measures that take into account the environment and future generations are elements of economic sustainable development. Intangible or produced goods using less natural resources. For example, in the 1980s, mobile phones were big and very simple.

Today there are smaller, more intelligent service options. When economic systems are investigated from a sustainable development perspective, it is important that economic activity does not lead to a decline in social or ecological capital. All other forms of sustainable development are based on a stable, sustainable economy. The economy helps tackle ambitious topics such as social security and increased health costs by aging groups.

A sustainable economy for the consumer

From a consumer perspective, it demonstrates the importance of a sustainable economy in purchasing habits and preferences. Every action we take affects our environment. Our lifestyle, transportation, nutrition and shopping behaviours have considerable ecological effects. Household spending decisions play an important role in fostering sustainable economic growth. Everyone can pursue financial sustainability by choosing eco-friendly products. When consumers are asked about the ethics of products, companies need to be committed to clarification and detail of the origins of the product and manufacturing process. Products and services must be provided with minimal impact on the environment, natural resources and energy.

Environmental and energy drawings inform consumers of the ecological outcomes of the product and guide them to options based on strategies for sustainable development. In many cases, it is assumed that consumers will behave reasonably and optimize the economic benefits they have obtained. In sustainable consumption, buyers should take a broader perspective on decisions from an economic perspective. This takes into account not only financial factors but also ecological, social and cultural aspects of consumption decisions. Buyers need to consider the ecological familiarity of products and production methods (clean technology, resource management, responsible workers). Even the best intentions of a consumer don't always lead to actual actions. Therefore, identifying consumer inconsistencies and answering were recognized to explore more sustainable alternatives (e.g. advice, instructions, tips, reviews, incentives, alternative branding, etc.). Conscious consumption is basically the responsibility of the consumer. Demand creates a sustainable supply of products. All purchasing decisions can contribute to sustainable economic growth. To achieve sustainable economic goals, it requires the

commitment and commitment of all involved parties: society, businesses and consumers.

Economically sustainable practices for businesses

In today's world, environmental impact is a problem for all businesses. Environmentally responsible companies offer stakeholder solutions that help reduce negative impacts on nature and reduce the use of unnecessary energy and resources by their customers. Considering environmental factors is an important part of a profitable company. Most products and services are produced by specialized companies. It appears there could be a shift towards an industrial paradigm directed by low carbon emissions and careful resource management. With increasing progress after sustainable production, the political focus will shift to promotions for new companies that not only work ethically but prioritize providing sustainable solutions. This includes more than a sustainable creation of products. The point is that the product or service itself solves the problem of sustainability. Sustainable production is often seen from an ecological perspective, and often seen by answers such as circular economy, biological economy, clean technology, or renewable energy. In addition to companies looking towards ecology, improving efforts to the capabilities of the wellness sector is extremely important in creating new forms of sustainable solutions. The Principles must comply with current regulations that show how to navigate in a variety of situations. Economically responsible corporate functions as part of the legal and guidelines framework to ensure compliance with tax obligations and employee compensation.

According to Ms. Harlem Brundtland, sustainable improvement is described as improvement that satisfies the wishes of the existing with out compromising the capacity of destiny generations to fulfill theirs. This report, posted in 1987 through the United Nations World Commission on Environment and Development, insists at the want to defend the range of genes, species, and all terrestrial and aquatic ecosystems in nature. This is viable particularly through measures to defend the high-satisfactory of the environment, and through the restoration, improvement, and preservation of habitats which might be crucial to species. This implies the sustainable control of using the animal and plant populations being exploited. In different words, it's far the rational

control of human, herbal, and financial sources that ambitions to fulfil the crucial wishes of humanity withinside the very lengthy term.

Sustainable improvement implies the fulfilment of numerous conditions: retaining the general balance, appreciate for the environment, and stopping the exhaustion of herbal sources. Reduced manufacturing of waste and the rationalisation of manufacturing and power intake ought to additionally be implemented. Sustainable improvement is provided as a greater or much less smooth wreck from different modes of improvement, that have led and are nonetheless main to traumatic social and ecological harm on each a global and a nearby scale. In order to be sustainable, improvement ought to integrate three foremost elements: fairness, safety of the environment, and financial efficiency. A sustainable improvement venture ought to be primarily based totally on a better-evolved mode of session among the network and the contributors it comprises. The fulfilment of one of these coverages additionally relies upon on clients accepting sure constraints and residents watching sure necessities in regards to transparency and participation.

History of the Subject – sustainable Development

Confronted with the excessive use of natural resources resulting from economic and population expansion, the Club of Rome—a think tank established in 1968—proposed a strategy of zero growth. This consortium brings together a diverse array of professionals, including scientists, economists, civil servants both from national and international levels, as well as industrial leaders, hailing from 53 different nations. The article delves into the intricate challenges encountered by societies across the spectrum, regardless of their level of industrialization or development. In the year 1971, a private international organization raised a critical warning by releasing the influential report titled 'The Limits to Growth'. In general terms, it argues that contemporary economic growth is at odds with the sustainable preservation of the Earth in the long run. The inaugural concept of sustainable development, originally referred to as 'eco development,' emerged from the United Nations Conference on the Human Environment held in Stockholm in 1972. The inaugural conference took place in a setting marked by tensions between environmental concerns and economic interests. The integration of social equity and ecological considerations into economic development models for

both the North and South has been significantly influenced by prominent figures like Maurice Strong, Professor René Dubos, Barbara Ward, and Ignacy Sachs. Their advocacy has played a crucial role in shaping these essential aspects o f sustainable development. This development led to the establishment of the United Nations Environment Programme (UNEP) alongside the United Nations Development Programme (UNDP). Over the years, various components of civil societies, albeit with cautious backing from governmental entities, have gradually recognized the importance of fostering global solidarity. This awareness aims to address the ever growing risks posed by potential chaos that threatens the delicate equilibrium of our natural environment.

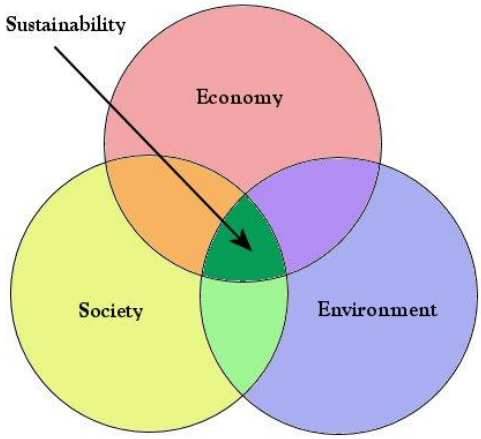
In the 1980s, as awareness grew among the general population regarding issues such as acid rain, the depletion of the ozone layer, and the greenhouse effect, this burgeoning consciousness reached a new level. Gradually, the media started to introduce these subjects in a manner that was more approachable for the broader audience. In the year 1980, the International Union for the Conservation of Nature (IUCN) released its global strategy for conservation efforts. This document serves as a primary source for the term ‘sustainable development,’ known as ‘développement durable’ in French and ‘desarollo sostenido’ (or sostenible) in Spanish. The idea emerged from a combination of key observations: the persistent North/South divide, which poses potential for future conflicts; the ongoing quest for human development; and the ecological threats that underscore the critical necessity of protecting the environment. The concept of 'sustainable development' largely flew under the radar until it experienced a resurgence in prominence with the release of the Gro Harlem Brundtland report, titled 'Our Common Future,' in 1987. During her tenure as the Prime Minister of Norway and as the chair of the World Commission on Environment and Development (WCED), she sought to articulate the notion of sustainable development. She defined it as a form of development that meets the current needs without jeopardizing the capacity of future generations to meet their own. Since that time, the idea of sustainable development has gained global recognition and acceptance.

Sustainable Development-meaning

In1987,the Brundtland Report, officially titled Our Common Future, was published by the United Nations World Commission on Environment and Development. The report presented a definition of "sustainable development" that has gained significant popularity and usage in contemporary discussions. Sustainable development refers to a coordinated approach that ensures the responsible use of natural resources, strategic investment allocation, and the advancement of technology. This process also involves necessary institutional reforms and all aimed at simultaneously fulfilling present and future human needs in a balanced and harmonious manner.

Sustainability refers to the responsible management of resources in a way that ensures their availability for future generations, emphasizing the need to avoid depletion. This concept extends beyond merely addressing environmental sustainability, which focuses on the preservation of the Earth's natural resources. It also encompasses economic and social sustainability, emphasizing the importance of fulfilling the current economic and social requirements of individuals while ensuring that future generations are not adversely affected.

Sustainability can be defined in broader terms, with a common understanding that attaining it requires a harmonious balance among economic, environmental, and social elements. This concept can be effectively depicted using a sustainability Venn diagram, as illustrated in the figure below:



This concept is often referred to as the triad of sustainability. To attain genuine sustainability, it is essential to harmonize economic, social, and environmental factors in a balanced manner. Environmental sustainability can be characterized as the practice of living in harmony with our natural resources, ensuring that they are utilized responsibly and preserved for future generations. Achieving genuine environmental sustainability requires us to consume our natural resources—such as materials, energy sources, land, and water—at a rate that is sustainable. Certain resources are more plentiful than others, prompting the necessity to evaluate material scarcity, the environmental impact caused by the extraction of these resources, and the extent to which they can align with the principles of a Circular Economy. Our goal should be to aim for net zero carbon emissions and progress further to embrace climate positive practices ultimately.

Environmental sustainability should not be mistaken for complete sustainability, as the latter encompasses a necessary equilibrium among economic and social considerations as well.

Economic Sustainability

A Key Approach to Responsible Resource Management Economic sustainability involves the efficient and responsible use of resources by businesses and nations alike. This concept emphasizes the importance of maintaining operational profitability over the long term while ensuring that resource management practices are sustainable. By adopting such an approach, organizations can secure their financial viability while contributing positively to the economy and the environment. A business cannot continue its operations without generating an operational profit. For a company to ensure its long-term sustainability, it is imperative that it operates responsibly and utilizes its resources efficiently. Failing to do so can jeopardize its ongoing operations and viability in the future.

Understanding Social Sustainability

Social sustainability refers to the capacity of a society, or any given social system, to continuously maintain and promote a high quality of social well-being. It embodies the principles and practices that enable communities to thrive over the long term, ensuring that all individuals can lead fulfilling lives within a supportive social framework. Attaining social sustainability is crucial for the long-term preservation of the social welfare of a nation, an organization, or a community. The concept of sustainability is

frequently depicted through a Venn diagram, illustrating the three fundamental pillars as overlapping circles. At the point of intersection lies the essence of sustainability, where these pillars converge to form a unified core. This graphic demonstrates that true sustainability can be attained only when all three pillars are simultaneously considered and addressed. Incorporating sustainability and sustainable development is essential for crafting effective strategies that address both short-term and long-term goals. Sustainability experts have the opportunity to leverage their insights into these foundational pillars to address specific challenges, including those associated with climate change and biodiversity conservation. Organizations can also utilize their expertise to align with the United Nations Sustainable Development Goals (SDGs), which consist of 17 interconnected objectives aimed at fostering a more sustainable future for everyone.

Five Principles of Sustainable Development

The five essential principles of sustainable development are as follows:

Preservation of Ecosystems and the Environment

The safeguarding of ecosystems and the natural environment is of paramount importance. Efforts aimed at maintaining and enhancing the health of our planet's diverse habitats play a crucial role in ensuring the survival of various species and the overall balance of nature. By focusing on sustainable practices and conservation initiatives, we can protect vital resources and mitigate the impacts of human activity on the environment. Emphasizing the need for ecological stewardship, it is essential to engage communities and individuals in actions that contribute to the preservation of our ecosystems for future generations. Preserving the planet's biodiversity is crucial for maintaining ecological balance and ensuring the health of our ecosystems. Biodiversity encompasses the variety of life on Earth, including the diverse species of plants, animals, and microorganisms, as well as their interactions and habitats. Protecting this wealth of biological diversity is essential for sustaining vital ecological functions and services that support human life, such as clean air and water, pollination of crops, and climate regulation.

Efforts to conserve biodiversity involve various strategies, including habitat protection, sustainable resource management, and restoration of degraded ecosystems. By prioritizing conservation initiatives, we can help safeguard not only the myriads of

species that share our planet but also the genetic diversity that is critical for resilience against environmental changes and diseases.

Ultimately, the conservation of biodiversity is not merely an environmental issue; it is intrinsically linked to global development, human health, and the survival of future generations. By recognizing the importance of our planet's rich biological heritage, we can foster a sustainable future that benefits both nature and humanity a like.

Sustainable Development of Society:

An Overview

When discussing the concept of sustainable development within society, it is vital to recognize its multi-faceted nature. Sustainable development not only emphasizes the importance of balancing economic growth with environmental protection but also highlights the need for social equity and community well-being.

The pursuit of a sustainable society entails creating systems and practices that fulfil the needs of the present without compromising the ability of future generations to meet their own requirements. This involves the integration of sustainability principles into various sectors, including education, infrastructure, and governance.

In essence, sustainable development promotes a harmonious relationship between people and the planet, ensuring that progress does not come at the expense of the environment or social justice. Embracing this philosophy will enable us to build resilient communities that thrive in an ever-changing world.

In conclusion, the sustainable development of society is a critical objective that requires collective effort and commitment from all stakeholders, including governments, businesses, and citizens. Through collaboration and innovative thinking, we can pave the way for a more sustainable and equitable future.

Preservation of Human Resources'

In the realm of human resource management, the importance of conserving our workforce cannot be overstated. Recognizing the value of human capital is critical for sustaining organizational growth and success.

The Importance of Workforce Preservation

Effective strategies for preserving human resources involve not only retention efforts but also the cultivation of a positive workplace culture, opportunities for professional development, and ensuring employee well-being. By fostering an environment where

individuals feel valued and engaged, organizations can maintain a loyal and productive workforce that is crucial for navigating today's competitive landscape.

In conclusion, prioritizing the conservation of human resources is essential for any organization aiming for long-term achievement and stability.

Population Control and Management: Principles of Sustainable Development

In the realm of sustainable development, several key principles guide efforts toward environmental preservation.

Ecosystem Conservation

One of the primary objectives of sustainable development is to ensure the conservation of our planet's ecosystems. This encompasses strategies and practices aimed at safeguarding natural resources and maintaining biodiversity for future generations. The goal is to strengthen the biological framework. The preservation of terrestrial and amphibian ecosystems is crucial for this very reason. When considering the limitations imposed by biological systems, it is essential for human activities to remain mindful of the carrying capacity of these ecosystems. Ensuring the sustainability of our environments should be a priority in all of our endeavours. Biodiversity conservation is crucial, as the vast array of biological diversity provides countless advantages. It is imperative to protect this variety to benefit not only current generations but also those in the future.

The preservation of species, ecosystems, and the natural cycles that sustain life is crucial for maintaining the quality of human existence. A biological system represents a component of nature, while biodiversity serves as a crucial aspect of environmental management. Sustainable Development of Society The sustainability of a society hinges on the availability of a safe living environment, a balanced diet, adequate healthcare services, employment opportunities, and high-quality education. Once these components are developed and made accessible to the general public, they transform into an economic community.

It contributes to nurturing a positive perspective towards the natural world and all living beings. The broader population is increasingly motivated to implement measures for climate rationing. • Focus on Well-Being and Personal Fulfilment: The primary emphasis of practical development issues revolves around individuals, their well-being, and efforts towards achieving personal satisfaction. Humans have the right to

lead a fulfilling and harmonious existence in unity with the natural world. The impact of the shale gas industry on well-being is observed across various countries, particularly in the United States. Various experts have documented the potential hazards associated with influences on well-being. The satisfaction levels among residents in Quebec are currently influenced by the local industry. Social Value and Resilience: Embracing progress requires an appreciation of both intra- and intergenerational values, alongside a commitment to social ethics and resilience. Residents living in proximity to wells are now facing exploitation by business interests, highlighting a lack of intergenerational value. Lack of Resilience Among Neighbors: The ocean's purpose is designed for a lifespan of 25 years, indicating a void of intra-generational value. Despite this, the environmental effects persist for several years. Properties located near theshale industry will lack any appeal for prospective newco mers. Lack of integrity and transparency contradicts societal values**.**

Conservation of Natural Resources

Rationing every one of the living creatures in the world is vital. Individuals ought to figure out how to moderate normal assets to safeguard living creatures. It is the core of development that is supported. The direction of projects to protect biodiversity should be public and global. The projects ought to cooperate with one another.

Population Control

Individuals keep up with their life by using the restricted means and assets found on the earth. Because of populace development, human necessities like food, clothing, lodging, and so forth builds, and the means and assets accessible on the planet can't be expanded to meet the necessities. As a result, the executives and populace control are essential to the stable course of events. It will keep the natural balance.

Natural Protection

Natural security ought to be a crucial component of the development interaction in order to achieve a stable turn of events. Natural insurance is positively not an essential part of the shale gas improvement since it is related to the creation of natural issues:

- Air contamination.
- Water defilement.
- Squander the executives.

- The production of shale gas decreases interest in environmentally friendly power sources. Preservation of Human Resource

Individuals can assume an essential part in the usage and preservation of the climate. The information and expertise on the minding of the earth ought to be created. Human asset is to be created by giving instruction, medical services, and preparation. The standards of a viable turn of events are embraced by human assets. Expansion in Peoples' Participation

Economical advancement can't be kept up with actually. A joint exertion of each and every individual is crucial.

Public cooperation ought to be increased in order to decipher the concept of reasonable advancement directly into it. In this way, every program of reasonable turn of events should include inspirational public perspectives. Protection of Cultural legacy

The public's significant commitment to the preservation of social customs, strict places, and social legacy has been emphasized by practical advancement, but bizarre ideas should be avoided. To ration protection upholds the economical turn of events.

The public's character is reflected in the social legacy's property, locations, scenes, customs, and information. It passes on the upsides of the general public from one age to another, what's more, the protection of this legacy cultivates the manageability of advancement. Social legacy parts should be recognized, safeguarded, and upgraded, taking their inborn unique case and delicacy into account.

Included inside Carrying Capacity of Earth

Improvement work should be inside the conveying limit of the earth. People aren't going to get everything they want from the earth right away. The earth has restricted assets. The restricted means and assets on the earth can't be enough for the limitless method for individuals. Over-double-dealing of the assets adversely affects the climate.

Mindful creation and utilization

Creation and utilization designs should be changed altogether to make the creation and utilization more feasible and then some socially and naturally mindful, specifically through an eco-efficient approach that evades squandering and advances the utilization of assets.

- Drinking enormous measures of water
- Producing various forms of contamination, including light contamination, air contamination, and water pollution
- Undermining the ground
- No mindful utilization: Shale gas is a petroleum product and its utilization is as untrustworthy as other previously existing petroleum products.

Precaution and Abjuration Preventative, rehabilitative, and alleviating actions should be initiated in the event of a known gambling problem, with attention paid to activities at the source. Whenever there are dangers of genuine or irreversible harm, the absence of full logical conviction should not be utilized as an explanation for delaying the reception of compelling measures to forestall ecological debasement.

It goes against common sense to not have a ban. There are still numerous vulnerabilities regarding the impact of the shale gas industry today. Bunches of exploration cautions against the innovative imperfections of this industry. In any case, there is no ban in place.

Monetary Efficiency

The economy of Québec and its locales should be powerful, intended for advancement and monetary success that is helpful for social advancement, and deferential to the climate.

- It has been demonstrated that there is no monetary advancement from shale gas for the locale of Quebec.
- Monetary review considering the climate and social impacts appears to be not to be the situation in the momentum.

Cooperation and Engagement

The cooperation and responsibility of residents and residents' bunches are expected to characterize a deliberate vision of improvement, what's more, to guarantee its ecological, social, and financial supportability.

Admittance to information

Measures good for instruction, admittance to data, and research should be urged to invigorate development, bring issues to light, and guarantee the successful interest of people in general in the execution of manageable turn of events.

Advantages of Sustainable Development

A Sustainable building has the following ten advantages:

1) Increased energy efficiency is one of the primary advantages of sustainable construction. It can reduce carbon footprints because they use less energy. In addition, energy-efficient technologies such as double-paned windows and insulation are utilized.

2) Water efficiency: Water is also saved in sustainable buildings. They use low-flow toilets, showers, and faucets and implement rainwater harvesting systems. As a result, water is saved, water bills are reduced, and local water resources are less strained.

3) Enhanced indoor air quality: Indoor air quality is improved by sustainable buildings. They use low-emission materials, have sound ventilation systems, and promote healthy indoor air by reducing pollutants and allergens.

4) Durability: Sustainable buildings frequently employ durable materials. Both the amount of waste produced and the frequency with which repairs and maintenance are required are reduced as a result.

5) Better Health: Sustainable buildings promote better health for those who use them. The air quality is better, natural light is encouraged, and green spaces are available. This can lead to reduced stress levels and improved mental and physical health.

6) Increased Productivity: Sustainable buildings have been shown to increase productivity. A healthier, more comfortable work environment leads to higher motivation and engagement.

7) Cost Savings: Although Sustainable buildings may have a higher upfront cost, they can result in significant cost savings in the long term. Energy-efficient buildings reduce energy bills, and water-efficient buildings reduce water bills.

8) An boom in property value: Sustainable buildings are often greater treasured than conventional ones. They in high demand and can fetch a better hire or sale rate.

9) Environmental Sustainability: Environmentally pleasant homes reduce the effect on the environment. They sell sustainable practices, lessen waste, and preserve assets.

10) growing call for within the marketplace clients and groups alike are increasingly seeking out environmentally friendly homes. As a end result, sustainable building technology and practices have attracted greater funding.

Risks of Sustainable improvement

High prices one of the main risks of sustainable improvement is that it may be luxurious. The initial funding required to put into effect sustainable practices together with green infrastructure and renewable strength may be excessive. This will deter a few businesses and individuals from adopting sustainable practices.

Restrained availability of sources

Every other disadvantage of sustainable development is that some resources required for sustainable practices can be confined. as an instance, the availability of a few renewable strength resources, consisting of wind and sun strength, may be restricted in sure regions.

Cultural and social barriers

Sustainable development may additionally face cultural and social barriers, particularly in communities with deeply ingrained conventional practices. this may make it difficult for sustainable practices to be followed and carried out.

Slow development

Sustainable improvement is an extended-time period manner that calls for full-size time and resources. which means that progress can be sluggish and incremental, which may be frustrating for folks that need to peer immediately results.

Sustainable improvement is based on the unique pieces of the puzzle working together. The false impression that sustainability is only about protecting the planet endangers our collective attempt to achieve the SDGs. Sustainable development goals consist of getting rid of poverty, finishing hunger, imparting exact health and training, reaching gender equality, lowering inequality, and promoting financial improvement.

The U.N.’s SDGs offer a path forward, however shopping for into the global vision requires participation from all sectors of society. without collaboration on operating toward the shared vision of sustainable improvement, development is slow and piecemeal.

Governments that fail to enact coherent regulations around sustainable improvement placed their very own populations at risk. those governments that do take part want partners from different governments and companies to conquer roadblocks and streamline the implementation of sustainability and sustainable development techniques.

the ones in sustainability roles can use their management, crucial thinking, and negotiation capabilities to assist groups and communities mitigate the consequences of these demanding situations.

economic growth and wellness

financial growth commonly refers to an increase within the level of products and offerings produced by way of an financial system, as predicted by means of measures inclusive of Gross domestic Product (GDP). whilst GDP and different comparable measures replicate the value of products and services furnished thru the marketplace, they exclude many others that aren't provided through the marketplace but that nonetheless contribute to standard welfare. as an instance, voluntary and unpaid sports or paintings inside the home, and many services furnished by means of the herbal surroundings in facilitating economic activity. As an end result, GDP does no longer reflect a number of the elements that affect the society’s wellbeing6. Human wellbeing is a complex and diverse idea, decided by using a wide-range of factors such as degrees of profits (absolute and relative), health reputation, academic attainment, housing conditions and environmental nice. It has on occasion been characterized in phrases of self-stated or subjective happiness. Many research has determined that increases in GDP in high-income nations do no longer bring about subsequent increases in degrees of happiness7. however, some others have found to the opposite; for example, Stevenson and Wolfers (2008) discover a strong relationship among will increase in GDP and increases in suggested well-being for each advanced and growing countries8. in the absence of a courting among GDP

and self-stated happiness, it's miles well worth focusing on the variety of things affecting well-being. A current report by using the fee at the

measurement of financial overall performance and social development identifies a number of dimensions to wellbeing – material dwelling standards, fitness, education, personal sports such as paintings, political voice and governance, social connections and relationships, environment (gift and destiny situation), and lack of confidence (of an economic in addition to a physical nature). but, while health is a multi-dimensional idea, financial boom remains a crucial aspect in using or allowing enhancements along lots of these dimensions. it's far important for assisting endured enhancements in material residing standards, fitness, existence expectancy, schooling and economic possibility, and to help the authorities supply on more than a few monetary, social and environmental objectives.

The debate over financial growth and the surroundings

at the same time as economic boom has produced many blessings – raising requirements of dwelling and enhancing high-quality of lifestyles across the world – it has additionally resulted inside the depletion of natural sources and the degradation of ecosystems. there was an awful lot debate over whether or not it is viable to achieve economic growth without unsustainably degrading the environment, and a developing realisation that financial increase at the contemporary price of depletion and degradation of environmental belongings can't retain indefinitely. as an instance, the boom in CO2 levels within the environment because of human activity manner that the arena is already locked into some weather exchange, and faces a main venture to hold global temperature rises to beneath two stages. in the context of environmental resources greater commonly, the Millennium atmosphere assessment (2003) found that 15 out of the 24 ecosystems services it examined have been being degraded or used unsustainably, and the use and consumption of herbal sources consisting of minerals and metals keeps at an growing pace. a few take the view that the finite assets of the Earth region limits on the extent to which economies can hold increasing within the long-term.

Others consider that the use of environmental sources sustainably is steady with persisted monetary increase, with the charges of inaction probably to be far greater than the fee of acting now. This paper targets to discover the function of the herbal surroundings in assisting and contributing to economic growth, and the function of environmental coverage in achieving advanced environmental results in approaches that are well matched with the long-term health and balance of the economic system. It does now not try to solution the question of what the sustainable degree of financial growth is probably, however as an alternative evaluations the evidence and units out an method for securing environmentally sustainable monetary increase – for clear-cut and destiny generations.

economic as opposed to uneconomic increase

each the neoclassical and the degrowth angle understand that human properly-being and GDP are handiest nicely-aligned if the latter as it should be displays the fee that society puts on suitable financial output (e.g., fitness or training) as well as its undesirable aspect-effects (e.g environmental pollution). distinct perspectives at the feasibility and desirability of endured financial growth can subsequently be straightforwardly discussed in phrases of the advantages and social fees related to financial hobby, as illustrated in determine . whereas benefits end result from elevated consumption possibilities, prices result from environmental affects. It seems affordable to assume that the relationship among GDP and its related benefits (blue line) is concave, in keeping with diminishing returns to consumption of monetary in addition to non-economic conceptions of well-being with each extra unit yielding a lower additional benefit, consumption features diminishing returns; as an instance, pleasurable basic wishes make a bigger contribution to human properly-being than luxurious intake. as long as GDP growth is observed through a proportional increase of emissions, there are excellent reasons to trust that the connection among GDP and environmental degradation (inexperienced line) is convex. such a greater than proportional growth of environmental impacts may want to as an instance rise up from nonlinear climate damages related to irreversible tipping points in the Earth gadget that could doubtlessly destabilize the entire climate device and result in catastrophic losses at the equal time, opportunities to conform to climate influences, despite the fact that technologically and economically possible, may face extreme social and political constraints. finest intake is then acquired at the factor at which

the internet advantages of economic interest is maximized (i.e., the marginal advantages of financial activity same its marginal prices).

Any growth in GDP beyond this factor will absolutely lower human well-being, and hence bring about what's on occasion called “uneconomic growth”. similarly, passing the edge at which environmental damages emerge as so huge that they lessen the net benefits of economic hobby to a volume that does not even permit for

subsistence intake consequences in a regime of ecological fall apart.

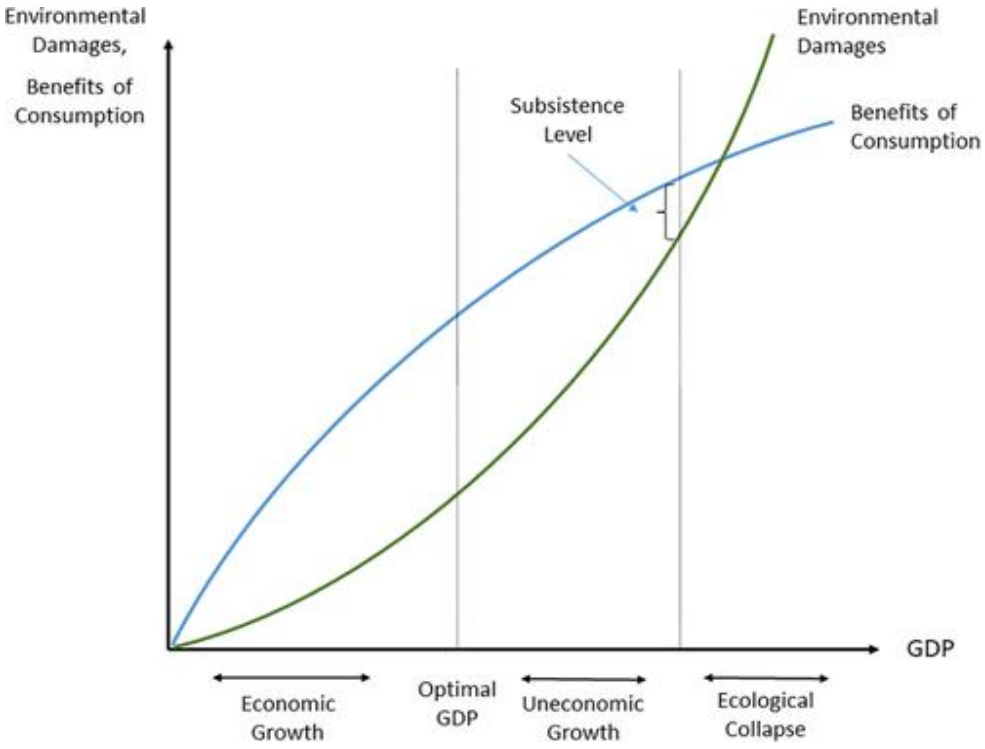


FIGURE 1

Benefits of economic activity versus their associated environmental impacts

Diverse viewpoints in the discussion of growth versus environmental sustainability can be categorized based on their stance regarding our position in Figure 1. Those who contend that we are still positioned on the left of optimal consumption suggest that anticipated economic growth will produce benefits that significantly outweigh its environmental repercussions. Conversely, those who assert that we currently reside on the right side of the optimum consumption point,

especially in affluent nations, view additional economic growth as potentially making us poorer and driving us nearer to ecological disaster.

More distinct divergences are evident when it comes to the suggested methods for preventing severe climate change. Advocates of degrowth propose curbing economic production—either through reducing output or slowing its growth rate—to prevent unsustainable growth or ecological degradation (the aim is to halt our shift to the right or even retreat left. However, it is crucial to recognize that while this strategy may be appropriate for developed nations, it would not be suitable for developing countries that must enhance their consumption levels to meet the basic needs of their populations. For these nations to allow for additional GDP growth, wealthier nations would have to considerably decrease their own economic output. Even disregarding the feasibility of such drastic cuts in consumption from a political standpoint, this would likely influence not only luxury items. If not managed properly, cuts in economic output could also affect essential services such as healthcare, education, and social welfare, leading to negative effects on human welfare.

An opposing viewpoint to deliberate reductions in economic activity is that growth stems from new ideas and increased productivity. Countries that undergo rapid economic growth also tend to achieve greater efficiency, showing that rising economic growth does not necessarily mean a higher use of resources and energy. On the other hand, nations with slow economic advancement often have poor environmental outcomes, exemplified by the wasteful energy usage in the Soviet Union or extensive deforestation in the Congo, both lacking any economic progress, which places a higher demand on environmental resources. Therefore, if slower economic growth is associated with less efficient use of resources, it may not result in improved environmental conditions.

Connection between economic growth and environmental quality

While the earlier section emphasized the significance of natural resources for economic development, this part examines how economic growth relates to environmental health and its key influences.

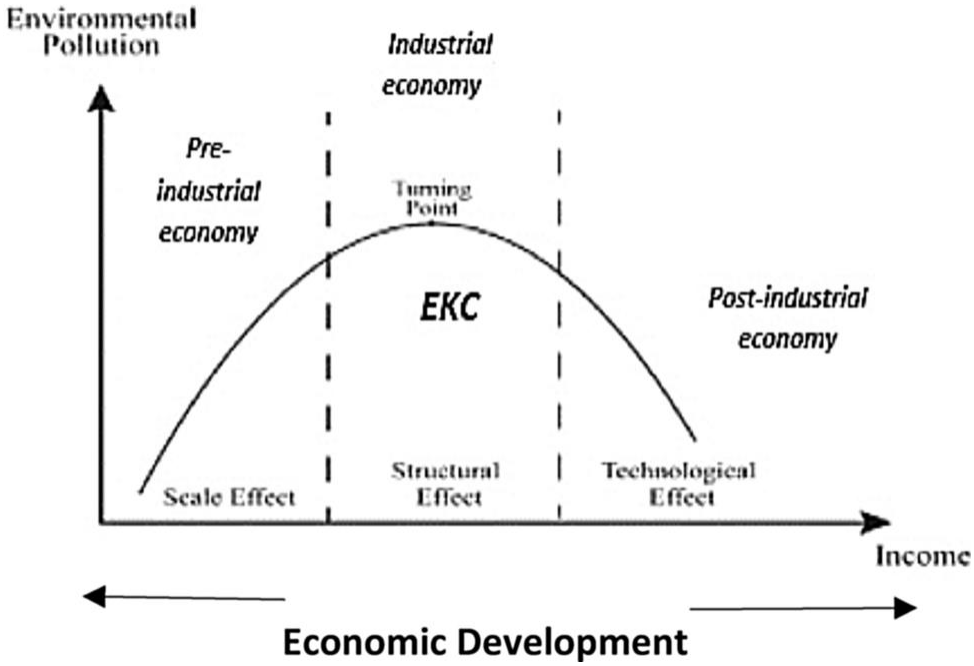
Environmental Kuznets Curve

The Environmental Kuznets Curve (EKC) is frequently referenced to illustrate the connection between economic growth and environmental health. It suggests that there is an inverted U-shaped correlation between per capita economic output and certain indicators of environmental health.

The curve's structure can be interpreted as follows: as per capita GDP increases, environmental harm also rises.

However, after reaching a specific threshold, further increases in per capita GDP result in a decrease in environmental damage. More specifically:

- at low income levels, reducing pollution is not a priority since people prefer to use their limited resources to satisfy basic needs;
- once a particular income level is reached, individuals start to weigh the balance between environmental well-being and consumption, leading to a slower increase in environmental harm; and
- after surpassing a certain point, investment in reducing pollution takes precedence as individuals favor enhancements in environmental quality over additional consumption, resulting in improved environmental conditions alongside economic growth.



Other possible causes for the shape of the EKC include:

• Technological progress: corporations to start with give attention to expanding manufacturing as speedy as possible, however as technology evolves manufacturing approaches turn out to be cleanser and more resource green;

• Behaviour change: society is at the start interested by better stages of consumption, irrespective of the skill by using which it's far accomplished, however after a sure point extra attention is given to other factors affecting quality of lifestyles, such as the environment;

• Lewis increase model: the improvement sample of any economy is characterized by using the converting patterns of financial hobby. degree 1: society concentrates assets inside the primary quarter (i.e. extraction, agriculture) to satisfy vital consumption; level 2: resources are switched to the secondary sector (i.e. production) as basic needs are cosy and in addition intake is focused on intake items; and level three: society movements from the secondary to the tertiary sector (i.e. offerings) characterized by means of much lower tiers of pollution. however, this version is less relevant in a more and more globalised international wherein the flow from stage 1 to a few might also occur as the end result of a shift rather than a discount inside the degrees of pollution.

The Environmental Kuznets Curve courting was to start with observed for some elements of air pollution (suspended particles and NOX), and the turning factor – or the point beyond which will increase in GDP in line with capita result in discounts in emissions – used to be estimated to be $5,000. subsequent research has estimated the turning point to be commonly better, but have found proof of the EKC applying to a larger set of environmental variables. more current reviews estimate the turning factor at $34,000. in line with those research, maximum reasonably advanced countries can assume to attain their pollution top through the centre of this century – only 10% are drawing near that factor now and reasonably evolved international locations' emissions will now not return to contemporary stages before the stop of the twenty first century. One excessive coverage implication of the EKC might be to inspire economic growth and keep away from luxurious environmental guidelines – mainly in evolved countries which have long gone beyond their turning factor. a few argue that

the early implementation of tight environmental rules ought to absolutely harm increase, and purpose multiplied but, there are numerous reasons to question the relevance of the EKC speculation to coverage-making.

First, the definitions of environmental fantastic generally used in EKC analyses are based totally on a confined set of pollution. As such, the conclusions reached by means of those analyses are not relevant to all forms of environmental damage. as an example, there has been no evidence of an EKC dating within the Ecological Footprint – a mixture measure of the pressure human beings place at the environment – unless energy use was eliminated from the measure. The Environmental Kuznets courting appears strongest for pollutants with vast local affects. For carbon and different greenhouse gases, then again, where the impacts are international and diffuse, emissions have persevered to upward shove with increases in income consistent with capita – even in the richest Nations. second, the econometric proof put forward in aid of the EKC has been observed to be much less reliable and sturdy than previously concept. as an example, the selection of version used to explain the connection among income and pollutants has a extensive impact on the outcomes of the evaluation., the life of hysteresis may reduce the relevance of EKC to environmental policy. specifically, the fees of repairing damage and improving environmental high-quality once the economy is past its turning point may be significantly better than the fee of preventing the harm or task mitigation earlier; as an instance, cleansing up a polluted waterway, in which the fee of averting the pollution within the first region is decrease than the following price of the cleanup.

Fourth, it has been proven that nations with similar tiers of wealth carry out in a different way, except any clean or systematic signs of convergence. moreover, it's far been counselled that the reducing a part of the EKC exists just for economies with much less inequality and a distinctly uniform distribution of wealth. e therefore, even as there's some evidence of an EKC relationship current for certain international locations and for certain nearby pollutants, it cannot be generalised to all forms of environmental damage and across all countries and income tiers. furthermore, it has constrained use as a predictor of environmental overall performance as international locations develop. environmental harm ultimately.

Environmental threats

The arena is facing a large number of environmental threats, many of that are already having devastating outcomes. With each passing yr, those threats solely develop more pressing, and the need to cope with them becomes increasingly pressing. In 2023, the world will preserve to face great demanding situations inside the fight in opposition to climate alternate, deforestation, and plastic pollution, amongst many others.

climate exchange

one of the maximum massive environmental threats going through the world nowadays is the effect of climate alternate. rising global temperatures, melting polar ice caps, severe weather events, and loss of biodiversity are just a number of the outcomes of this swiftly unfolding crisis.

Growing international Temperatures

one of the most visible influences of weather trade is the rise in international temperatures. consistent with NASA, the past decade has been the warmest on report, with 2020 rating the various hottest years on document. This upward push in temperatures is driving a number of other environmental problems, which includes rising sea ranges, extra frequent and excessive heatwaves, and multiplied chance of drought in some regions.

Melting Polar Ice Caps and growing Sea tiers

The melting of the polar ice caps is another widespread outcome of weather trade. as the ice melts, international sea levels upward shove, with potentially catastrophic results for low-lying areas and island nations. this could cause accelerated flooding, coastal erosion, and more than a few other poor impacts.

Intense climate activities and natural disasters

The effect of climate exchange also can be visible within the growing frequency and severity of extreme climate occasions, consisting of hurricanes, floods, and wildfires.

those activities can motive enormous damage to infrastructure, disrupt food resources, and displace hundreds of thousands of people from their houses and groups.

lack of Biodiversity and Ecosystems

finally, climate alternate is contributing to the lack of biodiversity and ecosystems round the arena. As temperatures rise, species are forced to conform or die, leading to a decline within the range and type of species on earth. This lack of biodiversity can have a ways-attaining results for ecosystems and the offerings they provide, which include easy water and air, fertile soil, and pollination of plants via bees and other bugs.

Deforestation and Habitat Destruction

any other significant environmental threat dealing with the sector these days is deforestation and habitat destruction. this is pushed by a variety of things, along with agricultural expansion, urbanization, and the demand for wood products.

The Amazon Rainforest disaster

The Amazon rainforest is one of the most biodiverse and ecologically treasured regions on this planet, but it's also below threat. Deforestation prices within the area have extended substantially in recent years, driven in part by means of the demand for agricultural land and the expansion of the cattle enterprise. This destruction of the Amazon rainforest is a first-rate contributor to weather exchange, in addition to a substantial lack of habitat for flora and fauna.

The Amazon rainforest is domestic to an anticipated 10% of the world’s known species, which include many that are endemic to the region. The loss of this habitat is having a devastating impact on flora and fauna populations, with many species facing extinction. for example, the Amazon river dolphin, one of the maximum iconic animals of the vicinity, is beneath danger as a result of habitat destruction and pollutants of its habitat.

further to the lack of biodiversity, deforestation within the Amazon is likewise contributing to weather alternate. trees take in carbon dioxide from the surroundings,

and while they're cut down or burned, that carbon is launched lower back into the atmosphere. The Amazon rainforest is a quintessential carbon sink, and its destruction is exacerbating the results of climate exchange.

The impact on natural world Populations

The destruction of forests and other habitats round the world is likewise having a considerable impact on natural world populations. Many species are declining in variety or going through extinction owing to habitat loss, especially people who rely on particular surroundings for their survival. This loss of biodiversity will have a ways-accomplishing impacts on ecosystems and the services they offer.

for example, the lack of pollinators inclusive of bees and butterflies can have a great effect on meals security, as many crops depend upon those insects for pollination. The lack of predators also can lead to an boom in populations of herbivores, which can in flip have bad impacts on plants and different species.

The role of Agriculture and Urbanization

Agriculture and urbanization are two of the number one drivers of deforestation and habitat destruction international. As the worldwide population maintains to develop and demand for food and housing will increase, the pressures on herbal ecosystems will only preserve to mount. Addressing those systemic problems would require a combination of policy adjustments, technological innovation, and changes in consumer behaviour.

One potential solution is to shift towards extra sustainable agricultural practices, consisting of agroforestry and regenerative agriculture, which can help to repair degraded ecosystems and decrease the want for brand spanking new agricultural land. Urbanization can also be made more sustainable through measures together with green roofs and partitions, which could help to provide habitat for flora and fauna and reduce the city warmness island impact.

Reforestation Efforts and solutions

One capacity technique to the trouble of deforestation is reforestation. through planting new trees and restoring degraded ecosystems, we can help to rebuild habitats and sequester carbon from the atmosphere. there are many initiatives around the sector

targeted on reforestation, which includes the Trillion bushes marketing campaign, and those efforts could make a extensive distinction within the fight in opposition to weather alternate and habitat destruction.

in addition to reforestation, there are many other solutions that can assist to cope with the trouble of deforestation and habitat destruction. these consist of lowering the demand for wood products thru measures consisting of recycling and using opportunity materials, protective essential habitats through measures such as countrywide parks and flora and fauna reserves, and selling sustainable land use practices thru rules and incentives.

In the end, addressing the hassle of deforestation and habitat destruction will require a concerted attempt from governments, organizations, and individuals around the world. by using operating collectively, we will assist to defend the sector's biodiversity and ensure a sustainable destiny for generations to come back.

Plastic pollutants and Waste control

sooner or later, plastic pollution is some other giant environmental risk facing the sector nowadays. Our dependence on unmarried-use plastics and a throwaway tradition have caused mountains of plastic waste, lots of which ends up in our oceans and ecosystems.

Plastic pollutants is a developing difficulty round the world. it's miles envisioned that 8 million lots of plastic waste come to be in the ocean every year, and this variety is predicted to increase in the coming years. This plastic waste can have a devastating effect on marine existence, in addition to at the fitness and nicely-being of ocean ecosystems.

The wonderful Pacific garbage Patch

The extraordinary Pacific garbage Patch is one of the best-recognized examples of the effect of plastic pollutants on the sector's oceans. This huge accumulation of plastic waste, located among Hawaii and California, is expected to be two times the size of Texas and growing. As plastic accumulates in the ocean, it is able to damage marine lifestyles, disrupt meals chains, and have other poor influences on the fitness and properly-being of ocean ecosystems.

The exquisite Pacific rubbish Patch isn't the only vicinity suffering from plastic pollution. Plastic waste can be determined in oceans round the arena, such as within the Arctic and Antarctic. that is a international problem that calls for a worldwide answer.

Microplastics and their effects on Marine life

further to larger plastic objects, microplastics also are becoming a giant problem. these tiny debris of plastic, frequently much less than 5mm in length, can be ingested by marine life, main to a variety of negative fitness effects. this may encompass digestive troubles, entanglement, or even dying.

Microplastics can come from a variety of resources, such as the breakdown of larger plastic gadgets, microbeads in non-public care merchandise, and even artificial fibers from apparel. As these particles collect within the ocean, they can have a full-size effect on the health and well-being of marine life.

Plastics and customer behavior

even as plastic pollution is a systemic issue, it is also driven in part with the aid of individual patron habits. the amount of plastic waste we produce as a society is directly tied to the alternatives we make as people, from the products we buy to how we remove them. via making aware alternatives to lessen our plastic use and undertake more sustainable conduct, we can all play a role in addressing this fundamental environmental mission.

reducing our use of single-use plastics is one of the most effective methods to deal with plastic pollution. this might consist of the use of reusable baggage, water bottles, and boxes, as well as selecting merchandise with minimal packaging. by means of making those small modifications in our everyday lives, we can help reduce the quantity of plastic waste that finally ends up in our oceans and ecosystems.

Modern Recycling and Waste reduction techniques

finally, efforts to address plastic pollution have to also consist of modern recycling and waste discount techniques. this may encompass growing new technology to transform plastic waste into usable merchandise, in addition to selling the use of reusable boxes and packaging substances. by way of working together to increase and put in force these solutions, we can help to create a extra sustainable and resilient destiny for all.

there are numerous innovative solutions being advanced to address plastic pollution. for example, researchers are running on developing biodegradable plastics that smash down quickly and do not harm the surroundings. different researchers are operating on developing new recycling technologies that may turn plastic waste into treasured raw materials. by using making an investment in those innovative answers, we will assist to create a more sustainable future for all.

From MDGs to SDGs:

The Sustainable development Goals (SDGs), the center-piece of the 2030 agenda for Sustainable improvement, were followed by way of the United international locations Sustainable improvement Summit in September 2015. This briefing sheet explains the formation of the SDGs and examines elements which could make a contribution to or restriction their fulfilment.

The 2030-time table for Sustainable development, adopted through all United international locations Member States in 2015, offers a shared blueprint for peace and prosperity for human beings and the planet, now and into the future. At its heart are the 17 Sustainable improvement goals (SDGs), which can be a pressing call for movement by using all international locations - developed and developing - in an international partnership. They recognize that finishing poverty and other deprivations ought to move hand-in-hand with techniques that improve health and training, reduce inequality, and spur financial boom – all whilst tackling weather alternate and running to maintain our oceans and forests.

The SDGs build on many years of labour with the aid of countries and the UN, including the UN department of economic and Social Affairs

- In June 1992, on the Earth Summit in Rio de Janeiro, Brazil, extra than 178 nations followed schedule 21, a complete diagram of motion to construct a worldwide partnership for sustainable development to improve human lives and guard the environment.

- Member States unanimously followed the Millennium announcement on the Millennium Summit in September 2000 at UN Headquarters in new york. The Summit brought about the elaboration of 8 Millennium development dreams (MDGs) to lessen intense poverty by way of 2015.

- The Johannesburg announcement on Sustainable development and the diagram of Implementation, followed at the world Summit on Sustainable improvement in South Africa in 2002, reaffirmed the worldwide network's commitments to poverty eradication and the environment, and constructed on time table 21 and the Millennium statement by using which include extra emphasis on multilateral partnerships.

- on the United international locations convention on Sustainable improvement (Rio+20) in Rio de Janeiro, Brazil, in June 2012, Member States followed the outcome report "The future We need" in which they determined, inter alia, to release a process to expand a fixed of SDGs to construct upon the MDGs and to establish the UN excessive-stage Political forum on Sustainable development. The Rio +20 outcome additionally contained different measures for imposing sustainable improvement, such as mandates for future programmes of work in improvement financing, small island developing states and greater.

- In 2013, the overall assembly set up a 30-member Open operating organization to expand a suggestion at the SDGs.

- In January 2015, the overall meeting started the negotiation technique on the put up-2015 improvement schedule. The system culminated within the subsequent adoption of the 2030 agenda for Sustainable development, with 17 SDGs at its middle, at the UN Sustainable development Summit in September 2015.

- 2015 used to be a landmark year for multilateralism and global policy shaping, with the adoption of several predominant agreements:

- Sendai Framework for disaster chance discount (March 2015)

- Addis Ababa movement time table on Financing for development (July 2015)

- remodelling our international: the 2030 schedule for Sustainable improvement with its 17 SDGs was adopted on the UN Sustainable development Summit in big apple in September 2015.

- Paris agreement on climate alternate (December 2015)

- Now, the annual excessive-stage Political forum on Sustainable development serves because the central UN platform for the follow-up and assessment of the SDGs.

these days, the division for Sustainable improvement goals (DSDG) in the United Nations branch of financial and Social Affairs (UNDESA) provides major assist and potential-constructing for the SDGs and their related thematic problems, inclusive of water, electricity, climate, oceans, urbanization, shipping, science and generation, the worldwide Sustainable development record (GSDR), partnerships and Small Island

growing States. DSDG performs a key function inside the assessment of UN systemwide implementation of the 2030 agenda and on advocacy and outreach activities regarding the SDGs. for you to make the 2030 schedule a truth, broad possession of the SDGs need to translate right into a sturdy dedication through all stakeholders to put into effect the global goals. DSDG aims to help facilitate this engagement.

In September 2000, at the UN Millennium Summit, the UN fashionable meeting followed the United nations Millennium announcement. The declaration, which referred to as for a worldwide partnership to reduce severe poverty, was once the primary ever worldwide method with quantifiable objectives to be agreed upon by way of all UN member states and the world's main development institutions. To assist the statement, former UN Secretary preferred Kofi Annan mounted eight accompanying targets. these goals (listed under) had been set with a closing date of 2015 and became known as the Millennium improvement dreams (MDGs).

The effectiveness of the MDGs has been the problem of great debate. Supporters argue that the development agenda promoted by the MDGs has spearheaded an remarkable international movement towards extreme poverty, decreasing it by means of extra than 50 percentage globally. prior to their enactment, character campaigns geared toward the thematic areas within the MDGs – inclusive of eliminating earnings poverty and promoting literacy – have been already underway, however prior to the MDGs that they had no longer been conceived as a coherent catalog of dreams at the worldwide level. Critics, on the other hand, note that progress on the precise objectives start off with the aid of the MDGs has been each domestically and thematically unbalanced. this is because many nations followed a "piecemeal method", selecting to have interaction with some but now not all of the MDGs. This has been attributed to the fact that the MDGs solely applied to countries of the worldwide South, and that they had together performed a minimum role of their design. therefore, the MDGs have been perceived by using several critics as a platform that was once imposed at the growing international locations by the more advanced.

In sharp contrast to the MDGs, the Sustainable improvement goals (SDGs) are uniformly relevant to all international locations of the world, doing away with the

“developing” as opposed to “developed” dichotomy that left the MDGs open to complaint. And at the same time as there are similarities in regard to the format of the MDGs and the SDGs – e.g. each framed the worldwide development agenda for a 15-yr duration – the SDGs have drastically improved on the dimensions and content of the MDGs. The SDGs are targeted on a international development with and-for sustainability, and exhibit a grasp that the surroundings isn't an add-on or in opposition to sustainable improvement, however as a substitute the base that underpins all other dreams. As a end result, whereas the MDGs maintained a retrospectively narrow attention on poverty discount, the SDGs encompass new subject matters which reflect an method that sees the environment, financial system and society as embedded systems instead of separate competing “pillars”: e.g. city areas, water and sanitation, electricity, and climate exchange are all prominently featured. some other sizable distinction between the MDGs and SDGs is how they were created: the crafting of the SDGs has been appeared as an unheard-of participatory coverage system, and that is pondered of their scale and ambition. A UN Open operating institution (OWG) made from 70 international locations sharing 30 seats was set up in 2013 to draft the SDGs and was tasked with incorporating various stakeholders into their negotiation process. As a end result, growing countries have been capable of offer tremendous enter into the content material, as have neighbourhood and subnational governments, and distinguished actors from civil society and the personal region.

The experience of the MDGs demonstrates that after offered with ambitious targets for improvement, international locations will frequently opt to use their personal dreams as a benchmark for development. because of this, empowering a variety of nonstate actors for implementation may be a key driving force in their fulfilment. For even though it appears that monitoring development at the SDGs can be cantered on the country wide degree, cities and concrete regions are wherein a superb amount of the implementation and tracking will occur. nearby government and groups want to be empowered as a consequence. this means setting up a collaborative stability among neighbourhood governments, states, and countrywide governments, as well as related to and maximizing the contributions from stakeholders and all ranges of administration within cities and regions - as well as the groups they serve. some other key to making the SDGs a fulfilment might be ensuring the move-slicing troubles of sustainable production and intake are a priority. this might be finished through moving towards

financial fashions which can be right away sustainable and inclusive. cities, which can be the central hubs of each innovation and the worldwide economy, are where the transition to such sustainable financial fashions will maintain to occur. but this transition does no longer only talk to the arena's iconic megacities; small and medium sized cities contain the statistical majority of urban areas and are experiencing rapid increase rates, yet they're at present dealing with the maximum good-sized resource/capacity gaps. cantered sustainable monetary and institutional development inside these urban regions could have a effective impact at the achievement of the SDGs. lastly, with worldwide urbanization forecasted to maintain during the route of the 2030 schedule for Sustainable improvement, we can probably see the endurance of challenges to the SDGs – such as making plans, employment, aid control, demographics, and service provision. those demanding situations require a strategic long-term making plans angle with focus at the inter-linkages within areas, due to the fact progress at the SDGs will not be made if a rustic is purely taken into consideration as a separate unit or if a district or town is considered in isolation. achievement within the SDGs that are specifically pass-cutting can excellent be finished thru effective vertical integration; this indicates all ranges of government operating collectively to align and accelerate strategic moves, mobilize appropriate sources, and engage key stakeholders.

Challenges faced by SDGs

The on the spot difficulty is that the objectives set up within the SDGs can be considered as the "ceiling" for achievement instead of the "floor" that's essential for global sustainability. This concern has no longer been lessened by using the challenges to how the SDGs might be applied, monitored, and financed.

lacking out on integration potential - a main project facing the successful implementation of the SDGs is the opportunity that countrywide governments will pick to attention solely on the dreams that align with their existing improvement time table. The undertaking posed with the aid of this technique is that the SDGs have been designed as an incorporated vehicle for sustainable improvement; wherever viable, move-slicing indicators were installed location, mainly in regard to housing, health, gender equality, manufacturing and consumption, and employment. lack of motion on one intention can compromise their collective achievement. two. statistics and

monitoring demanding situations - As was once the case for the MDGs, tracking of the SDGs may be finished by way of countrywide statistical places of work with the assist of diverse UN corporations. but many countries had been not able to get entry to the capability critical to acquire, analyze, and disseminate the information required for reporting their development on the MDGs. there is difficulty that the SDGs will suffer comparable shortfalls in regard to ability for tracking, as there at the moment are even more desires and goals which ought to be monitored.

Financing & the North-South divide - The most contentious challenge facing the SDGs is in regard to how they may be financed, as present day projections estimate the desires for financing their implementation and tracking to be around $17 trillion. it is inside this debate that the “evolved” as opposed to “growing” US dichotomy re-emerges. “evolved” countries are pushing for the mobilization of home resources, wherein every UN member kingdom can be answerable for securing its very own investment, while “growing” countries are calling for financing to be provided through the “advanced” nations via aid agreements. an answer may lie within a development finance version which could leverage and catalyse a combination of private funding, global and domestic public resources; however, without a solution to the finance question, the ambitious scope of the SDGs can be curtailed.

Unit-II

Economic Development

Rural-Urban Disparities

Extreme poverty is mainly a rural phenomenon. Four of every five people below the $1.90-a-day international income poverty line lived in rural areas in 2013. Over the last decades, however, there has been tremendous progress in reducing rural poverty, partly as a result of successful policies promoting economic opportunities for the rural poor and expanding social protection in rural areas.

This progress has not been equitable across the board. The same economic forces that reduce poverty, including rural development and urbanization, can increase inequalities. Moreover, poverty is now rising due to the COVID-19 crisis. All evidence points to increasing inequality as well. The pandemic and subsequent lockdown measures have affected urban areas disproportionately but have had a substantial impact on rural residents. Travel and transport restrictions disrupt the livelihoods of the rural poor, many of whom depend on mobility, seasonal and migrant work and remittances. In some nations, there has been a massive return of migrants to rural areas, largely due to job loss.

Rural-Urban Disparities are pretty vast in nature as a topic. There are several differences between rural and urban society in terms of architecture, education, career opportunities, etc. Generally, we see Indian society divided into rural society, urban society, and tribal society based on geographical locations and socio-cultural factors. The urban area consists of towns and cities. Before independence, the concept of rural and urban society was not valid. Just after the globalization process everything in the world was changing, the formation of towns and cities took place and the process of urbanization started from there itself. An urban area is the spatial concentration of people who are working in non-agricultural activities, in other words, the occupational components in the urban plethora are mainly official and industrial.

People living in urban areas get access to all modern amenities and services. Most people of urban areas live efficient, secure, and comfortable full lives. This is the most important reason why people are migrating from rural areas to urban areas: the

population in urban areas is increasing and the population of rural areas is decreasing, as a result, the cities and towns are so overpopulated that there is hardly any space left for habitation. It is said that the biggest slum area in Asia is in Dharavi, Mumbai because Mumbai is a megacity and there are a handful of opportunities for everybody.

A rural society or community can be classified based on a less human population, agricultural practices, less social differentiation, spatial mobility, etc. The main occupation of the rural area is agricultural work. There are few options other than that like mining, oil and gas exploration or working in the marketplace. The lifestyle of the rural area is completely different from an urban area mainly because in a rural area you have exposure to a very limited number of resources and services than an urban area.

Disparities Between Rural and Urban Areas

I. Educational Disparities: No doubt that Urban areas would have the best education system and infrastructure than rural areas. In the urban area, the educational institutions are very much advanced at both elementary and high school levels, and the urban area education system is made in such a way that students can get a better learning experience. On the other hand, in rural areas, there is no basic infrastructure or services available for the students, you will not find one private school or college over there and in government schools, teachers never attend classes only then can the student get access to proper education.

II. Healthcare Disparities: In this, we will learn about Urban Vs Rural Health Disparities**.** Urban Health and Medical systems are anyway better than rural ones. The urban area health sector is more developed and advanced than the rural health sector. In the rural healthcare sector, there are no proper medical devices available, they don't have proper infrastructure and most doctors over there are fraud. This is the reason why people of rural areas prefer to travel to urban areas to get medical facilities. The government of India has been working immensely in the section of decreasing the Urban Rural Health disparity**.**

III. Disparities in Employment Opportunities: Disparities between urban and rural areas are probably the most contrasted in this arena. Agriculture is said to be

the bread and butter of rural inhabitants. And about 60per cent of the population of our country is engaged in agricultural activities. Rest work in the non-agricultural sector or secondary and tertiary sector. Well, no doubt if you are interested to work in the tertiary or secondary sector you will get better options in urban areas. Other than farming, few more employment options have emerged in rural areas for a few years which includes working in the marketplace, mining, teaching, small-scale industries, etc.

IV. Architectural Disparities: In rural areas, people generally reside in small houses made up of huts, mud, thatched roofs, and their houses are mostly simple these houses are temporary which means these houses might get affected by natural disasters like floods, tsunamis, or heavy rain. On the other hand, an urban area mostly consists of big flats, and houses here are constructed with the help of cement, advanced technologies, and modern-day equipment which cannot affect these flats or houses easily.

V. Lifestyle Disparities: Basically, the lifestyle of rural people is very simple. They do day to day jobs in the agriculture sector or dairy or so, people of rural areas generally don't have access to electricity in their homes; they make their food on stoves. In urban areas, the lifestyle is more developed and improved, urban areas people are earning more due to more employment opportunities and this had increased the need for shopping, food, and new digital technologies so new products and services are being imported from other countries and new types of things have emerged in urban areas which had made urban areas' people lifestyle better.

Rural development and poverty reduction

Poverty remains mainly a rural challenge: 80 per cent of people in poverty live in rural areas; many developing countries present a large size of rural population; 18 per cent of rural residents lived in extreme poverty in 2013, compared to around 5 per cent of urban residents (Castañeda and others, 2018). Much like national poverty rates, rural poverty rates are the highest in sub-Saharan Africa, where more than 50 per cent of the rural population live in extreme poverty in numerous countries (see map).

The situation of the rural poor is made worse by inadequate access to public services, infrastructure and social protection. The COVID-19 pandemic has compounded their

already vulnerable position by reducing incomes, limiting mobility and undermining food security. Despite persistent rural disadvantage, poverty is declining faster in rural than in urban areas. A study of 19 countries with data shows that the rate of rural poverty reduction has been higher than that of urban poverty reduction in all countries but one. However, reaching the very poorest remains challenging. Over the past 30 years, developing countries have made little progress in raising the level of consumption of the poorest – they have been left behind.

Rural development and inequalities

While the rate of poverty is higher in rural than in urban areas, income inequality is often lower in the former, since top incomes are mostly earned in cities. This is the case in 44 of the 56 countries for which rural and urban income inequality estimates (based on the Gini coefficient) are available. Despite differences in inequality levels, trends are qualitatively similar in urban and rural areas. The fact that inequality tends to move in the same direction in both rural and urban areas – at least in countries with data – is not surprising. At the national level, rural and urban areas share common institutions and development patterns. Rural development is thus affected by national and regional contexts, particularly linkages between urban and rural areas.

Aside from income inequality, there has been some reduction in rural-urban gaps in access to basic services and opportunities. On average, progress in secondary school attendance, the reduction of stunting and access to electricity has been somewhat faster in rural than in urban areas since the 1990s (United Nations, 2020). Nevertheless, even if the progress observed in these dimensions of well-being continues at the same pace, it will take more than four decades to close rural-urban gaps in these dimensions of opportunity (ibid.). That is, under a business- as-usual scenario, rural areas will still lag far behind urban areas by 2030.

Within rural areas, inequalities in basic markers of opportunity – such as child health and school attendance – remain high and are persistent for specific groups. As shown in the United Nations World Social Reports 2020 and 2021, wealthier rural households with a well-educated head are almost as well off as the average urban household, while rural households in the bottom wealth quintiles with an uneducated head are far worse off. For indigenous peoples and ethnic minority groups, the available evidence suggests that wealth and opportunity gaps between them and the ethnic majority are

greater in rural than in urban areas. The overlay of gender with rural residence confers additional disadvantages to rural women, who face more obstacles to accessing education than rural men or women in urban areas and have lower levels of ownership and control of assets (including land), less access to paid employment and lower access to public services.

Reducing poverty and inequality in rural areas as complementary goals

Reductions in rural poverty have not always led to reductions in rural inequalities or in inequalities between rural and urban areas. The available data indicate that efforts to reduce rural poverty in the past did not always occur in tandem with efforts to reduce inequality. In China, India and Indonesia, for example, rural inequality increased or remained constant while rural poverty fell significantly between the 2000s and the 2010s.

Regional and time trends suggest that declines in inequality are not a systematic outcome of growth and development. The same economic forces that drive falling poverty can cause a rise in inequality within rural areas and between urban and rural areas. Agricultural development, a key driver of rural poverty reduction, can exacerbate rural inequality if those who are better off reap greater benefits from agricultural growth. Differences in the ability to take advantage of growth can arise from disparities among population groups in their access to resources such as land, education and labour markets. Inequality trends may also vary depending on the sector and nature of economic growth. Urbanization and diversification away from agriculture in developing countries, for instance, can concentrate economic returns in urban areas and wealthier households.

Persistent and growing inequality can be detrimental to growth and poverty reduction. In rural areas with high inequality, people in poverty – who are already disadvantaged in access to resources – benefit less from subsequent growth, or even from periods of agricultural expansion. Left unaddressed, challenges faced by the rural poor in trying to escape poverty and fulfil their potential ultimately led to constraints on rural economic growth.

Inequalities and rural areas

Most rural development strategies are designed to promote growth and reduce rural poverty. Few aim explicitly at reducing inequality. Yet more equitable and inclusive rural development does not occur naturally or in isolation of wider national trends. It requires promoting access to quality education, health and other services as well as opportunities for decent work, especially for the rural poor. It also calls for building resilience to shocks, addressing the degradation of natural resources and reducing inequality of opportunity both within rural areas and between rural and urban areas. Inclusive rural development therefore requires both localized rural policies and action at the national level. The right mix of economic and social policies, both rural and national, can spur economic development while reducing poverty and inequality in rural areas. There are five broad policy lessons from countries that have succeeded in reducing both rural poverty and rural inequality.

• Invest in infrastructure and public services. Sustained investments in roads, electrification, improved sanitation, safe drinking water, education, health care and the bridging of the digital divide in rural areas will be required to eradicate extreme poverty and to close rural-urban disparities. Such investments must also address inequalities in access to public infrastructure and services within rural areas to ensure that no area or group of people are left behind.

• Promote inclusive agricultural development. Agricultural growth is estimated to be two to three times as effective in reducing poverty as growth in other sectors and benefits mainly the poorest in society. The benefits of promoting inclusive agricultural development are both direct, through increased incomes and food security, and indirect, through increased investment in health and education.

• Ensure a fair distribution of and secure access to land and its natural resources. As populations and economies grow, and climate change affects natural resources, constraints on available land and natural resources may arise. Policy choices will influence whether this increased competition for resources leads to innovation and inclusive development or to degradation, scarcity and inequalities of access and control over these resources. A fair distribution is essential, regardless of whether tenure is based on individual or collective rights. Moreover, it is vital to ensure rural

women’s equal access to land and natural resources and address discriminatory laws and practices that impede their rights in this regard.

• Improve social protection coverage in rural areas. Social protection coverage in rural areas is generally lower than in urban areas. Few social protection programmes are explicitly tailored to rural populations or take into account their specific circumstances. There are legal, administrative and financial barriers that must be addressed in order to increase coverage of social protection in rural areas. To overcome these structural barriers, legal frameworks can be adjusted – such as through modifying contributory schemes – to account for informal employment and other forms of employment common in rural areas; participation in contributory schemes can be improved through subsidies; and the hidden costs of participation in all forms of social protection can be lowered, for example by offering one-stop shop solutions, utilizing digital platforms and reducing administrative red tape.

• End all forms of discrimination. Discrimination remains a persistent driver of inequality. Because of the systematic exclusion of ethnic minorities, indigenous peoples, women and other groups, the benefits of rural growth are likely to be unevenly distributed, unless swift action is taken to promote their inclusion, including by addressing prejudice and discrimination.

Development is very important for any country, and the development of a country depends on the education sector and health sector of any country because if people are getting educated it will generate more employment opportunities and its health sector is good then people won’t feel sick and people can contribute in the development of the country more efficiently. The development of both rural and urban areas is important. If we see the scenario now a lot of development has taken place in rural areas than before for sure, rural areas are having nicer education options now, nicer health, medical, technologies, infrastructure have emerged in rural areas now so that people don’t have lived in poverty and also have better-living conditions like people of urban areas.

Well-being

Well-being is what is ultimately good for a person. Also called "welfare" and "quality of life", it is a measure of how well life is going for someone. It is a central goal of many individual and societal endeavours.

Subjective and objective well-being

Subjective well-being is the measure of how people feel about and evaluate their own lives. It encompasses both affective and cognitive components. A person has high affective well-being if they have many pleasant experiences and few unpleasant ones. High cognitive well-being occurs when a person evaluates their life positively, making a global assessment that things are going well.

Subjective well-being is measured using questionnaires in which individuals report the quality of their experiences. Single-item measures provide the simplest approach, focusing on a single scale, like asking participants to rate how content they are with their lives on a scale from 1 to 10. Multi-item scales include questions for distinct aspects of subjective well-being, with the advantage of reducing the influence of the wording of any single question. They have separate questions for domains such as the presence of positive effects, the absence of negative effects, and overall life satisfaction, which they combine into a comprehensive index.

Objective well-being encompasses objective factors that a person's life is going well. Unlike subjective well-being, these factors can be assessed and quantified from an external perspective. They include personal, social, economic, and environmental aspects such as health, level of education, income, housing, amount of leisure time, and security.

By relying on objective data, measures of objective well-being are less affected by cultural and personal biases influencing self-reports. However, it is not universally accepted that objective well-being is a form of well-being in the strictest sense. This doubt is based on the idea that well-being is essentially a subjective phenomenon tied to a person's experience. According to this view, objective factors influence and indicate well-being but are not themselves forms of well-being.

Some inquiries focus only on subjective or objective well-being. Others combine both perspectives in their investigation, including questions about how the two are related. It is possible for subjective and objective well-being to diverge. For example, a person may feel subjectively happy despite scoring low on objective measures, like low income and frail health.

Individual and community well-being

Individual well-being concerns the quality of life of a particular person and is the main focus of disciplines like psychology and philosophy. Community well-being applies the concept of well-being to a group of people. It encompasses a broad range of economic, social, environmental, and cultural aspects that influence how the community functions and thrives while ensuring that the community's needs are fulfilled.

One view sees community well-being as the sum of individual well-beings while others emphasize that the relation between the two is more complex. Individual and community well-being often support each other. For instance, high individual well-being can lead a person to contribute more to their community, and a well-functioning community can make its members happy. However, there can also be tensions, like when changes necessary for community well-being conflict with the individual well-being of certain members.

Closely related to community well-being are categories of well-being defined for specific demographic groups. For instance, child well-being emphasizes health, education, material security, and social development in a loving and nurturing environment. Other examples include women's, elderly, student, and employee well-being.

Other types

Various types of well-being are categorized based on the domain of life to which they belong. Physical well-being concerns the domain of the body as the capacity to engage in physical activities and the absence of illness and bodily pain. It includes general health considerations and the ability to perform one's social role without being hindered by physical limitations.

Psychological well-being, also called mental health, is a state of mind characterized by internal balance. It involves the absence or successful management of disorders and disturbances, together with the abilities to cope with challenging situations, maintain positive relationships, and cultivate personal growth. It is closely linked to intellectual, spiritual, and emotional well-being. Intellectual well-being

encompasses well-functioning cognitive abilities and traits, such as critical thinking, problem-solving, and curiosity. Spiritual well-being is a state in which people find purpose in life and have inner peace, self-confidence, and a sense of identity. Emotional well-being involves the capacities to comprehend, articulate, and regulate emotions, together with an overall positive mood. Hedonic well-being refers to a life rich in pleasurable experiences and devoid of suffering. Eudemonic well-being is a form of personal fulfilment in which an individual flourishes by striving for excellence and actualizing their innate potentials.

Social well-being concerns the quality and number of interpersonal connections, including how well a person functions in their social environment and the level of social support available to them. Economic well-being refers to the economic situation of a person, such as the resources and skills they have in regard to income, job opportunities, and financial stability. Further types of well-being include financial, cultural, political, and environmental well-being

For many years, using a monetary measure like GDP per capita as a proxy for the population's wellbeing made much sense, at least for developed countries. GDP per capita provides an accurate measure of a country's capacity to deal with the material needs of its residents. And so long as the basic necessities of life remain scarce, additions to GDP per capita can be expected to equate closely with improvements in meeting the population's basic needs, and hence in greater well-being. The consensus on the use of GDP per capita as a good proxy measure of well-being is, however, becoming less obvious also for economists, as the more developed societies move from a situation of scarcity to a situation of plenty. The intuitive notion that, once a certain level of material needs has been met, further increments in economic growth will not yield the same improvements in the well-being of the citizens is backed up by numerous studies that indicate that this divergence between added income and added well-being holds true both within and across societies. At the same time, concerns have emerged on how economic growth led in many countries to environmental depletion, an element that is not included at all in GDP.

Alternative Measure of Well-being

Social indicators While the level and change in gross domestic product (GDP) per capita have long been used as the main yardstick for measuring and comparing living standards across countries, policy makers and citizens are concerned with much more than just GDP per capita. In particular, they seek to ensure the overall wellbeing of society, both today and in the future. Social indicators aim to provide information on well-being beyond that conveyed by conventional economic measures.

Social indicators focus on observable outcomes in a variety of fields (health, literacy, poverty) based on the premise that most people would agree about the value of what is being described and that these social characteristics can be measured reliably and independently of people's subjective perceptions. On the other hand, the economic literature assumes that individuals derive well-being from the satisfaction of their wants according to their preferences, chiefly as exercised in the marketplace. Satisfaction of wants is a function of what individuals consume, but since their consumption is ultimately determined by their income, this can be used as a proxy for well-being and reliably measured using national accounts income measures.

Social indicators provide a complementary approach to GDP-derived proxies for well-being. In this section, four indicators have been chosen for each of the four domains – self-sufficiency, equity, health status and social cohesion – used by the OECD to classify its own social indicators. 3 The selection of these indicators, while subjective, is based on both their importance to social well-being and their availability, so as to allow meaningful cross-country comparisons.

social indicators and GDP per capita, with the highest degrees of correlation with health indicators and the lowest with social cohesion indicators.

• Self-sufficiency reflects the extent of participation in the economy and society and how well individuals are able to get through daily life on their own. It is measured in terms of the overall employment rate, the proportion of the population in households where nobody has a job, the average number of years of schooling, and the average school performance of children at age 15. All these factors affect or will affect the ability of individuals to earn a decent living. GDP per capita correlates significantly with employment rates but not with measures of how employment opportunities (and thus

joblessness) are shared within the population. Likewise, in richer countries the average adult has completed more years of education, but the average 15-year-old student does not necessarily perform better. There is only a weak correlation between changes in these self-sufficiency measures and GDP per capita.

• Equity reflects the distribution of household incomes and the extent of equality of opportunity among individuals. It may be measured in terms of income inequality, relative poverty rates, child poverty and the gender wage gap. Higher levels of GDP per capita correlate to some extent with lower inequity in income distribution. OECD countries with lower GDP per capita also tend to record higher relative poverty and poverty among children, but not necessarily lower earnings inequalities by gender. Increases in GDP per capita go hand-in-hand with reductions in income inequality and gender wage gaps, but this is only very weakly, if at all, related to changes in child poverty and relative poverty.

• Health status reflects not only disease and its cure, but other social factors that can affect mortality and morbidity. The four indicators of health status used here are life expectancy at birth, “healthy” life expectancy at birth (i.e. lifespan free of disabling medical problems), infant mortality rates and the potential years of life lost as a result of accidents or preventable disease. These indicators are strongly correlated with GDP per capita, meaning that on average OECD countries with higher incomes enjoy better health. Nevertheless, differences in country performance can be significant – for example, infant mortality rates differ by a factor of around two between countries with similar GDP per capita. While changes in GDP per capita are positively related to changes in health status, the correlations are weak and not statistically significant.

• A feeling of belonging to a wider community and the satisfaction that derives from participation in the broader society are important to well-being. But social cohesion is measured not only through positive indicators, like the share of people who volunteer in community groups, but also through negative manifestations, such as levels of crime, victimisation and suicide. While people do more volunteering in countries with higher GDP per capita, there is no significant correlation with the negative indicators, although an increase in GDP per capita does seem to go hand-in hand with a decline in the number of people who have been victims of crime.

Overall, social indicators provide information about a number of dimensions of well-being that seem to go beyond what is conveyed by GDP. The main weakness of social indicators is, however, that they do not allow a parsimonious representation of well-being, because of the lack of agreement on how to aggregate these indicators. A simple synthetic measure can be constructed by normalizing and then aggregating the 16 indicators described above into a composite index that can be compared across countries. This index then needs to be tested to see how robust it is when different weights are used to aggregate the various elementary indicators.

Convergence

Definition: Convergence in development economics suggests that poorer countries or regions tend to grow faster than richer ones, leading to a narrowing of income gaps over time.
Theory: This concept is rooted in neoclassical growth theory, which posits that economies with lower initial levels of GDP per capita have the potential to catch up to richer economies by adopting more advanced technologies, investing in human capital, and benefiting from capital inflows and technological spillovers.
Implications: If convergence occurs, it implies that global inequality in income levels may decrease over time as less developed economies grow faster than developed ones, thereby reducing the income gap between them.

The idea of convergence in economics (also sometimes known as the catch-up effect) is the hypothesis that poorer economies' per capita incomes will tend to grow at faster rates than richer economies. In the Solow-Swan model, economic growth is driven by the accumulation of physical capital until this optimum level of capital per worker, which is the "steady state" is reached, where output, consumption and capital are constant. The model predicts more rapid growth when the level of physical capital per capita is low, something often referred to as “catch up” growth. As a result, all economies should eventually converge in terms of per capita income. Developing countries have the potential to grow at a faster rate than developed countries because diminishing returns (in particular, to capital) are not as strong as in capital-rich countries. Furthermore, poorer countries can replicate the production methods, technologies, and institutions of developed countries.

In economic growth literature the term "convergence" can have two meanings. The first kind (sometimes called "sigma-convergence") refers to a reduction in the dispersion of levels of income across economies. "Beta-convergence" on the other hand, occurs when poor economies grow faster than rich ones. Economists say that there is "conditional beta-convergence" when economies experience "beta-convergence" but conditional on other variables (namely the investment rate and the population growth rate) being held constant. They say that "unconditional beta-convergence" or "absolute beta-convergence" exists when the growth rate of an economy declines as it approaches its steady state. According to Jack Goldstone, "in the twentieth century, the Great Divergence peaked before the First World War and continued until the early 1970s, then, after two decades of indeterminate fluctuations, in the late 1980s it was replaced by the Great Convergence as the majority of Third World countries reached economic growth rates significantly higher than those in most First World countries", thus the present-day convergence should be regarded as a continuation of the Great Divergence.

The fact that a country is poor does not guarantee that catch-up growth will be achieved. Moses Abramovitz emphasised the need for 'Social Capabilities' to benefit from catch-up growth. These capabilities include an ability to absorb new technology, attract capital and participate in global markets. According to Abramovitz, these prerequisites must be in place in an economy before catch-up growth can occur, and explain why there is still divergence in the world today.

The theory also assumes that technology is freely traded and available to developing countries that are attempting to catch-up. Capital that is expensive or unavailable to these economies can also prevent catch-up growth from occurring, especially given that capital is scarce in these countries. This often traps countries in a low-efficiency cycle whereby the most efficient technology is too expensive to be acquired. The differences in productivity techniques are what separates the leading developed nations from the following developed nations, but by a margin narrow enough to give the following nations an opportunity to catch-up. This process of catch-up continues as long as the following nations have something to learn from the leading nations, and will only cease when the knowledge discrepancy between the leading and following nations becomes very small and eventually exhausted.

According to Professor Jeffrey Sachs, convergence is not occurring everywhere due to the closed economic policy of some developing countries, which could be solved through free trade and openness. In a study of 111 countries between 1970 and 1989, Sachs and Andrew Warner concluded that the industrialized countries had a growth of 2.3per cent per year per capita, open economy developing countries 4.5per cent and closed economy developing countries had only 2per cent.

Robert Lucas stated the "Lucas paradox" which is the observation that capital is not flowing from developed countries to developing countries despite the fact that developing countries have lower levels of capital per worker. However, this statement has recently received serious objections.

It means pattern in which economies with low per capita incomes grow faster than economies with high per capita incomes. Some low-income and middle-income economies around the world have shown a pattern of **convergence**, in which their economies grow faster than those of high-income countries. GDP increased by an average rate of 2.7per cent per year in the 1990s and 2.3per cent per year from 2000 to 2008 in the high-income countries of the world, which include the United States, Canada, the countries of the European Union, Japan, Australia, and New Zealand.

A first argument is based on diminishing marginal returns. Even though deepening human and physical capital will tend to increase GDP per capita, the **law of diminishing returns** suggests that as an economy continues to increase its human and physical capital, the marginal gains to economic growth will diminish. For example, raising the average education level of the population by two years from a tenth-grade level to a high school diploma (while holding all other inputs constant) would produce a certain increase in output. An additional two-year increase, so that the average person had a two-year college degree, would increase output further, but the marginal gain would be smaller. Yet another additional two-year increase in the level of education, so that the average person would have a four-year-college bachelor's degree, would increase output still further, but the marginal increase would again be smaller. A similar lesson holds for physical capital. If the quantity of physical capital available to the average worker increases, by, say, $5,000 to $10,000 (again, while holding all other inputs constant), it will increase the level of output. An additional

increase from $10,000 to $15,000 will increase output further, but the marginal increase will be smaller.

Low-income countries like China and India tend to have lower levels of human capital and physical capital, so an investment in capital deepening should have a larger marginal effect in these countries than in high-income countries, where levels of human and physical capital are already relatively high. Diminishing returns implies that low-income economies could converge to the levels achieved by the high-income countries.

A second argument is that low-income countries may find it easier to improve their technologies than high-income countries. High-income countries must continually invent new technologies, whereas low-income countries can often find ways of applying technology that has already been invented and is well understood. The economist Alexander Gerschenkron (1904–1978) gave this phenomenon a memorable name: “the advantages of backwardness.” Of course, he did not literally mean that it is an advantage to have a lower standard of living. He was pointing out that a country that is behind has some extra potential for catching up.

Finally, optimists argue that many countries have observed the experience of those that have grown more quickly and have learned from it. Moreover, once the people of a country begin to enjoy the benefits of a higher standard of living, they may be more likely to build and support the market-friendly institutions that will help provide this standard of living. When countries with lower levels of GDP per capita catch up to countries with higher levels of GDP per capita, the process is called convergence. Convergence can occur even when both high- and low-income countries increase investment in physical and human capital with the objective of growing GDP.

Divergence:

Definition: Divergence, on the other hand, suggests that income gaps between countries or regions widen over time. This means that richer economies continue to grow at a faster rate than poorer ones, perpetuating or exacerbating existing inequalities.

Theory: Divergence can occur due to various factors such as differences in institutional quality, access to technology, education levels, and policies that

either encourage or hinder economic growth. In some cases, structural impediments like corruption, political instability, or geographic disadvantages can also contribute to divergence.

Implications: Divergence implies that global income inequality may worsen over time as the gap between wealthy and poorer economies widens, potentially leading to social and economic disparities that can be challenging to overcome.

Popularized by economic historian Kenneth Pomeranz in his 2000 book “The Great Divergence”, the term "Great Divergence" refers to the process by which Western Europe, particularly after the 18th century, began to experience rapid economic growth and development, pulling ahead of other regions like China, India, and the Middle East, which had historically been wealthier or at least on par with Europe in terms of technological, political, and economic development. This divergence resulted in the rise of Western dominance in global politics, economics, and culture, while other regions lagged.

Kenneth Pomeranz’s The Great Divergence marked a significant shift in historiography by arguing that Europe’s divergence occurred because of luck—its access to colonies and fossil fuels—rather than inherent European superiority.

Historical Context

Before the 18th century, the major economies of the world—particularly China, India, and parts of the Middle East—were not vastly different in wealth and productivity compared to Europe. China’s Song Dynasty (10th to 13th centuries) and the Mughal Empire in India (16th to 18th centuries) boasted prosperous economies, advanced technology, and powerful states. Europe was relatively fragmented, war-torn, and less advanced during the medieval period.

However, by the 19th century, the industrialized nations of Europe, especially Britain, became global powers. Meanwhile, regions like China and India saw economic stagnation, colonial subjugation, or internal decline. This historical shift is known as the Great Divergence, and scholars have debated the causes and timing of this transformation.

Some of the key features of this Great Divergence were as follows

1. **Industrialization:** The rise of industrial economies in Europe, especially Britain, which could produce goods more efficiently than agrarian economies in Asia and the Middle East.

2. **Global Imbalance:** Europe's ability to exploit resources from its colonies and control global trade routes gave it a significant economic and political advantage.

3. **Technological Innovation:** Europe's rapid technological advancements, particularly in transportation, communication, and military technology, allowed it to outpace other civilizations.

4. **Institutional Development:** The development of legal systems, property rights, financial institutions, and more inclusive political structures in Europe created an environment conducive to sustained economic growth.

5. **Colonialism and Imperialism:** European powers expanded their political and economic control over large parts of the world, particularly in Africa, Asia, and the Americas, which further accelerated their economic development at the expense of these regions.

6. **Shift in Global Power:** By the 19th century, European powers dominated global politics and the economy, controlling vast colonial empires and influencing international trade, finance, and diplomacy.

Causes of the Great Divergence

The idea of the Great Divergence has evolved as scholars have debated both the causes and the timing of Europe's rise. Earlier narratives, particularly those rooted in Eurocentrism, attributed Europe's success to cultural superiority, technological ingenuity, or political institutions like democracy.

However, more recent scholarship has provided a more nuanced picture, emphasizing contingent factors like geography, the timing of industrialization, and the role of global trade and colonialism in Europe's rise. Several factors contributed to the Great Divergence, with varying emphasis from scholars:

1. **Industrial Revolution:** The technological advancements that began in Britain in the late 18th century, including steam power, mechanized factories, and advances in metallurgy, led to unprecedented economic growth. Western Europe's industrialization allowed it to produce goods on a massive scale, leading to economic expansion and the ability to conquer and exploit resources from other regions.

2. **Scientific and Intellectual Advancements:** The Scientific Revolution in Europe (16th to 18th centuries) fostered a culture of innovation and inquiry, which facilitated

technological progress. The Enlightenment also promoted rationality, leading to developments in governance, economics, and industry.

3. **Colonialism and Exploitation:** European powers engaged in aggressive colonization, exploiting the resources and labour of Africa, Asia, and the Americas. The profits generated from these colonies helped to fuel European growth and dominance, allowing European nations to finance industrial development and military expansion.

4. **Political Fragmentation in Europe:** Unlike large centralized empires like China, Europe's political fragmentation fostered competition among states. This rivalry led to more innovation in technology and governance. Decentralization also allowed for a diversity of economic experiments, giving rise to different commercial practices and more vibrant economies.

5. **Global Trade Networks:** Europe's maritime exploration and colonization led to the creation of global trade networks. The triangular trade, including the transatlantic slave trade, brought wealth to Europe and allowed it to control critical resources. Additionally, Europe's access to silver from the Americas, particularly in Spain, played a key role in financing trade with Asia.

6. **Institutional Factors:** Scholars like Daron Acemoglu and James A. Robinson argue in Why Nations Fail that Europe developed more inclusive political and economic institutions that fostered growth. These institutions provided better property rights, promoted innovation, and reduced the arbitrary power of the state over the economy, leading to sustained economic growth.

7. **Environmental Factors:** Kenneth Pomeranz emphasized geographic differences, particularly in access to coal and colonies, as crucial in allowing Europe (especially Britain) to industrialize. The availability of coal allowed Britain to mechanize production and overcome energy limitations that were common in other parts of the world.

As time progressed, convergence started to create divergence. Strong industries and companies tend to attract people around the world to invest, network, and work with certain Alpha firms. Many of these firms happened to be in developed and rich regions of the world. As globalization grew, more people began to move to or spend their money in these regions. This shifted the power even further towards these regions- geographical divergence- separating cities and countries even

further. Experts found that a child born in the bottom 20per cent in wealthy San Francisco has twice as much chance of a similar child in Detroit of ending up in the top 20per cent as an adult. Also, a boy born in Chelsea, London can expect to live nearly nine years longer than a boy born in Blackpool, Chelsea.

Inequality in opportunities is created along the process of divergence because these opportunities are limited to the people who happen to have lived or were born in these wealthy areas. For example, America's economy could have grown twice as fast if all Americans lived in places of high productivity over the past 50 years. In many less developed nations in the world, we see that inequality in wealth has risen as the country began to become more integrated with the world.

In order to eliminate the divergence caused by globalization, governments can play a bigger role in creating opportunities locally, while also helping people become more mobile. Foreign Direct Investment (FDI) has helped many emerging markets and is always a viable solution. Policies and programs can be implemented to encourage large corporations to increase their FDI into developing areas of the world.

The Diffusion of Economic Growth

In business, diffusion is the process by which a new idea or new product is accepted by the market. The rate of diffusion is the speed with which the new idea spreads from one consumer to the next. Adoption is the reciprocal process as viewed from a consumer perspective rather than distributor; it is similar to diffusion except that it deals with the psychological processes an individual goes through, rather than an aggregate market process. identify phrases associated with novel technologies using textual analysis of patents, job postings, and earnings calls, enabling us to identify four stylized facts on the diffusion of jobs relating to new technologies. First, the development of economically impactful new technologies is geographically highly concentrated, more so even than overall patenting: 56per cent of the most economically impactful technologies come from just two U.S. locations, Silicon Valley and the Northeast Corridor. Second, as the technologies mature and the number of related jobs grows, hiring spreads geographically. But this process is very slow, taking around 50 years to disperse fully. Third, while initial hiring in new technologies is highly skill-biased, over time the mean skill level in new positions declines, drawing in an increasing number of lower-skilled workers. Finally, the

geographic spread of hiring is slowest for higher-skilled positions, with the locations where new technologies were pioneered remaining the focus for the technology's high-skill jobs for decades.

A theory of innovation and diffusion in an interconnected world

In the model innovation and diffusion as a process involving the combination of new ideas with insights from other industries and countries. Insights occur randomly and result from local interactions among producers. In our theory, openness affects the creation and diffusion of ideas by determining the interactions from which producers draw their insights. Openness affects the set of producers that sell goods within a country as well as the set of technologies used domestically.

In this context, we provide conditions under which the distribution of productivity among producers within each country converges to a Fréchet distribution, no matter how trade barriers shape individual producers' local interactions. The state of knowledge within a country can be summarised by the level of this distribution, which we call the country's stock of knowledge. Furthermore, we show that the change in a country's stock of knowledge can be characterised in terms of only its trade shares, its trading partners' stocks of knowledge, and parameters. The model is thus tractable and compatible with the widely used quantitative frameworks that have been useful in studying trade flows in an environment with many asymmetric countries (Eaton and Kortum 2002, Bernard et al. 2003, Alvarez and Lucas 2007). This yields qualitative insights, and enables us to use actual trade flows to discipline the role of trade and geography in shaping idea flows and growth.

Starting from autarky, opening to trade results in a higher temporary growth rate and permanently higher level of the stock of knowledge, as producers are exposed to more productive ideas. We separate the gains from trade into static and dynamic components. The static component consists of the gains from increased specialisation and comparative advantage, whereas the dynamic component consists of the gains that operate through the flow of ideas.

In an environment in which producers in a country gain insight from those that sell goods to the country, the dynamic gains from reducing trade barriers are

qualitatively different from the static gains. The dynamic gains are largest for countries that are relatively closed, whereas the static gains are largest for countries that are already relatively open. For a country with high trade barriers, the marginal import tends to be made by a foreign producer with high productivity. While the high trade costs imply that the static gains from trade remain relatively small, the insights drawn from these marginal producers tend to be of high quality. In contrast, for a country close to free trade, the reduction in trade costs leads to large infra-marginal static gains from trade, but the insights drawn from the marginal producers are likely to have lower productivity and generate lower quality ideas.

Our model nests at two extremes, a model of pure innovation (Kortum 1997) and a model of pure diffusion (Alvarez et al. 2008, 2014). We span these two extremes by varying a single parameter, β, which we label the strength of diffusion. β measures the contribution of insights from others to the productivity of new ideas. One striking observation is that, for either of these two extremes, if a moderately open country lowers its trade costs, the resulting dynamic gains from trade are relatively small, whereas when β is in an intermediate range, the dynamic gains are larger. When β is small so that insights from others are relatively unimportant, it follows immediately that dynamic gains tend to be small. When β is larger, insights from others are more central. However, in the limiting model as β approaches the extreme of one, a country accrues almost all of the dynamic gains from trade as long as it is not in autarky. A moderately open country is much better off than it would be in autarky, but further reductions in trade costs have little impact. As a consequence, it is only when β is in an intermediate range that the dynamic gains from trade are both sizable and would result from reductions in trade costs in the empirically relevant range.

TECHNOLOGY DIFFUSION IS CRUCIAL FOR ECONOMIC GROWTH AND INCLUSIVENESS

As we discuss in our chapter in "Shifting Paradigms," analyzing the dynamics of technology diffusion in the context of changes brought by digital transformation is key to explaining these productivity trends.

Technology diffusion can be a slow and gradual process, uneven across countries, regions, sectors, and firms—and even within narrowly defined sectors in the same country.

While firms at the global frontier of productivity have continued to increase their productivity steadily, the rest of the business population has not kept pace.

Recent OECD analyses show that the increasing productivity gap between the most productive firms and the rest could be a reflection of a slowdown in technology diffusion. This is especially the case in the most digital- and knowledge-intensive sectors. Laggard firms in these sectors face higher obstacles and catch up at a slower pace.

Shifts to a digital and knowledge economy pose three new challenges for firms. First is a rising importance of intangible assets, such as research and development (R&D), software, and other intellectual property, in the production processes. Second is an increasing role of tacit knowledge. Third is rising technological complexity requiring increasingly sophisticated complementary investments in areas such as worker skills and organizational innovation.

The need for complementary investments in intangibles, the non-rivalry and low-cost scalability of digital technologies, and the related scale economies and network externalities create and reinforce winner-takes-most dynamics, especially in digital-intensive sectors. These factors may allow superstar firms to thrive and gain considerable market shares while acting as barriers for other firms to adopt new technologies and for new players to enter the market.

Weakening technology diffusion is not only associated with increasing productivity divergence, but it also affects other socioeconomic outcomes. It plays a role in explaining the recent declines in business dynamism, the rise in concentration and markups in many industries and countries, and trends in labor income shares and wage inequality.

The polarization between leading firms and laggards has been amplified even further by the COVID-19 pandemic. While there has been an acceleration of digital adoption during the pandemic, the rate of adoption of digital technologies and their

sophistication have been very heterogeneous: Tech-savvy firms, often already more productive and larger, have adopted more and more sophisticated digital technologies than smaller, less tech-savvy firms. Similarly, while teleworking has been crucial to sustaining production during the crisis, not all firms have been able to (re)organize their activities remotely. The pandemic may, in this way, add to the advantages of ex-ante digitally advanced firms. These dynamics, together with shocks to business registrations, may amplify declines in business dynamism, increase industry concentration, and weaken competition.

Thus, the effects of the pandemic have reinforced the need for policies to boost technology diffusion and foster conditions for broad-based growth of firms.

PUBLIC POLICY IS KEY TO BOOSTING TECHNOLOGY DIFFUSION

Governments can play an important role in fostering technology diffusion. Public policy can help remove barriers to diffusion and increase firms' absorptive capacity by addressing skill and financial constraints to technology adoption, implementing effective research and innovation policies, regulating data access and ownership, and ensuring a level playing field and a competitive environment.

No single policy can foster technology diffusion alone. A comprehensive policy mix, considering both demand-side and supply-side measures, that bolsters firms' incentives and capabilities is needed.

Demand-side measures would raise awareness about new technologies, develop absorptive capacity, and reduce risks. Supply-side measures would foster competition, broaden access to innovation financing, address the new regulatory issues of the digital economy, improve knowledge production and sharing (including through sensible intellectual property policies), and strengthen the foundation of digital infrastructure and skills.

Supporting wider technology diffusion, in particular for small and young firms, together with measures to boost business dynamism, equip workers with new skills, and foster fair labor markets would allow the achievement of economic growth that is stronger as well as more inclusive and sustainable.

Economic Development Since World War II

The post–World War II economic expansion, also known as the postwar economic boom or the Golden Age of Capitalism, was a broad period of worldwide economic expansion beginning with the aftermath of World War II and ending with the 1973–1975 recession. The United States, the Soviet Union, Australia and Western European and East Asian countries in particular experienced unusually high and sustained growth, together with full employment.

Development thought after World War II

After World War II a number of developing countries attained independence from their former colonial rulers. One of the common claims made by leaders of independence movements was that colonialism had been responsible for perpetuating low living standards in the colonies. Thus, economic development after independence became an objective of policy not only because of the humanitarian desire to raise living standards but also because political promises had been made, and failure to make progress toward development would, it was feared, be interpreted as a failure of the independence movement. Developing countries in Latin America and elsewhere that had not been, or recently been, colonies took up the analogous belief that economic domination by the industrial countries had thwarted their development, and they, too, joined the quest for rapid growth.

At that early period, theorizing about development, and about policies to attain development, accepted the assumption that the policies of the industrial countries were to blame for the poverty of the developing countries. Memories of the Great Depression, when developing countries' terms of trade had deteriorated markedly, producing sharp reductions in per capita incomes, haunted many policymakers.

Finally, even in the developed countries, the Keynesian legacy attached great importance to investment.

In this milieu, it was thought that a “shortage of capital” was the cause of underdevelopment. It followed that policy should aim at an accelerated rate of investment. Since most countries with low per capita incomes were also heavily agricultural (and imported most of the manufactured goods consumed domestically), it was thought that accelerated investment in industrialization and the development of manufacturing industries to supplant imports through “import substitution” was the path to development. Moreover, there was a fundamental distrust of markets, and a major role was therefore assigned to government in allocating investments. Distrust of markets extended especially to the international economy.

Experience with development changed perceptions of the process and of the policies affecting it in important ways. Nonetheless, there are significant elements of truth in some of the earlier ideas, and it is important to understand the thinking underlying them.

Growth economics and development economics

Development economics may be contrasted with another branch of study, called growth economics, which is concerned with the study of the long-run, or steady-state, equilibrium growth paths of the economically developed countries, which have long overcome the problem of initiating development.

Growth theory assumes the existence of a fully developed modern capitalist economy with a sufficient supply of entrepreneurs responding to a well-articulated system of economic incentives to drive the growth mechanism. Typically, it concentrates on macroeconomic relations, particularly the ratio of savings to total output and the aggregate capital–output ratio (that is, the number of units of additional capital required to produce an additional unit of output). Mathematically, this can be expressed (the Harrod–Domar growth equation) as follows: the growth in total output (g) will be equal to the savings ratio (s) divided by the capital–output ratio (k); i.e., g = s/k. Thus, suppose that 12 percent of total output is saved annually and that three units of capital are required to produce an additional unit of output: then the rate of

growth in output is 12/3per cent = 4per cent per annum. This result is obtained from the basic assumption that whatever is saved will be automatically invested and converted into an increase in output on the basis of a given capital–output ratio. Since a given proportion of this increase in output will be saved and invested on the same basis, a continuous process of growth is maintained.

Growth theory, particularly the Harrod–Domar growth equation, has been frequently applied or misapplied to the economic planning of a developing country. The planner starts from a desired target rate of growth of perhaps 4 percent. Assuming a fixed overall capital–output ratio of, say, 3, it is then asserted that the developing country will be able to achieve this target rate of growth if it can increase its savings to 3 × 4 percent = 12 percent of its total output. The weakness of this type of exercise arises from the assumption of a fixed overall capital–output ratio, which assumes away all the vital problems affecting the developing country's capacity to absorb capital and invest its saving in a productive manner. These problems include the central problem of the efficient allocation of available savings among alternative investment opportunities and the associated organizational and institutional problems of encouraging the growth of a sufficient supply of entrepreneurs; the provision of appropriate economic incentives through a market system that correctly reflects the relative scarcities of products and factors of production; and the building up of an organizational framework that can effectively implement investment decisions in both the private and the public sectors. Such problems, which generally affect the developing country's absorptive capacity for capital and a number of other inputs, constitute the core of development economics. Development economics is needed precisely because the assumptions of growth economics, based as they are on the existence of a fully developed and well-functioning modern capitalist economy, do not apply.

The developing and underdeveloped countries are a very mixed collection of countries. They differ widely in area, population density, and natural resources. They are also at different stages in the development of market and financial institutions and of an effective administrative framework. These differences are sufficient to warn against wide-sweeping generalizations about the causes of underdevelopment and all-embracing theoretical models of economic development. But when development

economics first came into prominence in the 1950s, there were powerful intellectual and political forces propelling the subject toward such general theoretical models of development and underdevelopment. First, many writers who popularized the subject were frankly motivated by a desire to persuade the developed countries to give more economic aid to the underdeveloped countries, on grounds ranging from humanitarian considerations to considerations of cold-war strategy. Second, there was the reaction of the newly independent underdeveloped countries against their past "colonial economic pattern," which they identified with free trade and primary production for the export market. These countries were eager to accept general theories of economic development that provided a rationalization for their deep-seated desire for rapid industrialization. Third, there was a parallel reaction, at the academic level, against older economic theory, with its emphasis on the efficient allocation of scarce resources and a striving after new and "dynamic" approaches to economic development.

All of these forces combined to produce a crop of theoretical approaches that soon developed into a fairly fixed orthodoxy with its characteristic emphasis on "crash" programs of investment in both material and human capital, on domestic industrialization, and on government economic planning as the standard ingredients of development policy. These new theories have continued to have a considerable influence on the conventional wisdom in development economics, although in retrospect most of them have turned out to be partial theories. A broad survey of these theories, under three main heads, is given below. It is particularly relevant to the debate over whether the underdeveloped countries should seek economic development through domestic industrialization or through international trade. The limitations of these new theories—and how they led to a gradual revival of a more pragmatic approach to development problems, which falls back increasingly on the older economic theory of efficient allocation of resources—are subsequently traced.

The missing-component approach

First, there are the theories that regard the shortage of some strategic input (such as the supply of savings, foreign exchange, or technical skills) as the main cause of underdevelopment. Once this missing component was supplied—say, by external economic aid—it was believed that economic development would follow in a

predictable manner based on fixed quantitative relationships between input and output. The overall capital–output ratio, mentioned above, is the most well-known of these fixed technical coefficients. But similar fixed coefficients have been assumed between the foreign-exchange requirements and total output and between the input of skilled manpower and output.

Shortage of savings

Given the broad relationship between capital accumulation and economic growth established in growth theory, it was plausible for growth theorists and development economists to argue that the developing countries were held back mainly by a shortage in the supply of capital. These countries were then saving only 5–7 percent of their total product, and it was manifest (and it remains true) that satisfactory growth cannot be supported by so low a level of investment. It was therefore thought that raising the savings ratio to 10–12 percent was the central problem for developing countries. Early development policy therefore focused on raising resources for investment. Steps toward this end were highly successful in most developing countries, and savings ratios rose to the 15–25 percent range. However, growth rates failed even to approximate the savings rates, and theorists were forced to search for other explanations of differences in growth rates.

It has become increasingly clear that there can be much wastage of capital resources in the developing countries for various reasons, such as wrong choice of investment projects, inefficient implementation and management of these projects, and inappropriate pricing and costing of output. These faults are particularly noticeable in public-sector investment projects and are one of the reasons why the Pearson Commission Report of the International Bank for Reconstruction and Development (1969) found that “the correlation between the amounts of aid received in the past decades and the growth performance is very weak.” But even in the private sector there may be a considerable distortion in the direction of investment induced by policies designed to encourage development. Thus, in most underdeveloped countries, a considerable part of private expansion investment, both foreign and domestic, has been diverted into the expansion of the manufacturing sector, catering to the domestic market through various inducements, including tariff

protection, tax holidays, cheap loans, and generous foreign-exchange allocations granting the opportunity to import capital goods cheaply at overvalued exchange rates. As a consequence, there developed a very considerable amount of excess capacity in the manufacturing sector of the underdeveloped countries pursuing such policies.

Foreign-exchange shortage

In the 1950s most developing countries were primary commodity exporters, relying on crops and minerals for the bulk of their foreign-exchange earnings through exports, and importing a large number of manufactured goods. The experience of colonialism, and the distrust of the international economy that it engendered, led policymakers in most developing countries to adopt a policy of import substitution. This policy was intended to promote industrialization by protecting domestic producers from the competition of imports. Protection, in the form of high tariffs or the restriction of imports through quotas, was applied indiscriminately, often to inherently high-cost industries that had no hope of ever becoming internationally competitive. Also, after the early stages of import substitution, protected new industries tended to be very intensive in the use of capital and especially of imported capital goods.

The import-substitution approach defined “industrialization” rather narrowly as the expansion of the modern manufacturing sector based on capital-intensive technology. Capital was therefore identified with durable capital equipment in the form of complex machinery and other inputs that the underdeveloped countries were not able to produce domestically. Thus, foreign-exchange requirements were calculated on the basis of the fixed technical input-output coefficients of the manufacturing sector.

With high levels of protection for domestic industry, and with exchange rates that were often maintained at unrealistic levels (usually in an effort to make imported capital goods “cheap”), the experience of most developing countries was that export earnings grew relatively slowly. The simultaneously sharp increase in demand for imported capital goods (and for raw materials and replacement parts as well) resulted in unexpectedly large increases in imports. Most developing countries found themselves with critical foreign-exchange shortages and were forced to reduce imports in order to cut their current-account deficits to manageable proportions.

The cutbacks in imports usually resulted in reduced growth rates, if not recessions. This result led to the view that economic stagnation was caused primarily by a shortage of foreign exchange with which to buy essential industrial inputs. But over the longer term the growth rates of countries that continued to protect their domestic industries heavily not only stagnated but declined sharply. Contrasting the experience of countries that persisted in policies of import substitution with those that followed alternative policies (see below) subsequently demonstrated that foreign-exchange shortage was a barrier to growth only within the context of the protectionist policies adopted and was not inherently a barrier to the development process itself.

Education and human capital in development

As it became apparent that the physical accumulation of capital was not by itself the key to development, many analysts turned to a lack of education and skills among the population as being a crucial factor in underdevelopment. If education and skill are defined as everything that is required to raise the productivity of the people in the developing countries by improving their skills, enterprise, initiative, adaptability, and attitudes, this proposition is true but is an empty tautology. However, the need for skills and training was first formulated in terms of specific skills and educational qualifications that could be supplied by crash programs in formal education. The usual method of manpower planning thus started from a target rate of expansion in output and tried to estimate the numbers of various types of skilled personnel that would be required to sustain this target rate of economic growth on the basis of an assumed fixed relationship between inputs of skill and national output.

This approach was plausible enough in many developing countries immediately after their political independence, when there were obvious gaps in various branches of the administrative and technical services. But most countries passed through this phase rather quickly. In the meantime, as the result of programs in education expansion, their schools and colleges began producing large numbers of fresh graduates at much faster rates than their general rate of economic growth could supply suitable new jobs for. This created a growing problem of educated unemployment. An important factor behind the rapid educational expansion was the expectation that after graduation students would be able to obtain well-paying white-collar jobs at salary

levels many times the prevailing per capita income of their countries. Thus, the underdeveloped countries' inability to create jobs to absorb their growing armies of graduates created an explosive element in what came to be called the revolution of expectations.

It is possible to see a close parallelism between the narrow concept of industrialization as the expansion of the manufacturing sector and the narrow concept of education as the academic and technical qualifications that can be supplied by the expansion of the formal educational system. If a broader concept of education, relevant for economic development, is needed, it is necessary to seek it in the pervasive educational influence of the economic environment as a whole on the learning process of the people of the underdeveloped countries. This is a complex process that depends on, among other less easily analyzable things, the system of economic incentives and signals that can mold the economic behaviour of the people of the underdeveloped countries and affect their ability to make rational economic decisions and their willingness to introduce or adapt to economic changes. Unfortunately, the economic environment in many underdeveloped countries is dominated by a network of government controls that tend not to be conducive to such ends.

Surplus resources and disguised unemployment

Two theories emphasized the existence of surplus resources in developing countries as the central challenge for economic policy. The first concentrated on the countries with relatively abundant natural resources and low population densities and argued that a considerable amount of both surplus land and surplus labour might still exist in these countries because of inadequate marketing facilities and lack of transport and communications. Economic development was pictured as a process whereby these underutilized resources of the subsistence sector would be drawn into cash production for the export market. International trade was regarded as the chief market outlet, or vent, for the surplus resources. The second theory was concerned with the thickly populated countries and the possibility of using their surplus labour as the chief means of promoting economic development. According to this theory, because of heavy population pressure on land, the marginal product of labour (that is, the extra

output derived from the employment of an extra unit of labour) was reduced to zero or to a very low level. But the people in the subsistence sector were able to enjoy a certain customary minimum level of real income because the extended-family system of the rural society shared the total output of the family farm among its members. A considerable proportion of labour in the traditional agricultural sector was thus thought to contribute little or nothing to total output and to really be in a state of disguised unemployment. By this theory, the labour might be drawn into other uses without any cost to society.

It is necessary to clear up a number of preliminary points about the concept of disguised unemployment before considering its applications. First, it is highly questionable whether the marginal product of labour is actually zero even in densely populated countries such as India or Pakistan. Even in these countries, with existing agricultural methods, all available labour is needed in the peak seasons, such as harvest. The most important part of disguised unemployment is thus what may be better described as seasonal unemployment during the off-seasons. The magnitude of this seasonal unemployment, however, depends not so much on the population density on land as on the number of crops cultivated on the same piece of land through the year. There is thus little seasonal unemployment in countries such as Taiwan or South Korea, which have much higher population densities than India, because improved irrigation facilities enable them to grow a succession of crops on the same land throughout the year. But there may be considerable seasonal unemployment even in sparsely populated countries growing only one crop a year.

The main weakness in the proposal to use disguised unemployment for the construction of major social-overhead-capital projects arises from an inadequate consideration of the problem of providing the necessary subsistence fund to maintain the workers during what may be a considerably long waiting period before these projects yield consumable output. This may be managed somehow for small-scale local-community projects when the workers are maintained in situ by their relatives. But when it is proposed to move a large number of surplus workers away from their home villages for major construction projects taking a considerable time to complete, the problem of raising a sufficient subsistence fund to maintain the labour becomes formidable. The only practicable way of raising such a subsistence fund is to

encourage voluntary saving and the expansion of a marketable surplus of food that can be purchased with the savings to maintain the workers. The mere existence of disguised unemployment does not in any way ease this problem.

Role of governments and markets

In earlier thinking about development, it was assumed that the market mechanisms of developed economies were so unreliable in developing economies that governments had to assume central responsibility for economic activity. This was to be done through economic planning for the entire economy (see economic planning: Planning in developing countries), which in turn would be implemented by active government participation in the economy and pervasive controls over all private-sector economic activity. Government participation took many forms: Public-sector enterprises were established to manufacture many commodities, including steel, machine tools, fertilizers, heavy chemicals, and even textiles and clothing; government marketing boards assumed monopoly power over the purchase and sale of many agricultural commodities; and government agencies became the sole importers of a variety of goods, and they often became exporters as well. Controls over private-sector activity were even more extensive: Price controls were established for many commodities; import licensing procedures eliminated the importing of commodities not given priority in official plans; investment licenses were required before factories could be expanded; capacity licenses regulated maximum permissible outputs; and comprehensive regulations governed the conditions of employment of workers.

The consequence, frequently, was that indigenous entrepreneurs often found it more financially rewarding to devote their energies and ingenuity to the task of procuring the necessary government import licenses and other permits and exploiting the loopholes in government regulations than to the problem of raising the efficiency and productivity of resources. For public-sector enterprises, political pressures often resulted in the employment of many more persons than could be productively used and in other practices conducive to extremely high-cost and inefficient operations. The consequent fiscal burden diverted resources that might otherwise have been used for investment, while the inefficient use of resources dampened growth rates.

Related to the belief in market failure and in the necessity for government intervention was the view that the efficiency of the price mechanism in developing countries was very small. This was reflected in the view of foreign-exchange shortage, already discussed, in which it was thought that there are fixed relationships between imported capital and domestic expansion. It was also reflected in the view that farmers are relatively insensitive to relative prices and in the belief that there are few entrepreneurs in developing countries.

Lessons from development experience

By the end of the 1950s the experience gained from efforts to promote economic development showed great differences among developing countries. Some had broken away relatively quickly from the import-substitution, government-control and -ownership pattern that had been the early development wisdom. Others persisted with the same policies for several decades. A great deal was learned from the experiences of different developing countries.

The importance of agriculture

Despite early emphasis on industrialization through import substitution, a first major lesson of postwar experience was that there is a close connection between the rate of growth in the output of the agricultural sector and the general rate of economic development. The high rates of economic growth are associated with rapid expansion of agricultural output and low rates of economic growth with the slow growth of agriculture. This is (in hindsight, at least) to be expected, since agriculture forms a large part of the total domestic product and of the exports of the developing countries. What is more interesting is that the expansion of agricultural output was by no means confined to those countries with an abundant supply of unused land to be brought under cultivation. Taiwan and South Korea, with some of the highest population densities in the world, were able to expand their agricultural output rapidly by a vigorous pursuit of appropriate policies. These included the provision of adequate irrigation facilities, enabling a succession of crops to be grown on the same piece of land throughout the year; the use of high-yielding seeds and fertilizers, which raised

the yields per acre in a dramatic fashion; provision of adequate incentives for producers by setting producer prices at reasonable levels; and improvements in credit and marketing facilities and a general improvement in the economic organization of the agricultural sector. Agricultural development is important because it raises the incomes of the mass of the people in the countryside; in addition, it increases the size of the domestic market for the manufacturing sector and reduces internal economic disparities between the urban centres and the rural districts.

The role of exports

A second conclusion to be drawn from experience is the close connection between export expansion and economic development. The high-growth countries were characterized by rapid expansion in exports. Here again it is important to note that export expansion was not confined to those countries fortunate in their natural resources, such as the oil-exporting countries. Some of the developing countries were able to expand their exports in spite of limitations in natural resources by initiating economic policies that shifted resources from inefficient domestic manufacturing industries to export production. Nor was export expansion from the developing countries confined to primary products. There was very rapid expansion of exports of labour-intensive manufactured goods. This phenomenon occurred not only in the extremely rapidly growing, newly industrialized countries (NICs)—Singapore, South Korea, and Taiwan, as well as Hong Kong—but also from other developing countries including Brazil, Argentina, and Turkey. Countries that adopted export-oriented development strategies (of which the most notable were the NICs) experienced extremely high rates of growth that were regarded as unattainable in the 1950s and ’60s. They were also able to maintain their growth momentum during periods of worldwide recession better than were the countries that maintained their import substitution policies.

Analysts have pointed to a number of reasons why the export-oriented growth strategy seems to deliver more rapid economic development than the import substitution strategy. First, a developing country able to specialize in producing labour-intensive commodities uses its comparative advantage in the international market and is also better able to use its most abundant resource—unskilled labour. The experience of

export-oriented countries has been that there is little or no disguised unemployment once labour-market regulations are dismantled and incentives are created for individual firms to sell in the export market. Second, most developing countries have such small domestic markets that efforts to grow by starting industries that rely on domestic demand result in uneconomically small, inefficient enterprises. Moreover, those enterprises will typically be protected from international competition and the incentives it provides for efficient production techniques. Third, an export-oriented strategy is inconsistent with the impulse to impose detailed economic controls; the absence of such controls, and their replacement by incentives, provides a great stimulus to increases in output and to the efficiency with which resources are employed. The increasing capacity of a developing country's entrepreneurs to adapt their resources and internal economic organization to the pressures of world-market demand and international competition is a very important connecting link between export expansion and economic development. It is important in this connection to stress the educative effect of freer international trade in creating an environment conducive to the acceptance of new ideas, new wants, and new techniques of production and methods of organization from abroad.

The negative effect of controls

Another major lesson that was learned is that poor people are, if anything, more responsive to incentives than rich people. Nominal exchange rates that are pegged without regard to domestic inflation have strong negative effects on incentives to export; producer prices for agricultural goods that are set as a small fraction of their world market price constitute a significant disincentive to agricultural production; and controls on prices and investment serve as significant deterrents to economic activity. Indeed, in most environments, controls lead to "rent-seeking" behaviour, in which resources are diverted from productive activity and instead are used to try to win import licenses, or to get the necessary bureaucratic permissions. In addition, in many countries, "parallel," or black, markets emerged, which diverted resources from activities in the official sector. In some countries, legal exports diminished sharply as smuggling and underinvoicing intensified in response to increasing discrepancies between the official exchange rate and the black-market rate.

The importance of appropriate incentives

As a corollary to the lesson that controls may strongly divert economic activity from an efficient allocation of resources, it became increasingly evident that inappropriate incentives can adversely affect economic behaviour. The response of agricultural supply to increases in producer prices is considerably stronger than was earlier believed. Likewise, individuals respond to incentives with respect to their education and training. Thus, much of the overinvestment in education referred to earlier came to be seen as the result of artificially inflated wages for university graduates in the public sector and of the fact that university education was virtually free to students in many developing countries. As a consequence, students perceived an incentive to obtain university degrees, even when there was a chance that they would remain unemployed for an extended period of time. When they did eventually find employment, the high wage would compensate for their earlier period of unemployment. Privately, such behaviour makes good sense in response to existing incentives; socially, however, it represents a waste of valuable and scarce resources.

The role of the international economy

In the modern view of development, an open, expanding international economy is the greatest support that the developed countries can provide for developing countries. Foreign aid can be extremely helpful in situations in which policies are conducive to development, but development will in any event be accelerated if the international economy is experiencing healthy growth. Removal of the trade barriers that developed countries have erected against developing countries is at least as important as economic aid. Trade barriers are many. They include restrictions on temperate-zone agricultural products and sugar; restrictions on the simpler labour-intensive manufactured goods (which often can be produced more cheaply in developing countries) including especially the Multifibre Arrangement under which imports of textiles and clothing into developed countries are greatly restricted; and tariff escalation, or higher rates of duties on processed products as compared with raw materials, which discourages the growth of processing industries in the developing countries. The removal of these trade barriers can help those developing countries that have already shown their capacity to take advantage of the available external

economic opportunities to grow even more satisfactorily and can also provide additional incentives for other developing countries to alter their economic policies.

Population growth

Still another lesson is the desirability of slowing down the rapid population growth that characterizes most developing countries. Their average rate of population growth is about 2.2 percent per year, but there are some countries where population growth is 3 percent or more. If the aim of economic development is to raise the level of per capita incomes, it is obvious that this can be achieved both by increasing the rate of growth of total output and by reducing the rate of growth of population. Development economists of the 1950s tended to neglect population-control policies. They were partly seduced by theories of dramatically raising total output through crash investment programs and partly by the belief that population growth could be controlled only slowly, through gradual changes in social attitudes and values. But it is now recognized that some births in developing countries are unwanted. Great technical advances in methods of birth control about the same time made possible mass dissemination at very low cost. Countries where these methods were made available experienced significant declines in birth rates, although significant changes in social attitudes and values are necessary before average family size declines enough to halt population growth. As soon as birth rates stop rising, the relative increase in population in the working-age groups and the higher income available to existing family members immediately start to release resources for increasing consumption and saving.

Development of domestic industry

The positive case for the expansion of the manufacturing sector may now be considered. It is based on the general assumption that the manufacturing sector will in due course become the leading sector, drawing in workers (in part, siphoning off a portion of the increase in the labour force that would otherwise tend to drive down labour productivity in agriculture) from the traditional agricultural sector and providing them with higher-productivity jobs than could be obtained in agriculture. Agricultural

productivity would necessarily be rising simultaneously, as investments in that sector permitted increasing output. Whereas it was earlier thought that this process would follow the historical experience of countries such as England and Japan, the lesson from the successful developing countries is that by providing incentives and infrastructural support to encourage exports, there are significant opportunities for expansion of manufacturing of labour-intensive commodities, opportunities that can promote rapid growth.

Thus, given the much greater size of the international economy, and the much lower transport and communications costs that confront contemporary developing countries as contrasted with conditions in the 19th century, the potential for rapid growth is much greater now. Countries such as South Korea and Taiwan have experienced in a decade proportionate increase in per capita incomes that it took England and Japan a century to achieve. Whether other developing countries can follow this lead depends on a number of factors, including their economic policies and the continued growth of the international economy.

The central problem of countries with low per capita output is that they have not as yet succeeded in making use of their potential economic opportunities. To do so, they must achieve an efficient allocation of the available resources and provide incentives for resource accumulation. But efficient allocation of resources is not merely a matter of the formal optimum conditions of economic theory. It requires the building up of an effective institutional and organizational framework to carry out the allocation of resources. In the private sector this requires the development of a well-articulated market system that embraces the markets for final products and the markets for factors of production. In the public sector the development of the organizational framework requires improvements in the administrative machinery of the government, especially in its fiscal machinery.

In the setting of the developing countries, one is concerned not only with the once for all problem of efficient allocation of resources but also with improving the capacity of these countries to make a more effective use of their resources over a period of time. That is to say, one is concerned not only with the static problem of the efficient allocation of given resources with the given organizational framework but also

with dynamic problems of improving the capability of this framework. From this point of view, there is no conflict, as some have maintained, between the static, or the short-run, considerations and the dynamic, or long-run, considerations. The two sets of requirements move in the same direction.

The problem of the efficient allocation of investable funds in the developing countries may be taken as an example. Static rules would require the developing countries to have higher rates of interest to reflect their greater capital scarcity. But many developing countries, under the influence of dynamic theories of economic development, have used a variety of direct and indirect controls to divert large sums of capital to the manufacturing sector in the form of loans at interest rates well below the level required to equate the demand and supply of capital funds. This practice has resulted not only in a wasteful use of scarce capital resources but also in a retardation of the development of a domestic capital market. Instead of developing a unified capital market for the whole country, it aggravates the financial dualism characterized by low rates of interest in the modern sector and high rates in the traditional sector. The policy of keeping the official rate of interest below the equilibrium rate of interest also results in an excess demand for loans, leading to domestic inflation and pressure on the balance of payments and to a discouragement of the growth of domestic savings. Few private individuals are prepared to buy government securities when they frequently carry rates of interest below the rate of depreciation in the value of money. Through the pursuit of “cheap money” policies that contradict the real facts of capital scarcity, the governments of developing countries have failed to make use of the opportunity of building up a domestic capital market based on an expanding volume of transactions in government securities.

Developing countries and debt

After World War II it was thought that developing countries would require foreign aid in their early stages of development. This aid would supplement the capital created by domestic savings, permitting a higher rate of investment and thus stimulating growth. It was expected that their reliance on official sources of additional capital would continue until their economies had progressed enough to gain them access to private international capital markets.

Until the 1980s this pattern seemed to evolve as predicted. In the 1950s almost all capital flows to developing countries were from official sources, in the form of foreign aid from developed countries or of resources from the multilateral institutions, the World Bank and the International Monetary Fund. In the 1960s some of the export-oriented, rapidly growing countries began to rely on private international capital markets. Some, such as Singapore, attracted direct private foreign investment; others, such as South Korea, relied more on borrowing from commercial banks. In the 1970s many oil-importing developing countries were able to turn to borrowing from private sources when their economies were hit by the severe oil price increase of 1973.

The borrowing by rapidly growing countries was of the type earlier envisaged. Investment yielded a very high rate of return in these countries, so additional foreign resources could be attracted and productively used. However, some other countries borrowed in order to offset higher oil prices and in order to maintain an excess of expenditures over consumption, without developing the highly profitable investments with which to finance the debt-servicing obligations they incurred. Balance-of-payments crises and debt-servicing difficulties had been experienced by a few countries in most years since the 1950s, but with the second oil price increase and the worldwide recession of the early 1980s, developing countries increased their borrowing and total indebtedness sharply until commercial banks virtually ceased voluntary lending after Mexico experienced difficulty meeting its obligations in 1982. The result was that a large number of developing countries were unable to meet their debt obligations, as export earnings declined owing to the recession, interest rates were rising, and new money was not forthcoming.

For many heavily indebted developing countries, the consequence was a prolonged period of slow growth or even declines in outputs and incomes. The lessons were several: The buoyant conditions of the 1970s were not likely to recur, and policies that had sustained satisfactory growth rates in those conditions were not likely to do so in the future; countries that had not yet moved away from import-substitution policies and direct governmental controls would need to undertake structural adjustments rather rapidly in order to resume their growth and to restore

creditworthiness; and future private lending to developing countries would need to be somewhat more discriminating as to the economic prospects of recipient countries.

Development in a broader perspective

Modern economic development started in Great Britain, which in the 1780s accounted for a little over 1 percent of the total world population at that time. Since then, economic development has spread in widening circles to other parts of the world, spurred on by a series of technological innovations, particularly in the form of improvements in transport and communications. In the early decades of the 19th century the circle of the developed countries was limited to western Europe. By the late 19th century the circle had widened to include North America, Australia and New Zealand, and Japan. By the early 1970s about 34 percent of the total world population belonged to the developed countries, which among them had 87.5 percent of the total world GNP. What are the prospects of the still-to-develop countries of Asia, Latin America, and Africa joining this circle of economic development?

On the negative side there are a number of factors that add to their difficulties. First, the level of per capita product in the present-day developing countries is much lower than in the developed countries in their pre-industrialization phase (with the exception of Japan). Second, the present-day developing countries have large population bases and are handicapped by much faster rates of population growth. Third, they have generally a much weaker social and political framework to cope with the more explosive forces of discontent engendered by their reaction against their colonial past and by their internal economic disparities.

On the positive side, the present-day developing countries can draw upon a greater store of scientific and technical knowledge from the developed countries. The potential opportunities to exploit the “technological gap” are not confined to manufacturing. Modern science and technology can make immense contributions to agriculture, as illustrated by the Green Revolution created by the introduction of improved seeds and fertilizers in some Asian and Latin-American countries. Modern methods of birth control can make a decisive contribution in the race for raising per

capita incomes. In addition, as the circle of the developed countries widens, they are bound to exert an increasing upward pull on the developing countries.

The economic growth of the developed countries has generally resulted in an expanding demand for the products and sometimes for direct labour services from the developing countries. But there are also the stronger localized pulls, such as the pull of the United States economy on Mexico and the pull of western Europe on the developing countries of southern Europe. The spectacular economic growth of Japan since World War II may also exert a similar pull-on neighbouring country in East Asia.

Countries such as South Korea, Taiwan, and Singapore are rapidly approaching developed-country status, and the circle is widening still farther. Rapid growth rates are being experienced by many countries in Southeast Asia. If one considers the successful developing countries of the 1950s and ’60s, it is evident that the rapid growth of the international economy was a very positive contributing factor in their success. Future widening of the circle will no doubt depend in large part on whether the growth of the international economy attains a satisfactory level.

In conclusion, the experience of the postwar years has provided many lessons that form a basis for optimism. A great deal has been learned about the types of economic policies that are conducive to rapid economic development. Rates of growth of per capita income experienced by the developing countries have been significantly higher than had been achieved by the first countries to develop. Attainable rates of growth of per capita income appear to be far above what formerly was thought feasible. The chief potential obstacles to successful development appear to be the spectre of disintegration of the international economy, should protectionist pressures be increasingly effective, and the inability or unwillingness of leaders in developing countries to adopt policies conducive to rapid economic growth.

Making of Globalisation

Globalization is the process of increasing interdependence and integration among the economies, markets, societies, and cultures of different countries worldwide. This is made possible by the reduction of barriers to international trade, the liberalization of capital movements, the development of transportation, and the

advancement of information and communication technologies. The term globalization first appeared in the early 20th century, developed its current meaning sometime in the second half of the 20th century, and came into popular use in the 1990s to describe the unprecedented international connectivity of the post–Cold War world. The origins of globalization can be traced back to the 18th and 19th centuries, driven by advances in transportation and communication technologies. These developments increased global interactions, fostering the growth of international trade and the exchange of ideas, beliefs, and cultures. While globalization is primarily an economic process of interaction and integration, it is also closely linked to social and cultural dynamics. Additionally, disputes and international diplomacy have played significant roles in the history and evolution of globalization, continuing to shape its modern form.

Economically, globalization involves goods, services, data, technology, and the economic resources of capital. The expansion of global markets liberalizes the economic activities of the exchange of goods and funds. Removal of cross-border trade barriers has made the formation of global markets more feasible. Advances in transportation, like the steam locomotive, steamship, jet engine, and container ships, and developments in telecommunication infrastructure such as the telegraph, the Internet, mobile phones, and smartphones, have been major factors in globalization and have generated further interdependence of economic and cultural activities around the globe.

Though many scholars place the origins of globalization in modern times, others trace its history to long before the European Age of Discovery and voyages to the New World, and some even to the third millennium BCE. Large-scale globalization began in the 1820s, and in the late 19th century and early 20th century drove a rapid expansion in the connectivity of the world's economies and cultures. The term global city was subsequently popularized by sociologist Saskia Sassen in her work The Global City: New York, London, Tokyo (1991).

In 2000, the International Monetary Fund (IMF) identified four basic aspects of globalization: trade and transactions, capital and investment movements, migration and movement of people, and the dissemination of knowledge. Globalizing processes affect and are

affected by business and work organization, economics, sociocultural resources, and the natural environment. Academic literature commonly divides globalization into three major areas: economic globalization, cultural globalization, and political globalization.

Proponents of globalization point to economic growth and broader societal development as benefits, while opponents claim globalizing processes are detrimental to social well-being due to ethnocentrism, environmental consequences, and other potential drawbacks. Between 1990 and 2010, globalization progressed rapidly, driven by the information and communication technology revolution that lowered communication costs, along with trade liberalization and the shift of manufacturing operations to emerging economies (particularly China)

Transportation geography detects, describes, and explains the Earth's surface's transportation spaces regarding location, substance, form, function, and genesis. It also investigates the effects of transportation on land use, on the physical material patterns at the surface of the earth known as 'cover patterns', and on other spatial processes such as environmental alterations. Moreover, it contributes to transport, urban, and regional planning.

Transportation is fundamental to the economic activity of exchange. Therefore, transport geography and economic geography are largely interrelated. At the most basic level, humans move and thus interact with each other by walking, but transportation geography typically studies more complex regional or global systems of transportation that include multiple interconnected modes like public transit, personal cars, bicycles, freight railroads, the Internet, airplanes and more. Such systems are increasingly urban in character. Thus, transport and urban geography are closely intertwined. Cities are very much shaped, indeed created, by the types of exchange and interaction facilitated by movement. Increasingly since the 19th century, transportation is seen as a way cities, countries or firms compete with each other in a variety of spaces and contexts

Purpose of Transportation

The unique purpose of transportation is to overcome space, which is shaped by human and physical constraints such as distance, time, administrative divisions,

and topography. Jointly, they confer friction to any movement, commonly known as the friction of distance (or friction of space). In an ideal world, transportation would come at no effort in terms of cost and time with unlimited capacity and spatial reach. Under such circumstances, geography would not matter. However, geography can be a significant constraint to transport in the real world since it trades space for time and money and can only be partially circumscribed. The extent to which this is done has a cost that varies significantly according to factors such as the length of the trip, the capacity of modes and infrastructures, and the nature of what is being transported. From the mobility of a person using an automobile or a public transit system to commute to their place of work to the mobility of cargo being shipped across the Pacific as part of an international trade transaction; both are bound to a similar set of constraints.

Transport geography can be understood from a series of eight core principles:

1. Transportation is the spatial linking of derived demand.
2. Distance is a relative concept involving space, time, and effort.
3. Space is concomitantly the generator, support, and constraint for mobility.
4. The relation between space and time can converge or diverge.
5. A location can be central, generating and attracting traffic, or an intermediate element where traffic transits.
6. To overcome geography, transportation requires a footprint.
7. Transportation seeks massification but is constrained by atomization.
8. Velocity is a modal, intermodal, and managerial effort.

These principles underline that there would be no transportation without geography and no geography without transportation. Thus, the goal of transportation is to transform the geographical attributes of freight, passengers, or information, from an origin to a destination, conferring them an added value in the process. There is substantial operational differences between transportation modes, particularly between passengers and freight, which are often operated separately. The convenience at which this can be done varies considerably and is commonly labelled as mobility.

Physical Constraints

Since transportation involves a set of technologies designed to overcome the constraints of space, particularly distance, physical constraints are the most fundamental to consider. Even if technological improvements have made the physical constraints of space less acute, they still play a considerable role in the location, path, construction and maintenance costs, and operational conditions of transportation systems.

Topography

Features such as mountains and valleys have strongly influenced the structure of transportation networks, the cost, and the feasibility of transportation projects. Land transport infrastructures are usually built where there are the least physical impediments, such as on plains, along valleys, through mountain passes, or, when necessary, through digging tunnels. Roads follow the path of least resistance. When the first alpine tunnels began to be built in the 19th century, they were constructed at higher altitudes to make their length shorter but more difficult to access. By the mid-20th century, boring technology allowed the construction of base tunnels. Water depths and the location of obstacles such as reefs influence water transport. Coastlines exert an influence on the location of port infrastructure. Aircraft require airfields of considerable size for take-off and landing. Topography can impose a natural convergence of routes that will create a certain degree of centrality. It may help a location become a trade center as a collector and distributor of goods.

Topography can complicate, postpone, or prevent transport activities and investment. Physical constraints fundamentally act as absolute and relative barriers to mobility. An absolute barrier is a geographical feature that entirely prevents a movement, while relative barriers impose additional costs and delays. The topography notably influences land transportation networks, as highways and railways tend to be impeded by grades higher than 3per cent and 1per cent, respectively. Under such circumstances, land transportation tends to be denser in areas with limited topography.

Hydrology

The properties, distribution, and circulation of water play an important role in the transport industry as hydrology simultaneously supports and constrains transport activities. Maritime transport is influenced by the availability of navigable channels through oceans, rivers, lakes, and shallow seas. Several river systems, such as the Mississippi, the St. Lawrence, the Rhine, the Mekong, and the Yangtze, are important navigable routes into the heart of continents. Historically, they have been the focus of human activities that have taken advantage of their transport opportunities. While Europe, the Americas, and East Asia are well endowed with navigable rivers, Subsaharan Africa does not have navigable rivers over long stretches because of escarpments. This is particularly the case for the segments reaching the ocean with several rapids and waterfalls, making navigation impractical. Therefore, differences in hydrological endowments can be associated with differences in economic opportunities.

Port sites are also highly influenced by the physical attributes of the site, where natural features (bays, sand bars, and fjords) protect port installations. Since it is at these installations that traffic is transhipped, the location of ports is a dominant element in the structure of maritime networks. Where barriers exist, such as narrows, rapids, or land breaks, water transport can only overcome these obstacles with substantial investments in canals or dredging. Conversely, waterways serve as barriers to land transportation, necessitating the construction of bridges, tunnels, and detours.

Climate

The main components of climate include temperature, wind, and precipitation, with their impacts on transportation modes and infrastructure ranging from negligible to severe. Hazardous conditions such as snow, heavy rainfall, ice, or fog can severely curtail freight and passenger movements.

Air transportation is particularly vulnerable to weather disruptions, such as during winter, when a snowstorm can create cascading effects on air services. There is seasonality for global wind patterns. Jet streams are also a major physical

component that international air carriers must consider. For an aircraft, the wind speed can affect travel time and costs. Tailwind conditions can reduce scheduled flight time by up to an hour for intercontinental flights. For instance, due to strong jet stream conditions during winter, transatlantic flights between the American East Coast and Europe can gain 30 to 45 minutes from the scheduled eastbound flight time. However, for westbound flights, unusually strong jet stream conditions will lengthen flight time. They may occasionally force a flight to do an unscheduled refuelling stop in intermediary airports such as Gander (Newfoundland) or Bangor (Maine). Climate change is expected to increase the strength of the North Atlantic jet stream and could lengthen westbound flights between North America and Europe.

The climate is also having an impact on transportation networks by influencing construction and maintenance costs. Since a large share of the global population lives in temperate climates, they are exposed to notable temperature variations between the summer and winter. Large temperature variations have a taxing impact on transportation infrastructures with thermal expansion and contraction cycles that may damage infrastructure made from or resting on concrete and asphalt. Infrastructures such as bridges, railways, and pipelines require expansion joints to absorb thermal expansion and contraction of their materials. For instance, land covered by permafrost offers unique constraints for constructing and maintaining transportation infrastructures. In temperate climates, the freeze-thaw cycle can damage transport infrastructure such as road surfaces, particularly during spring, when they are more continuous. Even volcanic eruptions, by altering atmospheric conditions, can impact transport operations. In 2010, a volcanic eruption in Iceland released large amounts of ashes into the atmosphere, which forced the closing of most airports in northwestern Europe and the cancellation of many transatlantic flights out of concern that the ash could damage jet engines.

From a geometrical standpoint, the sphericity of the earth determines the great circle distance; the shortest distance line between two points on a sphere. This feature explains the paths followed by major intercontinental maritime and air routes. For air travel, the great circle distance was first used by Lindbergh to cross the North Atlantic non-stop in 1927.

Overcoming the Physical Environment

Rapid technological developments have enabled transportation to overcome the physical environment. Before the Industrial Revolution, most road paths were adapted to topography. Since then, efforts have been made to pave roads, bridge rivers, and cut pathways over mountain passes. Engineering techniques in arches and vaults used in Byzantine and Gothic church constructions in the twelfth century permitted building bridges across wider streams or deep river valleys. With the Industrial Revolution, iron and steel allowed for the construction of even longer bridges, and by the late 19th century, suspension bridges led to even more options with lengths above one kilometer. Thus, road building has been at the core of technological efforts to overcome the environment since it supports local and even long-distance travel.

Road building has transformed the environment from efforts to mechanize road transport modes to developing integrated multilane highways. The earliest developments in maritime transport came in transforming waterways for transportation purposes through canal locks coping with adverse natural gradients. Further improvements in navigation came with the cutting of artificial waterways. Some of the earliest examples can be found in the Martesana canals of Lombardy (15th century), the Dutch canals (17th century), the Canal de Briare in France (17th century), or the Grand Canal of China (mainly from the 7th to the 16th centuries).

Further improvements in navigation technology permitted an increase in the speed, range, and capacity of ocean transport. However, the increasing size of ships has prevented canals and many ports from servicing the largest ships. Several port authorities have thus embarked on expansion programs to cope with these new technical requirements. Passages through the Arctic Ocean are being investigated to create new international connections. Artificial islands are also built to expand port installations in deep waters.

As level ground over long distances is important for increasing the efficiency of railway routes, the transport industry has come to modify the earth's features by building bridges and tunnelling. From the early steam engines to the first high-speed

trains, increasing motive power has permitted physical obstacles to be overcome by rail.

The role of technology has been a determinant in the development of the air transport sector. From the experiments of the Montgolfier brothers to the advent of jet aircraft, the aerial crossing of rugged terrain over a considerable distance became possible. Technical innovation in the aeronautic industry has permitted planes to avoid adverse atmospheric conditions, improve speed, increase range, and raise carrying capacity. Unlike maritime shipping, polar air routes have been a reality since the 1990s, allowing them to connect North America and Pacific Asia. With the rapid rise in air passenger and freight transport demand, emphasis has been given to constructing airport terminals and runways. As airports occupy large areas, their environmental footprint is substantial. The construction of Chek Lap Kok airport in Hong Kong led to the levelling of mountainous land for the airport site. Kansai Airport, servicing Osaka, has been built on an artificial island.

Transportation and the Spatial Structure

The concepts of site and situation are fundamental to geography and transportation. While the site refers to the geographical characteristics of a specific location, its situation concerns its relationships with other locations. For instance, a port site relates to attributes such as the suitability of its harbour. In contrast, a port situation relates to its connectivity with its foreland (other ports) and hinterland (the inland market it serves). Thus, all locations are relative to one another, but the situation is not a constant attribute as transportation developments change accessibility levels, and the relations between locations. The development of a location reflects the cumulative relationships between transport infrastructure, economic activities, and the built environment.

The following factors are particularly important in shaping the spatial structure:

- Costs. The spatial distribution of activities is related to distance factors, namely friction. Locational decisions are taken to minimize costs, often related to transportation.

- Accessibility. All locations have accessibility, but some are more accessible than others. Thus, because of transportation, some locations are perceived as more valuable than others.
- Agglomeration. There is a tendency for activities to agglomerate to take advantage of the value of specific locations. The more valuable a location, the more likely agglomeration will take place. The organization of activities is essentially hierarchical, resulting from the relationships between agglomeration and accessibility at the local, regional, and global levels.

Many contemporary transportation networks are inherited from the past, notably transport infrastructures. Since the Industrial Revolution, new technologies have revolutionized transportation in terms of speed, capacity, and efficiency, but the spatial structure of many networks has not changed much. Two major factors can explain this inertia in the spatial structure of some transportation networks:

- ✓ Physical attributes. Natural conditions can be modified and adapted to suit human uses, but they are a challenging constraint to escape, notably for land transportation. Thus, it is not surprising that most networks follow the easiest (least cost) paths, which generally follow valleys and plains. Considerations that affected road construction a few hundred years ago are still in force today, although they are sometimes easier to circumscribe with civil engineering work.
- ✓ Historical considerations. New infrastructures generally reinforce historical exchange patterns, notably at the regional level. For instance, the current highway network of France has mainly followed the patterns set by the national road network built early in the 20th century. This network was established over the Royal Roads network, mainly following roads built by the Romans. At the urban level, the pattern of streets is often inherited from an older pattern, which may have been influenced by the pre-existing rural structure (lot pattern and rural roads).

While physical and historical considerations are at play, introducing new transport technology or adding new transport infrastructure may lead to transforming existing networks. Recent developments in transport systems such as container shipping, long-range aircraft, and the application of information technologies to transport

management have created a new transport environment and spatial structure. These transport technologies and innovations have intensified global interactions and modified the relative location of places. In this highly dynamic context, two processes are taking place at the same time:

- Specialization. From a situation of diversification, linked geographical entities can specialize in producing goods for which they have an advantage and trading for what they do not produce. As a result, efficient transportation systems are generally linked with higher levels of regional specialization. Economic globalization underlines this process as specialization occurs as long as the savings in production costs are higher than the additional transport costs incurred.
- Concentration. The continuous evolution of transportation technology may not necessarily have expected effects on the spatial structure, as two forces are at play; concentration and dispersion. Linked geographical entities may see the reinforcement of one at the expense of others, notably through economies of scale. This outcome often contradicts regional development policies that provide uniform accessibility levels within a region.

A common fallacy is to relate transportation solely as a force of dispersion, favoring the spatial diffusion of activities. This is not always the case. In numerous instances, transportation is a force of concentration and clustering, notably for business activities. Since transport infrastructures are generally expensive to build and maintain, they are established first to service the most important locations. For instance, even if it was a substantial dispersion factor, the automobile has also favoured the clustering of activities.

Space and Time Relationships

One of the most fundamental relationships supported by transportation involves how much space can be overcome within a given amount of time. The faster the mode, the more significant the distance that can be overcome within the same amount of time. Transportation, particularly improvements in transport systems, changes the relationship between time and space. When this relationship involves easier,

faster, and cheaper access between places, the outcome is a space/time convergence because the amount of space that can be overcome for a similar amount of time increases significantly. It is, however, a spatially and socially uneven process since it will impact the accessibility of locations differently. For instance, infrastructure will not be laid up uniformly, and segments of the population will experience a more significant improvement in mobility because of their socioeconomic status.

Despite these uneven processes, significant regional and continental gains were achieved during the 18th and 19th centuries with the establishment of national and continental railway systems as well as with the growth of maritime shipping. This process continued into the 20th century with the development of road and air transport systems. The outcome has been significant differences in space/time relationships, mainly between developed and developing countries, reflecting differences in the efficiency of transport systems. Differences in mobility are thus a defining characteristic of development, but as time progresses, improvements diffuse. For instance, countries considered lagging behind just half a century ago, such as Japan, South Korea, and China, have seen a remarkable improvement in the space and time convergence of their national transportation systems.

At the international level, globalization has been supported by improvements in transport technology. More than 200 years of technological advancements have resulted in a space/time convergence of global proportions. This enabled the widespread exploitation of the advantages of the global market, notably in terms of resources and labour. Significant reductions in transport and communication costs occurred concomitantly. Thus, there is a relationship between space and time convergence and the integration of a region in global trade. Five major factors are of relevance in this process:

- Speed: The most straightforward factor relates to the increasing speed of many transport modes, a condition that notably prevailed in the first half of the 20th century. More recently, speed has played a less significant role, as many modes are not going much faster. For instance, an automobile has a similar operating speed in the early 21st century than in the mid-20th century. At the

same time, a commercial jet plane operated at a similar speed in the 2020s than in the 1970s.

- Economies of scale: Being able to transport larger amounts of freight and passengers at lower costs has considerably improved the capacity and efficiency of transport systems. For space-time convergence, this implies more capacity for a given quantity of passengers or freight being carried. Instead, the traffic can be handled with fewer trips, implying that at the aggregate level, it is moving faster.

- Expansion of transport infrastructures: Transport infrastructures have expanded considerably to service areas not previously or insufficiently serviced. A paradox of this feature is that although the expansion of transport infrastructures may have enabled distribution systems to expand, it also increased the average distance over which passengers and freight are being carried.
- Efficiency of transport terminals: Terminals, such as ports and airports, have shown a growing capacity to handle large quantities in a timely manner. Thus, even if the speed of many transport modes has not increased, more efficient transport terminals and better management of flows have helped to reduce transport time.
- Information technologies (IT): Permitted several economic activities to bypass spatial constraints in a significant manner as IT enables an improvement of traffic flows and better managing transport assets.

Yet, space and time convergence does not occur ubiquitously. In time, some locations gain more accessibility than others, particularly if they experience the accumulation of transport infrastructures and have a level of economic and political command. For instance, by the early 20th century, London was the most connected location in the world, a status reflective of the primacy of the British Empire at that time. The importance of locations reflects priorities attributed to connectivity and accessibility and variations in space and time convergence.

There is also a scale effect on space/time convergence as long-distance transportation tends to be more impacted than short-distance transportation. For

instance, the setting of high-speed rail services in Europe and China has lessened inter-urban distances at a much more significant rate than intra-urban distances. Therefore, space/time convergence between two cities could be more significant than within a city, creating a duality between regional or international mobility.

After centuries of transport developments and their impacts on geography, global accessibility reflects heterogeneous geography. Space/time convergence can also be inverted under specific circumstances, meaning space/time divergence occurs. For instance, congestion is increasing in many metropolitan areas, implying additional delays for activities such as commuting. Mobility in congested urban areas is at the same speed as 100 years ago on horse carriages.

Despite dramatically contributing to space/time convergence, air transportation is also experiencing growing delays. Flight times are getting longer between many destinations, mainly because of take-off, landing, and gate access delays. Airlines are simply posting longer scheduled flight times to factor in congestion. The termination of the Concorde supersonic jet service in 2003 can also be considered a space/time divergence. More stringent security measures at airports have also imposed additional delays, which tend to penalize short-distance flights. Additionally, direct transport services can be discontinued and replaced by a hub-and-spoke structure. The “last mile” can be the longest in many transport segments. For instance, an express mail package flown from Washington to Boston in about an hour (excluding delays at take-off and landing due to airport congestion) can have an extra one-hour delay as it is carried from Logan Airport to downtown Boston, a distance of only three kilometres.

Energy Geographies

- The study of energy development, transportation, markets, or use patterns and their determinants from a spatial, regional, or resource management perspective.
- Geography is central to understanding and addressing the current energy dilemmas. The resource systems of energy production, distribution, and consumption are thoroughly entwined as social–environmental interactions occurring across multiple scales.

- Energy geographies represent the convergence of concepts and techniques borne out of geography's core sub-fields to past, prevailing, and future patterns of energy production, distribution, and use at various geographical scales. This includes an emphasis on the material (e.g. biophysical, technological) as well as immaterial (discursive, cultural) spatial dimension of scientific (academic) and policy (applied) imperatives.

While energy geography has existed as a sub-field within geography for at least the past three decades, the interest in energy issues has been cyclical, spiking around the time of energy crisis. However, with energy taking centre stage in regional, national, and international policy and public debates, scholarship in energy geography has seen a resurgence since the mid-2000s. Geographers argue that the inter-disciplinary nature of geographical research makes the discipline well-placed to engage with critical question of energy as well as affecting policy.

Scholars suggests that the approach of geography to energy studies is best thought of as "an academic borderland", as it lies somewhere in the overlap between the (four) sub-disciplines of geography.

Energy is simultaneously:

- a physical entity that is derived from natural processes and transformed through physical systems, and therefore partly the domain of the 'physical geographer'.
- a social relation to the extent that physical entities are socially constructed as energy resources through political-economic and cultural processes but also a primary agent in the spatialization of social activities, and therefore partly the domain of the 'human geographer'.
- a primary mediator of our relationship with the environment and therefore partly the domain of the 'nature-society' or 'human-environment' geographer.
- non-uniform over space and made accessible or not by site-level conditions and therefore partly the domain of the 'GI Scientist' and 'cartographer.

Energy geographers' study

Energy geographers have studied the entire value chain of energy, from fuels and the extraction of energy to its distribution and consumption. A large part of the geographical work on energy has been to highlight the unequal distribution of benefits

and costs that emerge from energy systems. Pasqualetti (2011), in his review of books in energy geography, notes the shifts that have occurred in the subjects studied by energy geographers since the 1950s. While in its formative years, energy geography concentrated on the location of resources, regional energy systems and nuclear power; since the 2000s, the focus has moved to climate change, energy justice, energy security, and renewable energy. While oil has been the most studied resource, recent scholarship in energy geography has turned its attention towards renewable sources of energy (solar, wind) as well as non-conventional sources (shale gas, oil sands).

In his review of energy geography, Calvert (2016) concludes that energy geography scholarship includes the description and explanation of:

- the spatio-temporal distribution of energy stocks and flows as well as the geophysical processes which underlie that distribution;
- the relationship between the spatial form of socio-ecological systems and energy availability, production, distribution, and use at various geographic scales;
- national and regional differences in the above, as well as how they are intertwined with inter- and intra-regional distributions of political- economic power and social activities;
- the ways in which energy production and consumption mediates, and is mediated by, spatial politics and the human-environment relationship;
- the co-constitution of energy production and consumption with place-making activities, geographical imaginaries, spatial identities, and spatial representations;
- the geographical dimensions of the political tensions, social injustices, and scientific uncertainties that surround prevailing and future energy resource management decisions;
- the study of place-based solutions to the social, economic, and environmental problems of energy system development including integrated regional supply-demand planning, integrated land-energy planning, and (critical) energy-GIS.

Energy Transitions in Geography Research

There is an ongoing global shift in energy sources, from fossil fuels like coal and oil to renewable energy like solar, wind, and hydropower. These shifts are referred to as "Energy Transitions". At the global scale, current transitions are driven by concerns about climate change and environmental sustainability. But energy transitions are highly variable, in Africa poor households have extremely limited energy access, so “energy transitions” can include increased use of energy, as well as a shift from reliance on biomas (wood fuel and charcoal) towards cleaner energy such as gas and electricity for cooking, heating and lighting. Energy transitions impact the way energy is produced, distributed, and consumed across different regions with distinct geographical factors influencing the transition process. Energy transitions require major infrastructural requirements (e.g. hydroelectric dams and electric vehicle charging station) and have significant geopolitical Implications (e.g. changes in trade relationships as countries stop importing certain types of energy or start importing minerals for electric vehicles).

Energy transitions are an emerging area of Geographical research and scholarship. Geographical thought, including thinking through the lenses of social-ecological systems, governance and political ecology, is well positioned to help us understand the complexities in trade-offs and needs that occur to humans, ecosystems and planetary boundaries as we navigate these complex transitions. For example, the shift to use of ethanol (from plants) to run our cars is one such shift that has complicated implications across geographical scales (see below). The increasing demand for minerals needed for electric batteries and vehicles is another aspect of these transitions you will explore in this course.

Palm Oil as a Biofuel and Deforestation in Indonesia

“Dedicated to the 25 orangutans we lose every day” “Let’s stop palm oil destroying the forest”. These are the lines with which the Greenpeace video on palm oil deforestation ends. This video, released by the organization on the internet in August 2018, recently made headlines when it was banned from being telecast to UK television screens when it was submitted as a Christmas ad.

Palm oil is extracted from the fruit of the Oil Palm trees. It is an efficient crop and a highly versatile oil, which has resulted in it being used in the manufacture of all sorts of products – from pizza to shampoos; from detergents to diesel. However, palm

oil production is a major driver of deforestation and is destroying the habitat of endangered animals like the orangutan. A large part of the palm oil produced is exported to other countries (European Union, China, India, etc.) where it is used for a variety of purposes, including conversion to Biofuel.

Indonesia and Malaysia currently account for 86per cent of the global palm oil production, and palm oil production is increasingly contributing to the 1.5per cent annual deforestation rate in these countries. The population of orangutans in Borneo has fallen by 80per cent over the past 75 years as a result of habitat destruction. The Sumatran Orangutan was declared critically endangered in 2016.

The impact of biofuels on climate change is not clear: “Our analyses suggests that biofuels such as palm oil, if produced on converted land, could, for long periods of time, be much greater net emitters of greenhouse gases than the fossil fuels that they typically replace”.

However, the palm oil story is much more complicated. Consider the following:

- Palm oil industry employs 15 million Indonesians.
- Indonesia also protects 106 million acres of forests
- Palm oil is an efficient crop, such that it uses only 5.5per cent of global land use for cultivation, but produces 33per cent of global oils and fats. Replacing palm oil with other types of oils may require even more farmland.

Infectious diseases

Infectious diseases vary by geographic region and population, and they change over time. When moving from one region to another, humans are exposed to a variety of potential pathogens and also serve as part of the global dispersal process.[1] Microbes picked up at one time and in one place may manifest in disease (and potentially be transmitted) far away in time and place. Because many microbes have the capacity to persist in the human host for months, years or even decades, the relevant time frame for study of geographic exposures becomes a lifetime.

Furthermore, microbes also move and change and reach humans via multiple channels.

Caring for patients requires an understanding of the basic factors that underlie the geography of human diseases and events that cause shifts in the distribution and burden of specific diseases. Current travel capacity contributes to massive population movements and rapid shifts in diseases and their distributions, but technology also provides communication channels that aid clinicians who care for patients with unfamiliar medical problems. This chapter reviews the factors that shape the global distribution of infectious diseases and the forces that are expected to shift distributions in the future. Examples illustrate the range of factors that affect the distribution and expression of infectious diseases.

Many authors have traced the origins and spread of infectious diseases through history. A century and a half ago, John Snow noted that epidemics of cholera followed major routes of commerce and appeared first at seaports when entering a new region. Yersinia pestis, the cause of plague, accompanied trade caravans and moved across oceans with rats on ships. Exploration of the New World by Europeans introduced a range of human pathogens that killed one-third or more of the local populations in some areas of the Americas. The plants and animals introduced as a result of this exploration have also had profound and long-lasting consequences for the ecology and economics of the new environment.[3] The speed, reach and volume of today's travel are unprecedented in human history and offer multiple potential routes to move biologic species around the globe. Pathogens of animals and plants are being transported as well, and this can affect global food security. Establishment of arthropod vectors, such as mosquitoes, that are competent to transmit human pathogens in new geographic areas expands the regions that are vulnerable to outbreaks of some vector-borne infections. Here we focus only on pathogens that directly affect human health and on their sources. When thinking about geography of human infections, it is useful to consider both the origin of the organism and the conveyor or immediate source for the human.

Factors Influencing Geographic Distribution

In past centuries, lack of contact with other regions could allow an infection to remain geographically isolated. Today, most infections that are found only in focal areas have biologic or geoclimatic constraints that prevent them from being introduced into other geographic regions. For example, the fungus Coccidioides immitis, which causes coccidioidomycosis, thrives in surface soil in arid and semiarid areas with alkaline soil, hot summers and short, moist winters; it is endemic in parts of south-western USA, Mexico and Central and South America. People become infected when they inhale arthroconidia from soil. An unusual wind storm in 1977 lifted soil from the endemic region and deposited it in northern California, outside the usual endemic region. In general, infection is associated with residence in or travel through the endemic region. However, because the fungus can persist in the human host for many years following initial infection (which may be mild and unrecognized), disease may be diagnosed far from the endemic regions. Although it is a 'place' disease, coccidioidomycosis has increased in the south-western USA in recent years, in part attributable to a large influx of susceptible humans into the endemic zone and construction and other activities that disturb the soil. Outbreaks are also linked to climatic and environmental changes.

Vectors

Many microbes require a specific arthropod vector for transmission or an animal reservoir host and hence inhabit circumscribed regions. Malaria is a vector-borne infection that cannot become established in a region unless a competent vector is present. The presence of a competent vector is a necessary but not sufficient condition for human infection. The mosquito must have a source of malarial parasites (gametocytemic human or, rarely, nonhuman primates), appropriate bioclimatic conditions and access to other humans. The ambient temperature influences the human biting rate of the mosquito, the incubation period for the parasite in the mosquito and the daily survival rate of the mosquito. Prevailing temperature and humidity must allow the mosquito to survive long enough for the malarial parasite to undergo maturation to reach an infective state for humans. Competent vectors exist in many areas with no malaria transmission, because the other conditions are not met. These areas are at risk of the introduction of malaria, as illustrated by several recent examples in the USA and elsewhere.

An estimated 77per cent of the world's population lived in areas with malaria transmission in 1900. By 2002 about 48per cent lived in at-risk areas, but because of population growth and migration the total global population exposed to malaria had increased by 2 billion since 1900 (see Figure 106-2). For example, in Africa, the population in malaria endemic zones increased by almost 200 million people between 2000 and 2010. This contrasts with the situation in the USA, where malaria was endemic in many areas into the 20th century, with estimates of more than 600 000 cases in 1914. Even before extensive mosquito control programs were instituted, transmission declined. Demographic factors (population shifts from rural to urban areas), improved housing with screened doors and windows, and the availability of treatment were among the factors that contributed to this decrease.

The distribution of onchocerciasis in Africa is notable for its association with rivers. The vector of this filarial parasite, the black fly (genus Simulium), lays her eggs on vegetation and rocks of rapidly flowing rivers and usually inhabits a region within 5–10 km on either side of a river. Another name for onchocerciasis, river blindness, describes the epidemiology as well as one consequence of infection.

Other pathogens have complex cycles of development that require one or more intermediate hosts. Distribution may remain relatively fixed, even when infected humans travel widely, if other regions do not supply the right combination and geographic proximity of hosts. Although persons with schistosomiasis visit many regions of the world, the parasite cannot be introduced into a new region unless an appropriate snail host is present, excreted eggs (in urine or feces) are released into fresh water where they reach the snail hosts, and humans subsequently have contact with the untreated water. However, local ecologic changes and climate change can be associated with expansion of transmission in endemic areas or increased intensity of transmission, and this has been identified as a possible consequence of warming temperatures in China.

Ebola and Marburg viruses are viruses that have focal distributions but have caused dramatic human outbreaks with high mortality. They also infect nonhuman primates and threaten the survival of great apes. Recent studies suggest that bats may be the reservoir hosts.15, 16 Because these infections can be spread from person to person, secondary household and nosocomial spread in several instances has amplified what began as an isolated event. Lack of adequate resources in hospitals in many developing regions contributes to the spread of infections within hospitals and clinics.

Cultural practices can lead to unusual infections in isolated areas. Residents of the highlands of Papua New Guinea developed kuru after ingestion (or percutaneous inoculation) of human tissue during the preparation of the tissues of dead relatives.

The presence of a pathogen in a region may reflect the biologic properties of the organism, its need for a certain physicochemical environment or its dependence on specific arthropods, plants or animals to provide the milieu where it can sustain its life cycle. The presence of a pathogen in a region does not equate with human disease, because mechanisms must exist for the pathogen to reach a susceptible human host for human disease to occur. Exploration of new regions or changes in land use may place humans in an environment where they come into contact with microbes that were previously unrecognized as human pathogens.

Biologic Attributes of Organisms That Influence Their Epidemiology.

- Host range
- Duration of survival in host
- Route of exit from host
- Route of entry into human
- Inoculum needed to establish infection
- Virulence
- Capacity to survive outside host
- Resistance to antimicrobials and chemicals

Factors Influencing the Burden of Disease

Among the infectious diseases that impose the greatest burden of death globally, most are widely distributed: respiratory tract infections (e.g. influenza, Streptococcus pneumoniae and others), diarrheal infections, tuberculosis, measles, AIDS and hepatitis B. Most of these infections are spread from person to person. The World Health Organization estimated that about 65per cent of infectious diseases deaths globally in 1995 were due to infections transmitted from person to person.

Burden from these diseases is unevenly distributed across populations and among different countries. Poor sanitation, lack of clean water, crowded living conditions and lack of vaccination contribute to the disproportionate burden from many of these infections in low- and middle-income countries (LMIC). In industrialized countries, pockets of high risk persist. Disadvantaged populations have higher rates of tuberculosis, HIV and many other infectious and non-infectious diseases. Rates of reported cases of tuberculosis vary widely by region and within countries (Table 106-2). Figure 106-5 shows the effect of crowded living conditions on rates of tuberculosis in England and Wales in 1992. Among welfare applicants and recipients addicted to drugs or alcohol in New York City, the rate of tuberculosis was 744 per 100 000 person years, or more than 70 times the overall rate for the USA. The impact of an infection also derives from the access to effective therapy. Treatment of a patient with active tuberculosis can cure the individual and eliminate a source of infection for others in the community.

Diphtheria, controlled in many parts of the world through the use of immunization, resurged in new independent states of the former Soviet Union in the 1990s, a reminder of the tenuous control over many infectious diseases. Populations in other countries also felt the impact as cases related to exposures in the Russian Federation were reported in Poland, Finland, Germany and the USA. Serologic studies in America and Europe suggest that up to 60per cent of adults may be susceptible to diphtheria.

Travelers to tropical and LMIC can pick up geographically focal, often vector-borne or animal-associated infections, but travellers most often acquire infections with a worldwide distribution that are common in areas lacking good sanitation. Food- and water-borne infections lead to travellers' diarrhoea, which is caused by multiple agents, typhoid fever and hepatitis A. Respiratory tract infections may be acquired from other travellers as well as from local residents. Further, influence the types and abundance of microbes in a community and the probability of exposure to pathogens.

- Biogeoclimatic conditions.
- Socioeconomic conditions.
- Public health infrastructure.
- Urban versus rural environment.
- Density and mobility of population.
- Season of the year.
- Animal populations.
- Factors That Influence the Probability of Exposure to Pathogens.
- Living accommodation.
- Level of sanitation.
- Occupational and recreational activities.
- Food preparation and preferences.
- Sexual activities and other behavior.
- Contact with pets, other animals, vectors.
- Time spent in the area.

Hepatitis A virus remains a common cause of infection in LMIC where most persons are infected at a young age and become immune for life. Infection in young children is typically mild or inapparent. Persons living in areas of high transmission may be unaware of the presence of high levels of transmission, although nonimmune; older people (such as travellers) who enter the environment may develop severe, and occasionally fatal, infection. Countries with an improving standard of living may observe a paradoxical increase in the incidence of hepatitis A disease as the age of

exposure increases, shifting the age of infection to a time when jaundice and other symptoms are more likely to occur.

Travelers also contribute to the global spread of infectious diseases. Neisseria meningitidis, a global pathogen, occurs in seasonal epidemics in parts of Africa. Irritation of the throat by the dry, dusty air probably contributes to invasion by colonizing bacteria. Pilgrims carried an epidemic strain of N. meningitidis type A from southern Asia to Mecca in 1987. Other pilgrims who became colonized with the epidemic strain introduced it into sub-Saharan Africa, where it caused a wave of epidemics in 1988 and 1989. The epidemic clone spread to several countries. In 1996 in Africa, major outbreaks of meningococcal meningitis occurred (>185 000 reported cases with a case fatality rate of ~10per cent) caused by N. meningitidis serogroup A, clone III-1. In Canada, a virulent group C, ET-15 strain of N. meningitidis was associated with an increased case fatality rate. In these examples, the virulence of the microbe and travel and trade acted synergistically to change the epidemiology and burden of disease. In 2000, serogroup W135 N. meningitidis caused an outbreak of infection in pilgrims to the Hajj and spread to their contacts and others around the world. Studies using serotyping, multilocus sequence typing, multilocus DNA fingerprints and other techniques found identical W135 isolates in multiple countries. Before this outbreak, pilgrims from many countries received a vaccine that protected against serotype A but not W135. The polysaccharide meningococcal vaccine reduces risk of disease in the vaccinated individual but does not prevent oropharyngeal carriage or transmission of N. meningitidis.

Factors Influencing Emergence of Disease

Travel of persons from tropical regions to major urban areas throughout the world raises concerns that unusual infections could be introduced into an environment where they could spread to large populations. A key factor that determines whether a pathogen can persist and spread in a new population is its basic reproductive rate, which is the number of secondary infections produced in a susceptible population by a typical infectious individual. To become established in a new host population, a pathogen must have a basic reproductive rate that exceeds one. The basic reproductive rate for a pathogen is affected by a range of biologic, social and

environmental factors, so may vary by place and population. Also critical in determining how easily an infection can be controlled is the proportion of transmission that occurs before onset of symptoms or during asymptomatic infection.

Multiple factors restrict the introduction and spread or persistence of infection in a region. Nutrition determines susceptibility to and severity of many infections. A substantial proportion of disease burden in Low and Middle income Countries (LMIC) can be attributed to childhood and maternal weight and micronutrient deficiencies. Before measles vaccine was introduced, the epidemiology of measles exhibited marked periodicity in large populations, with peaks typically occurring every 2–3 years. In small island communities (or other isolated populations), outbreaks typically occur only after periodic introductions from outside. It has been suggested that measles, as it has been known in the 20th century, could not have established itself much before 3000 BCE because before that time human populations had not achieved sufficient size to sustain the virus.

Factors That Restrict the Introduction and Spread of Infections.

- Geoclimatic factors that cannot support vector or intermediate host.
- Genetics of human population, making it genetically resistant or relatively resistant.
- Immunity of human population, making it not susceptible because of past infection with same or related microbe or via vaccination.
- Demographic factors (e.g. size and density of population will not support sustained transmission of diseases such as measles).
- Social and behavioral factors (e.g. absence of activities such as iv drug use and unprotected sex with multiple partners).
- Food preparation habits and local traditions (e.g. certain dishes not eaten, food always well cooked).
- High-quality housing, sanitation, public health infrastructure, good surveillance.
- High standard of living, good nutrition, lack of crowding, access to good medical care.
- Biologic characteristics of the microbe.

Examples of Emerging Pathogens

It is instructive to look at examples of infections that have recently undergone major shifts in distribution and to review the key factors that have influenced their geographic spread. A recurring theme is the movement of humans who introduce pathogens into a new region and human alteration of the landscape or ecology that permits contact with previously unrecognized microbes, often through interaction with animals or animal products. Many infections in humans have domestic or wild animals as their sources.

Human Immunodeficiency Virus and Other Pathogens Carried by Humans

Organisms that survive primarily or entirely in the human host and are spread from person to person (e.g. by sexual or other close contact) can be carried to any part of the world. The spread of HIV in recent decades to all parts of the world is a reminder of the rapid and broad reach of travel networks. Although the infection has also spread via blood and shared needles, it has been the human host engaging in sex and reproduction who has been the origin for the majority of the infections worldwide. Person-to-person spread accounted for the rapid worldwide distribution of severe acute respiratory syndrome (SARS), a coronavirus infection, in the spring of 2003, after the virus emerged from an animal reservoir, most likely bats, and infected farmed civets.

Multidrug-resistant (MDR) tuberculosis has continued to increase. The World Health Organization estimated that 450 000 cases and 170 000 deaths from MDR tuberculosis occurred in 2012. Extensively drug-resistant (XDR) tuberculosis, which is virtually untreatable, has been reported by 92 countries. Almost 10per cent of MDR-TB cases are XDR-TB.[18] Humans also carry resistance genes and virulence factors that can be transferred to and exchanged with other microbes.

Dengue Fever

Dengue fever is a mosquito-borne viral infection found in most tropical and subtropical regions globally. An estimated 96 million people have symptomatic

infection each year. Viremic humans regularly enter regions infested with Aedes aegypti, the principal vector of dengue, transporting the virus for new outbreaks. Because four serotypes of dengue virus exist and infection with one serotype does not confer lasting immunity against other serotypes, a person can be infected more than once. One study found the risk of developing severe dengue after repeat infection was 82–103 times greater than after primary infection. In an outbreak in Cuba, 98.5per cent of cases of dengue shock syndrome (DSS) or dengue hemorrhagic fever (DHF) were in persons with a prior dengue infection. Risk factors for severe dengue identified in epidemiological studies include young age, virus strain, and host genetics.

Factors that have aided the spread of dengue include increasing travel to and from tropical regions; expansion of the regions infested with Aedes aegypti and Aedes albopictus; population growth and increasing urbanization in tropical areas; the use of nonbiodegradable and other containers that make ideal breeding sites for the mosquito; inadequate vector control programs and increasing resistance of vectors to insecticides.

In 2001 the vector that was implicated in an outbreak of dengue in Hawaii was Aedes albopictus, a mosquito species that has been introduced into new regions in recent decades, probably primarily by shipping used tires and other items. The virus responsible for the Hawaii outbreak was similar to dengue isolates from Tahiti, suggesting that viraemic travellers introduced the virus from the South Pacific.

Although large dengue epidemics occurred in the USA in the 20th century, few cases have been acquired in the USA in recent years, despite the presence of epidemic disease in adjacent areas of Mexico and the presence of a competent vector (Aedes aegypti) in south-eastern USA. Aedes albopictus has even broader distribution in continental USA. The presence of screened dwellings and air conditioning may make an area relatively resistant to spread of infection, even if a competent vector infests a region. Since 2009 a few cases of local dengue transmission have occurred in Key West, Florida, and serologic studies have also documented that dengue infections are occurring in Texas.

Chikungunya Virus

Chikungunya, a mosquito-borne alphavirus originally isolated in Tanzania in 1953, has spread from Africa, causing massive outbreaks in the Indian Ocean islands, India, and other parts of Asia since 2005. In the summer of 2007, an outbreak caused hundreds of cases (175 laboratory confirmed) in north-eastern Italy. The index case was a visitor from India. The vector implicated was Aedes albopictus, postulated to have been introduced via used tires. Mutations in the virus may have enabled it to replicate more efficiently in Aedes albopictus mosquitoes, the Asian tiger mosquito, which is now widely distributed outside of Asia. It can survive cooler temperatures than Aedes aegypti.

Beginning in late 2013 local chikungunya transmission was documented in the Caribbean islands. The virus has now spread widely in Central and South America. Chikungunya virus is introduced into new areas by viraemic travellers and can cause high attack rates in susceptible populations; persistent and disabling joint pain can follow acute illness, especially in older individuals.

Cholera

Cholera illustrates the complex interactions between microbe, environment and host. Vibrio cholerae lives in close association with marine life, binding to chitin in crustacean shells and colonizing surfaces of algae, phytoplankton, zooplankton and water plants. V. cholerae can persist within the aquatic environment for months or years, often in a viable but dormant state, no cultivable by usual techniques. Environmental factors, including temperature, salinity, pH and sea-water nutrients, affect the persistence, abundance and viability of the organisms, and hence influence human epidemics.

Under conditions of population crowding, poor sanitation and lack of clean water, cholera can have a devastating impact, as was shown by the massive outbreak of El Tor cholera in Rwandan refugees in Goma, Zaire, which caused 12 000 deaths in July 1994.

Toxigenic Vibrio cholerae O1 was introduced into Haiti in 2010 in the aftermath of the earthquake. As of March 2013, it had caused 650 000 illnesses and 8000 deaths. Studies suggest that it was introduced by UN mission personnel who lacked sanitary disposal of their waste. Subsequently a tributary of the Artibonite River was contaminated with a pathogenic strain of South Asian type Vibrio cholerae.

The organism can be carried by humans who can introduce it into new regions. Trade probably also plays a critical role. Ballast water, picked up by boats in multiple locations and discharged at another time and place, carries a wide range of species. In earlier studies of the ballast and bilge of cargo ships in the USA Gulf of Mexico, researchers were able to identify V. cholerae identical to the strains causing epidemic disease in Latin America.

Food-Borne Disease

The globalized food market moves pathogens from one region to another. An outbreak of cholera in Maryland, USA, was traced to imported, contaminated commercial frozen coconut milk.[55] Alfalfa sprouts grown from contaminated seed sent to a Dutch shipper caused outbreaks of Salmonella spp. on two continents, the USA and Finland. Commercial movement of fruits and vegetables redistributes resistance factors along with the microbes.

Travel and trade are key features in the epidemiology of the infection Cyclospora, a cause of gastroenteritis. For many years cases were often associated with living in or travel to areas where sanitary facilities were poor. In the summer of 1996, a large US outbreak occurred in persons who had not travelled. Over a period of a few months, 1465 cases of cyclosporiasis were reported from 20 states. The outbreak was linked to raspberries imported from Guatemala.

Visceral Leishmaniasis

In the past, visceral leishmaniasis in Brazil was primarily a rural disease. Recently, however, several cities have reported large outbreaks of visceral leishmaniasis. Reasons for the change in epidemiology include geoclimatic and economic factors (drought, lack of farm land, famine), leading to migration of large

numbers of persons, who settle in densely populated peri-urban areas that lack basic sanitation. Domestic animals, such as dogs and chickens, are sources of blood meals for the sand fly vector of leishmaniasis. Outbreaks, affecting especially children and young adults, have occurred in many cities in Brazil. Malnutrition contributes to disease severity.

Disease–disease interactions also alter the epidemiology of infections. Visceral leishmaniasis has become an important infection in HIV-infected people in Spain and other areas where the two infections coexist. The presence of HIV leads to increased risk of progression of infection; disease can also appear years after exposure.

Movement of Vectors and Other Species

Movement of nonhuman species can affect infections in humans. Importation of wild animals from Ghana into the USA led to an outbreak of monkeypox, an infection previously known to exist in Africa. Humans became infected by handling domestic prairie dogs (sold as pets) that had been housed with the imported wild animals from Africa. Aedes albopictus introduced into the USA via used tires shipped from Asia has since become established in at least 21 contiguous states of the USA and in Hawaii. Aedes albopictus can transmit dengue and chikungunya viruses and is a competent laboratory vector of La Crosse, yellow fever and other viruses. Multiple strains of eastern equine encephalitis virus have been isolated from Aedes albopictus in Florida.

Current transportation systems regularly carry all forms of life, including potential vectors, along with people and cargo. In an experiment conducted several years ago, mosquitoes, house flies and beetles in special cages were placed in the wheel base of a Boeing 747 aircraft and carried on flights lasting up to 7 hours. Temperatures were as low as −62°F (−52°C) outside and ranged from 46°F to 77°F (8–25°C) in the wheel bays. Survival rates were greater than 99 per cent for the beetles, 84per cent for the mosquitoes and 93 per cent for the flies. Occasional cases of so-called airport malaria – cases of malaria near airports in temperate regions – attest to the occasional transport and survival of an infective mosquito.

In the USA, transportation of raccoons in the late 1970s from Florida to the area between Virginia and West Virginia (in order to stock hunting clubs) unintentionally introduced a rabies virus variant into the animals of the region. From there, the rabies enzootic spread for hundreds of miles, reaching raccoons in suburban and densely populated regions of the north-east USA. Spill-over of the rabies virus variant into cats, dogs and other animal populations and direct raccoon–human interactions have had costly consequences.

Highly pathogenic avian influenza A (H5N1) is a global concern. It is entrenched in poultry populations in Asia and Africa and has caused outbreaks in Europe and the Middle East. Although the virus causes high mortality in infected humans, thus far H5N1 has not been able to establish sustained transmission from person to person. Most humans appear to have been infected via close contact with poultry or their products. Although the virus can be carried by migratory birds, most introductions appear to have been related to movement of poultry and poultry products. In South East Asia risk was associated with duck abundance, human population and rice cropping intensity.

Geographic Influences on Differential Diagnosis

Geographic exposures influence how one thinks about probable diagnoses in a given patient. In Mexico, for example, more than 50 per cent of patients with late-onset seizures have computed tomography (CT) evidence of the parasitic infection, neurocysticercosis. In Peru, 29 of persons born outside Lima who had onset of seizures after 20 years of age had serologic evidence of cysticercosis. In northern Thailand, melioidosis is a common cause of sepsis, accounting for 40 per cent of all deaths from community-acquired sepsis.

In considering the consequences of exposures in other geographic regions, relevant data in assessing the probability of various infections include the duration of visit, activities and living conditions during the stay and the time lapsed since the visit. Among British travellers to West Africa, the relative risk of malaria was 80.3 times higher for persons staying for 6–12 months than among those staying 1 week. In Malawi, the risk of schistosome infection increased directly with duration of stay.

Seroprevalence was 11per cent for those present for 1 year or less, but this increased to 48per cent among those present for 4 years or longer. In a study of persons with cysticercosis, the average time between acquisition of infection and onset of symptoms was about 7 years.

For malaria, it is necessary to know not only whether infection can be acquired in a specific location but also the species of parasites present and the patterns of resistance to antimalarial agents. Analysis of data from the Geo Sentinel Surveillance network, a network that uses travellers as a sentinel population, finds marked differences in the spectrum of disease in relation to the place of exposure.

Expression of disease may vary depending on age of first exposure, immunologic status of the host, genetic factors and the number and timing of subsequent exposures. Temporary residents of endemic regions have different patterns of response to a number of helminths from those of long-term residents. Temporary residents have immunologic hyperresponsiveness, high-grade eosinophilia and severe symptoms that are not seen in long-term residents of the same area. Genetic factors can affect susceptibility to infection or expression of disease. Some persons, for example, are genetically resistant to infection with parvovirus because they lack appropriate receptors on their erythrocytes.[75] Persons lacking Duffy factor cannot be infected with the malarial parasite, P. vivax.

Knowledge about the geographic distribution of diseases is essential for informed evaluation and care of patients, who increasingly have had exposures in multiple geographic regions. Recent travel and trade patterns have led to more frequent contact with populations from low latitude areas, regions with greater species richness.[76] Infectious diseases are dynamic and will continue to change in distribution, and access to real time epidemiologic outbreak surveillance data such as that provided by ProMED (www.promedmail.org) is a vital tool for clinicians. Changes in virulence and shifts in resistance patterns will also require ongoing surveillance and communication to healthcare providers. Multiple factors favour even more rapid change, perhaps in unexpected ways, in the future: rapidity and volume of travel, increasing urbanization (especially in developing regions), the globalization of trade,

multiple technologic changes that favor mass processing and broad dispersal, and the backdrop of ongoing microbial adaptation and change, which may be hastened by alterations in the physicochemical environment.

Geography and Agriculture

Geography Affects Agriculture

Agriculture is the backbone of many economies around the world, and its success heavily depends on geography. Geography, the study of the earth's physical features and their relationship to human activities, plays a crucial role in shaping agricultural production, distribution, and consumption. In this article, we will explore how geography affects agriculture, including the physical features of land, climate, and weather patterns. Understanding how these factors interact can help farmers and policymakers make informed decisions about crop selection, farming methods, and infrastructure development, ensuring sustainable agricultural practices and food security.

Agriculture is an essential part of our lives, and geography is crucial for its success. Geography influences the climate, topography, soil type, and other environmental factors that affect agriculture. Understanding these factors is essential for farmers to make informed decisions and maximize their crop yield. Some of the factors are:

Physical Features of Land

The physical features of land are crucial in determining the type of crops that can be grown and the productivity of the agricultural sector. These features include the type of soil, topography, and altitude.

Soil

Soil is the foundation of agriculture. The type of soil in a particular region plays a significant role in the type of crops that can be grown and the yields obtained.

There are various types of soil, including sandy, loamy, and clay soils. **Sandy soils** are known for their low water retention capacity and low nutrient levels, making them suitable for crops that require little water and nutrients, such as cacti.Loamy soils are a mixture of sand, silt, and clay, and are known for their high nutrient retention capacity and water-holding ability. This type of soil is ideal for growing most crops, including fruits and vegetables. Clay soils are characterized by their high water retention capacity but low nutrient levels. These soils are suitable for crops that require large amounts of water, such as rice.

Topography

Topography refers to the shape and features of the land, including the elevation, slope, and drainage. The topography of an area can influences the types of crops grown and the farming methods used. For example**,** steep slopes may require terracing to prevent soil erosion and ensure water retention, while flatlands may require irrigation to supplement rainfall.

Altitude

Altitude refers to the height above sea level, and it has a significant impact on agricultural productivity. As altitude increases, the temperature decreases, and this affects the type of crops that can be grown. High-altitude regions are suitable for crops such as potatoes, barley, and wheat, while low-altitude regions are ideal for tropical crops such as bananas and pineapples.

Proximity to the Coast

Coastal areas may have different weather patterns and soil types than inland areas, affecting crop growth. Coastal areas also have access to seafood, which can be an essential source of income for farmers.

Proximity to Urban Areas

Proximity to urban areas can affect land use and availability. Urbanization can lead to the conversion of farmland into urban areas, making it more challenging for farmers to find suitable land for agriculture.

Climate

Climate is another critical factor that affects agriculture. It refers to the long-term weather patterns of a particular region, including temperature, rainfall, and humidity. Climate affects agricultural production by influencing crop growth and yield, pest and disease prevalence, and water availability.

Temperature

Temperature plays a crucial role in determining the type of crops that can be grown and their yield. Different crops have different temperature requirements for growth and development.For example**,** tropical crops such as bananas and pineapples require high temperatures, while crops such as wheat and barley require cooler temperatures. Extreme temperatures, such as frost and heatwaves, can also affect crop yield and quality.

Sunlight

Sunlight is also critical in agriculture. Most crops require a specific amount of sunlight to grow and develop. For instance, crops like wheat require a lot of sunlight, while others like coffee require only partial sunlight.

Rainfall

Rainfall is essential for crop growth and development. The amount and distribution of rainfall in a particular region determine the types of crops that can be grown and their yield. Regions with low rainfall may require irrigation to supplement water availability, while regions with high rainfall may require drainage systems to prevent waterlogging.

Humidity

Humidity refers to the amount of moisture in the air, and it affects agricultural production by influencing the growth and spread of pests and diseases. High humidity levels can promote the growth of pests and diseases, while low humidity levels can lead to water stress in crops.

Weather Patterns

Weather patterns, including extreme events such as droughts, floods, and storms, also affect agriculture. These events can have a significant impact on crop growth and yield, soil erosion, and water availability.

Droughts

Droughts occur when there is a prolonged period of low rainfall, leading to water stress in crops. Droughts can significantly reduce crop yield and quality, leading to food shortages and economic losses. Regions that are prone to droughts may require drought-resistant crops or irrigation systems to mitigate the impact of droughts on agricultural production.

Floods

Floods can also have a significant impact on agricultural production. They can lead to soil erosion, crop damage, and waterlogging, which can reduce crop yield and quality. Regions that are prone to floods may require drainage systems to prevent waterlogging, or flood-resistant crops that can withstand waterlogging.

Storms

Storms, such as hurricanes and tornadoes, can also damage crops and agricultural infrastructure. They can cause crop damage, soil erosion, and waterlogging, leading to significant economic losses. Regions that are prone to storms

may require storm-resistant crops or infrastructure to mitigate the impact of storms on agricultural production.

Geography plays a crucial role in shaping agricultural production, distribution, and consumption. The physical features of land, climate, and weather patterns are all important factors that affect agriculture. By taking into account the geographic factors that affect agriculture, we can ensure sustainable agricultural practices and food security for generations to come.

UNIT-III

The MDGS and Extreme Poverty

MDG 1: Eradicate extreme poverty and hunger

Recent gains in millennium development goal 1 have seen the number of hungry people in the world decrease to fewer than 1 billion, though the Food and Agriculture Organisation of the United Nations believes that this number is still unacceptably high.

Millennium Development Goal 1 has three targets:

1. To halve the proportion of people whose daily income is less than $1.25
2. To achieve full and productive employment, as well as decent work for all, including young people and women
3. To halve the proportion of individuals suffering from hunger in the period between 1990 and 2015.

Achievements

- A considerable reduction in extreme poverty over the last 25 years. In 1990, nearly 50 percent of the population in developing nations lived on less than $1.25 a day. As of 2015, that proportion has dropped to 14 percent.
- The number of people living in extreme poverty worldwide has reduced by more than 50 percent. In 1990, 1.9 billion people were said to be living in extreme poverty, compared to 836 million in 2015. Most progress was seen in the new millennium.
- The number of living on more than $4 a day – those in the working middle class – has nearly tripled between 1991 and 2015. In 1991, this group made only 18 percent of the population, and rose to 50 percent in 2015.
- The proportion of undernourished people in the developing world has dropped by almost 50 percent since 1990; from 23.3 percent in 1990 – ’92 to 12.9 percent in 2014 – ’16.

A closer look at the achievements of Millennium Development Goal 1 targets

Target 1: Extreme poverty reduction

The poverty rate in the developing world has plummeted from 47 percent to 14 percent in the period between 1990 and 2015 – a 70 percent drop! The MDG target of reducing by half extreme global poverty was achieved by 2010 – 5 years before the 2015 deadline. Recent estimates show that the number of people surviving on less than $1.25 a day worldwide reduced from 36 percent to 15 percent between 1990 and 2011. As of 2015, the proportion has dropped further to 12 percent.

By 2011, all developing regions, with the exception of sub-Saharan Africa, had achieved the target of halving the number of people living in extreme poverty. The most populous countries in the world – China and India – played a major role in the worldwide reduction of poverty. The remarkable progress in China led to reduction in extreme poverty in Eastern Asia from 61 percent to 4 percent between 1990 and 2015. Southern Asia's progress has also been impressive, with a decline from 52 to 17 percent within the same time period, but with accelerated reduction since 2008.

In contrast, the rate of poverty in sub-Saharan Africa did not change between 1990 and 2002. The rate of poverty decline has accelerated since, though more than 40 percent of sub-Saharan population continues to live extreme poverty in 2015. Worse still, extreme poverty in Western Asia was expected to increase between 2011 and 2015.

MDG 1: Uneven progress in reducing extreme poverty, hunger and malnutrition

Millennium Development Goal 1 is to "Eradicate extreme poverty and hunger" and is assosciated with three targets to: a) Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day; b) Achieve full and productive employment and decent work for all; and to c) Halve, between 1990 and 2015, the proportion of people who suffer from hunger. The latest estimates show that the proportion of people living on less than $1.25 a day fell from 43.6 percent in 1990 to 17.0 percent in 2011. Forecasts based on country-specific growth rates in the past 10 years indicate that the extreme poverty rate will fall to 13.4 percent by 2015, a drop of more than two-thirds from the 1990 baseline.

The number of people worldwide living on less than $1.25 a day is also forecast to be halved by 2015 from its 1990 level. Between 1990 and 2011 the number of extremely poor people fell from 1.9 billion to 1 billion, and according to forecasts, another 175 million people will be lifted out of extreme poverty by 2015.

This means that based on current trends, nearly half of developing countries have already achieved the Millennium Development Goal 1 (MDG1) target of halving the proportion of the population in extreme poverty five years ahead of the 2015 deadline.

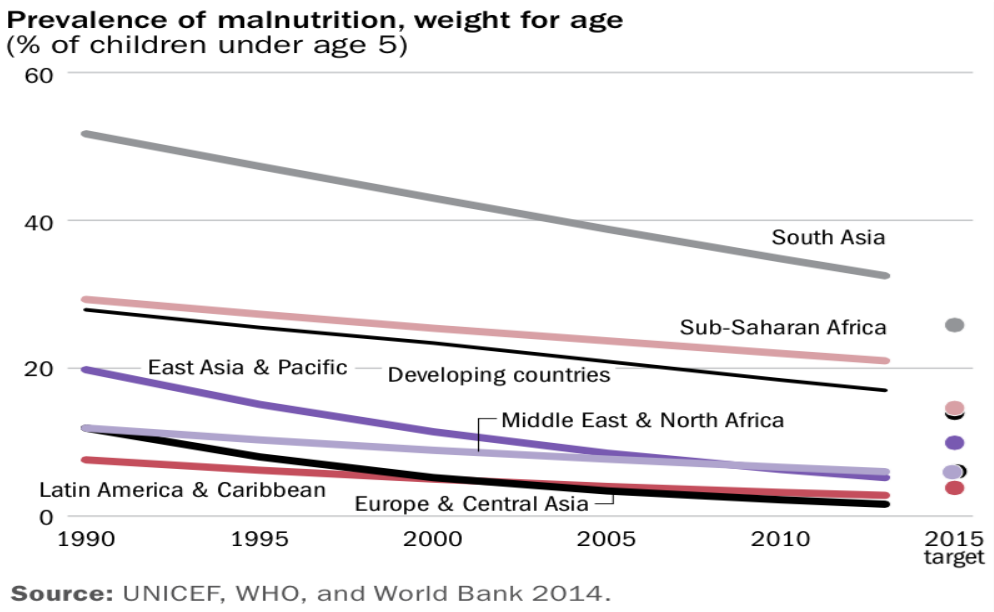
Half of countries will meet the poverty target, but 20 percent are seriously off track

However, despite the remarkable achievement in developing countries as a whole, progress in reducing poverty has been uneven across regions and 20 percent of countries are seriously off track. This means that at the current pace of progress they will not be able to halve their 1990 extreme poverty rates even by 2030.

Progress is most sluggish among countries in Sub-Saharan Africa, where about 45 percent of countries are seriously off track. Compared with 1990, the number of extremely poor people has fallen in all regions except Sub-Saharan Africa, where population growth exceeded the rate of poverty reduction, increasing the number of extremely poor people from 290 million in 1990 to 415 million in 2011. South Asia has the second largest number of extremely poor people: In 2011 close to 400 million people lived on less than $1.25 a day.

A large proportion of countries classified as International Development Association–eligible and defined by the World Bank as being in fragile and conflict situations are also among those seriously off track.

Regional disparities in progress towards the hunger and malnutrition targets



Source: UNICEF, WHO, and World Bank 2014.

MDG 1 also addresses hunger and malnutrition. On average, developing countries saw the prevalence of undernourishment drop from 24 percent in 1990–92 to 13 percent in 2012–14. The decline has been steady in most developing country regions in the past decade, although the situation appears to have worsened in the Middle East and North Africa, albeit from a low base. The 2013 estimates show that East Asia and Pacific and Latin America and the Caribbean have met the target of halving the prevalence of undernourishment from its 1990 level by 2012–14.

By crude linear growth prediction, developing countries as a whole will meet the undernourishment target by 2015, whereas the Middle East and North Africa, South Asia, and Sub-Saharan Africa likely will not.

Another measure of hunger is the prevalence of underweight children (child malnutrition). Prevalence of malnutrition in developing countries has dropped substantially, from 28 percent of children under age 5 in 1990 to 17 percent in 2013. Despite considerable progress, in 2013 South Asia still had the highest prevalence, 32 percent. By 2013 East Asia and Pacific, Europe and Central Asia, and Latin America and the Caribbean met the target of halving the prevalence of underweight children under age 5 from its 1990 level. The Middle East and North Africa is predicted to be on track to meet the target by 2015. However, developing countries as a whole may not be able to meet the target by 2015, nor will South Asia or Sub-Saharan Africa.

The Level of Extreme Poverty in South Asia

Extreme poverty is the most severe type of poverty, defined by the United Nations (UN) as "a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services". Historically, other definitions have been proposed within the United Nations.

In 2018, extreme poverty mainly refers to an income below the international poverty line of $1.90 per day (in 2011 prices, $2.66 in 2024 dollars), set by the World Bank. In October 2017, the World Bank updated the international poverty line, a global absolute minimum, to $1.90 a day. This is the equivalent of $1.00 a day in 1996 US prices, hence the widely used expression "living on less than a dollar a day". The vast majority of those in extreme poverty reside in South Asia and Sub-Saharan Africa. As of 2018, it is estimated that the country with the most people living in extreme poverty is Nigeria, at 86 million.

In the past, the vast majority of the world population lived in conditions of extreme poverty. The percentage of the global population living in absolute poverty fell from over 80% in 1800 to around 10% by 2015. According to UN estimates, in 2015 roughly 734 million people or 10% remained under those conditions. The number had previously been measured as 1.9 billion in 1990, and 1.2 billion in 2008. Despite the significant number of individuals still below the international poverty line, these figures represent significant progress for the international community, as they reflect a decrease of more than one billion people over 15 years. In public opinion surveys around the globe, people surveyed tend to think that extreme poverty has not decreased.

The reduction of extreme poverty and hunger was the first Millennium Development Goal (MDG1), as set by the United Nations in 2000. Specifically, the target was to reduce the extreme poverty rate by half by 2015, a goal that was met five years ahead of schedule. In the Sustainable Development Goals, which succeeded the MDGs, the goal is to end extreme poverty in all its forms everywhere. With this declaration the international community, including the UN and the World Bank have adopted the target of ending extreme poverty by 2030.

Poverty measures in South Asia

The World Bank set a target of reducing global extreme poverty to less than 3 percent by 2030 and to ensure continued focus and steady progress toward this goal. Progress towards this goal is measured by monitoring the share of the global population living below the international poverty line, currently set at US$1.90 in 2011 purchasing power parity (PPP) dollars. With the exception of Afghanistan, countries in South Asia measure the international extreme poverty status of an individual by comparing consumption expenditures per capita against this poverty line.

Even as much of the region leaves extreme poverty behind, poverty is becoming more entrenched and harder to root out in certain areas, particularly in countries burdened by violent conflict and weak institutions. Nepal experienced devastating earthquakes in 2015 and remains predominantly rural, with the highest share of labour force in agriculture (73%) in the region as of 2016. The Maldives were devastated by the 2004 tsunami while its tourism industry is seriously threatened by climate change. Even though the international poverty line cannot be used in Afghanistan, official poverty rates present a steady increase as violence continues to affect the security of livelihoods and economic activity in the country.

Poverty and shared prosperity report

According to the Poverty and Shared Prosperity Report (2018), the number of extreme poor in South Asia dropped to 216 million people in 2015, compared to half a billion in 1990, and Nigeria may already have overtaken India as the country with the most extreme poor in the world. Still, to achieve the Sustainable Development Goals, progress in poverty reduction needs to continue in India and the rest of South Asia.

Poverty has long been a major challenge in South Asia, one of the world's most densely populated regions. However, recent data from the World Bank's September 2024 update to the Poverty and Inequality Platform (PIP) shows significant progress in poverty reduction across this region, despite various global challenges.

Poverty trends in South Asia

The World Bank's 2024 update reveals that South Asia has experienced one of the largest reductions in extreme poverty in recent years, making it a leading example of how developing regions can overcome significant socio-economic challenges.

In 2019, before the Covid-19 pandemic struck, the percentage of the population in South Asia living in extreme poverty (defined by the $ 2.15 per day poverty line) was approximately 10.6%. This rate increased to 13% in 2020, reflecting the immediate impact of the pandemic, which led to job losses, disruptions in supply chains, and widespread economic instability.

However, the region showcased remarkable resilience and adaptability. By 2022, the extreme poverty rate had declined to 9.7%, which was lower than pre-pandemic levels. The trend continued to improve, with projections estimating that the rate will further decrease to 7.6% by 2024.

Comparing poverty across various income lines

While the $ 2.15 poverty line is commonly used to measure extreme poverty, examining poverty rates at different thresholds provides a broader picture of economic well-being in South Asia. The $ 6.85 poverty line is a more typical measure for upper-middle-income countries and reflects the struggle of a wider segment of the population to achieve a better standard of living. At this level, 80.4% of South Asia's population was classified as poor in 2019. Although this figure increased slightly to 81.9% in 2020, it started to decline in subsequent years, reaching 78.8% in 2022 and further reducing to an estimated 75.6% by this year.

This reduction in poverty, even at higher income thresholds, showcases a widespread improvement in living standards and economic opportunities for millions of people across South Asia.

Key drivers of poverty reduction in South Asia

Economic recovery post-Covid-19

The region's recovery from the pandemic has been uneven but largely successful. While South Asia was heavily affected by Covid-19's economic fallout, governments across the region took decisive measures to stimulate growth, such as fiscal stimulus packages, support for small businesses, and targeted social assistance programmes. These interventions helped stabilise economies and provided a foundation for poverty reduction.

Growth in key economic sectors

South Asia's economy has traditionally been driven by agriculture, but recent years have seen growth in sectors like technology, services, and manufacturing. These sectors have created job opportunities, especially for the younger population, contributing significantly to poverty reduction. The expansion of digital services and e-commerce has also played a role in boosting household incomes, even in rural areas.

Improvements in social welfare programmes

Governments in South Asia have increasingly focused on enhancing social protection programmes, which has helped cushion the poor against economic shocks.

For instance, direct cash transfers, food subsidies, and employment guarantee schemes have ensured that vulnerable populations are better protected from poverty, especially during crises such as the pandemic.

The role of inflation and global shocks

Despite this progress, South Asia's journey out of poverty has not been without setbacks. The region faced additional global shocks such as rising inflation, particularly after Russia's invasion of Ukraine in 2022. This led to increased prices for essential goods, which disproportionately affected low- and lower-middle-income countries in South Asia. Nevertheless, the region has shown remarkable resilience by adapting to these challenges and continuing its journey toward poverty reduction.

Comparisons with other regions

Compared to other regions, South Asia's progress in poverty reduction stands out. For example, while Sub-Saharan Africa's poverty rate has remained stubbornly high, with little improvement from 36.7% in 2019 to 36.5% projected for 2024, South Asia's poverty reduction has been more significant and sustained. This contrast underscores the effectiveness of South Asian countries' strategies to combat poverty, despite facing numerous obstacles.

Poverty and inequality in South Asia

The reduction in poverty has not always been accompanied by a reduction in inequality. Inequality remains a significant concern in South Asia, as wealth distribution continues to be uneven. The Gini index, a common measure of income inequality, remains relatively high in many countries, suggesting that while poverty rates are falling, wealth and income disparities persist.To address this, more efforts are needed to ensure that economic growth benefits all segments of society, particularly the most marginalised and vulnerable. Investment in education, healthcare, and infrastructure can play a crucial role in reducing inequality and ensuring that the benefits of growth reach everyone.

The outlook for South Asia

The PIP's projections suggest that by 2024, South Asia could see poverty rates reach record lows. However, sustaining this progress will require continued policy interventions and investments in areas such as education, healthcare, infrastructure, and technology.

The challenge

Food security occurs when all people are able to access enough safe and nutritious food to meet their requirements for a healthy life, in ways the planet can sustain into the future. However, food security faces a number of challenges across both production and consumption which research will be essential to solve.

Many countries are facing the double burden of hunger and undernutrition alongside overweight and obesity, with one in three people across the globe currently suffering from some form of malnutrition, as referenced in the Global Nutrition Report 2016: From Promise to Impact – Ending Malnutrition by 2030 (IFPRI, 2016). Indeed, it is not unusual to find people with different forms of malnutrition living side-by-side in one country, in one community, or even in the same household.

The prevalence rates of overweight, obesity and diet-related non-communicable diseases (NCDs) such as cardiovascular disease, stroke, certain cancers and type II diabetes, as detailed in the Insight on Overconsumption and Influences on Diet (2016), are increasing in every region, in both developed and developing countries. Globally, there are now more people who are overweight or obese than underweight, with the two combined accounting for more than half of the world population: a new normal as found in this publication from The Lancet. The estimated cost to the world economy of disease and death from overweight and obesity is $2 trillion, also detailed in the Insight on Overconsumption and Influences on Diet (2016).

At the same time, around 795 million people face hunger on a daily basis and more than two billion people lack vital micronutrients (e.g. iron, zinc, vitamin A) as published in the Global Nutrition Report 2016: From Promise to Impact – Ending Malnutrition by 2030 (IFPRI, 2016), affecting their health and life expectancy. Nearly a quarter of all children aged under five today are stunted, with diminished physical and mental capacities, and less than a third of all young infants in 60 low- and middle-income countries meet the minimum dietary diversity standards needed for growth.

Climate change will only make things worse as elevated levels of CO2 reduce the nutritional content of grains, tubers and legumes, affecting key nutrients such as zinc and iron as found in the publication Increasing CO2 threatens human nutrition – PubMed (nih.gov). The estimated impact of undernutrition on gross domestic product (GDP) is 11% every year – more than the annual economic downturn caused by the global financial crisis referenced in the Global Nutrition Report 2016: From Promise to Impact – Ending Malnutrition by 2030 (IFPRI, 2016).

A growing population means more mouths to feed. The expanding global population is getting wealthier, and richer people tend to eat more and demand food that is resource intensive to produce, particularly meat and dairy.It has been estimated that we need to produce more food in the next 35 years than we have ever produced in human history, given the projected increases in world population, and on the basis that rising incomes will continue to change diets. However, there is by good approximation no new land for agriculture (Foresight. The Future of Food and Farming (2011) Final Project Report), with increasing competition from urbanisation (the world will be 70% urbanised by 2050), sea level rise reducing land availability, and the growing need for land for bioenergy, carbon capture and storage (BECCS) to remove greenhouse gases (GHGs) from the atmosphere. This implies sustainable intensification (SI) of agriculture on the land that is available (i.e. produce more without expanding the agricultural area).

Food production is ultimately dependent on other ecosystem services so it is essential that these are maintained. For example, agriculture uses 70% of all fresh water, produces around a third of all GHG emissions, and contributes to biodiversity loss and soil degradation (around 69% of agricultural land is degraded). If food demand continues to grow as projected, by 2050 we would need 120% more water, 42% more cropland, lose 14% more forest, and produce 77% more GHG emissions. Even with yield gap closure through SI, we would still need 56% more water, 5% more cropland, lose 8% more forest and produce 42% more GHG emissions, published in the Importance of food-demand management for climate mitigation, Nature Climate Change. It is clear that we will need to use every technology available, alongside best practice farming to sustainably increase production, but this has to be accompanied by changes to food demand including measures on both consumption and waste.

The Paris Agreement commits signatories to keeping the increase in global average temperature to well below 2°C above pre-industrial levels, with an aim to limit the increase to 1.5°C. Emissions across all sectors therefore need to decrease by over 80% by 2050 (AR5 Climate Change 2014: Mitigation of Climate Change — IPCC), with even greater reductions required for a 1.5°C target.It has been estimated that on the current trajectory, the food system will account for most of the GHG emissions

budget for 2°C, leaving very little space for other sectors, and making it almost impossible to meet the Paris Agreement.

Gradual climate change will alter what can be grown and where, but the variability that makes up the average temperature and rainfall will lead to climatic shocks (heatwaves, cold snaps, droughts and floods), significantly reducing yields. Our report estimates that the risk of these kinds of extreme weather events hitting multiple major breadbasket regions of the world at the same time could triple by 2040. This results in a loss of yield that is channelled downstream via market and policy responses into food price spikes, and in some cases civil unrest.

Climate change can also alter the distribution and severity of pests and diseases in crops and livestock and has the potential for severe impacts on food production and animal welfare. Around a third of the food produced in the world for human consumption every year gets lost or wasted, whether early in the supply chain through pests and diseases and post-harvest losses, or late in the supply chain at retail and consumption. This impacts on how much we might need to produce in the future.

A major challenge is understanding how can we re-design the food system to be healthy, sustainable, and more resilient to climate change, helping to meet both the Sustainable Development Goals and the Paris Agreement. The Global Food Security programme brings together the major UK public funders to address these challenges, increasing coordination and collaboration on research and facilitating its translation into policy and practice.

Origins of Boundary: Robert Malthus

Approximately 60 years before the now historic publication of Charles Darwin's On the Origin of Species in 1859, Reverend Thomas Robert Malthus (1766-1834) penned a commentary on what he perceived to be the destiny of the human population in eighteenth-century Britain. Malthus's Essay on the Principles of Population profoundly impacted the evolutionary theories of Charles Darwin (1809-1882) and Alfred Russel Wallace (1823-1913), and continues to resonate through social, political, and environmental issues that affect the lives of people today.

Background

Prior to 1750, agricultural practices were as they had been since the Middle Ages. Great Britain was an agricultural society in which farmers worked long hours using simple tools—wooden plows, hoes, and scythes—to produce scanty crops. Using these tools and techniques, farmers were scarcely able to eke out a living. The mid-1700s saw a shift from an agricultural society to an industrial society as new farming practices and mechanization, the growing use of machines, reduced the number of workers needed to produce food for Europe's growing population. As a result, unemployed farmers migrated to the new industrial towns to seek employment in factories.

The Industrial Revolution radically transformed the economic structure of British society from a system of feudalism—a hierarchical system of lords and serfs that concentrated wealth at the top—to one of capitalism. Free enterprise and cost-efficient machines caused factory owners, bankers, and entrepreneurs to gain significant wealth and power. The middle and upper classes prospered from the labours of the poor who filled the factories and toiled long hours for little pay.

Malthus's Essay on the Principles of Population was written in response to William Godwin's The Enquirer. In The Enquirer Godwin (1756-1836) promoted population growth as the stimulus for attaining equality among men. Godwin described population growth as a positive force that paves the way to greater wealth and improvement for all. Malthus attempted to point out weaknesses in Godwin's philosophy by way of simple mathematics. Rather than seeing increasing population size as a way of improving the standard of living for all Britons, Malthus viewed it as a limiting factor that reduced the opportunity for the poor to escape from the miseries and hardships of their daily lives.

Malthusian principle states that populations grow geometrically while resources grow only arithmetically. Simply stated that Population grows much more quickly than the food supply. Malthus believed that the inability of available resources to keep pace with ever increasing population size ultimately results in a continuing struggle for survival by the lower economic classes. His Essay on the Principles of Population describes the outcome of mankind's struggle to obtain increasingly limited

resources as a life filled with misery and vice. It was this concept of a struggle for survival within large populations that was adopted by evolutionary biologists, forever changing evolutionary thought.

Impact

The impact of Malthus's Essay on the Principles of Population on Charles Darwin as he sought the mechanism for evolution has never been understated. Darwin himself recorded in his 1876 autobiography the following:"In October 1838, that is, fifteen months after I had begun my systematic inquiry, I happened to read for amusement Malthus on Population, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations would tend to be preserved, and unfavourable ones to be destroyed. The results of this would be the formation of a new species. Here, then I had at last got a theory by which to work."

Malthus's work caused Darwin to refocus on a bigger picture. While Darwin's predecessor, Jean Baptiste de Lamarck (1744-1829), and contemporaries such as Jean Agassiz (1807-1873) and Richard Owen (1804-1892) focused on individual organisms and the belief that something was driving the evolution of organisms in a direction toward perfection independent of environmental influence, Darwin dismissed this popular theory and continued his quest for another explanation.

Upon reading Essay on the Principles of Population, both Darwin and Alfred Russel Wallace independently adapted Malthus's "struggle for existence" principle and applied it to plant and animal species, thereby arriving at the theory of natural selection. Darwin's theory of natural selection stretches Malthus's principle beyond the boundaries of the human population and political economy. Darwinian theory of natural selection made the connection between organisms and their environments stronger than they had ever been.

Prior to Darwinian theory, many believed that individual plants and animals changed in response to their environments. According to Lamarkian theory, then the dominant school of thought with regard to evolution, a giraffe's neck grows longer in

its lifetime to reach leaves on taller trees. This individual, in turn, passes this acquired trait on to its offspring. Thus, it was believed, organisms change in response to their environment. However, under this model it would seem that the environment exerts little direct pressure on a species.

Darwin's model challenged the passive role of the environment. He proposed that the environment set the stage for a competition for survival. In economics, as in biology, those that are best able to compete are best able to survive. In a capitalist society, those that are most successful, as measured by accrued wealth, are those who are able to best utilize their resources. Similarly, environment or factors within the environment select for those traits that enable plants and animals to survive long enough to reproduce.

Darwin recognized that many plant and animal species produced far more offspring than could survive. Upon reading Malthus, he surmised that the large numbers of offspring are produced in a biological gamble. According to the selection theory, within the large numbers of offspring some will have the traits that will aid in their survival and will pass desirable traits on to their offspring. Those lacking the traits needed to successfully utilize resources and reproduce do not survive.

The idea that organisms and species survive as a result of characteristics selected for by the environment did not sit well with orthodox religion. The automated nature of the selection process precludes the involvement of a divine figure. Additionally, Christian philosophy holds all life as a gift. In light of Darwinian theory, the essential randomness and apparent wastefulness of the selection process argued against any form of divine intervention. This significant difference in philosophy resulted in battle lines being drawn between Creationists—those believing that the hand of God guides changes in species—and Evolutionists—those contending that species change as a function of natural selection.

Malthus's influence is still felt today as the battle rages on between Creationists and Evolutionists, affecting the way Evolution is taught in schools across America. Similarly, as global population approaches six billion, concerns continue to mount over the Earth's ability to support the growing human population, while at the same time preserving essential ecosystems and maintaining biological diversity.

Neo-Malthusianism in the early 20th Century

One main concern of human ecology and ecological economics is the balance between human population and natural resources. This is rightly named “the Malthusian question” because Malthus predicted that human populations, if unchecked, would grow exponentially (in geometrical ratio, such as: 1, 2, 4, 8, 16…) while agricultural production would grow only in arithmetic ratio (1, 2, 3, 4…), or even worse, it would be subject to decreasing returns to the labour input (reaching zero marginal productivity). However, around 1900 there was in Europe and America a successful international social movement that in contrast to Malthus’ pessimism, believed that population growth could be stopped among the poor classes by voluntary decisions.

Women were entitled to choose the number of children they wanted to have. This neo-Malthusian movement did not appeal to the State to impose restrictions on population growth. On the contrary, it was based on “bottom up” activism based on women’s freedom, the downward pressure of excessive population on wages, and the threat to the environment and subsistence’s. An excess of population was foreseen, and this led to anticipatory behaviour. More recently, in the 1960s and 1970s, there arose a new wave of Neo-Malthusianism, this time top-down, imposed by international organization or by governments (like in China) based on doctrines of overpopulation put forward by Paul Ehrlich (1968) and other authors.

Amartya Sen has explained that in 1798, Malthus quoted Condorcet's discussion in 1795 of the possibility of overpopulation. Condorcet believed in reasoned human action in order to prevent an overpopulation crisis through increases in productivity, through conservation and prevention of waste, and through education (especially female education) which would contribute to reducing the birth rate. Voluntary family planning would be the solution. Malthus, on the contrary, thought that improving the situation of the poor was counterproductive, since it would lead to larger families.

Thus, the neo-Malthusianism of 1900 can be seen a one moment in a prolonged discussion which started in 1795 and continues today. The origins of neo-Malthusianism Ever since 1798, when Malthus formulated his essay on population, there arose concerns in his country about avoiding the overpopulation of poor people.

The alternative to the Malthusian trap, if there was one, went no further than puritan advice on moral restraint, celibacy, delay in the age of marriage and sexual abstinence. It took some time for Malthus's "remedies" to be transformed. In 1822 Francis Place, a tailor by profession and associate of the utopian socialist Robert Owen, first published in London Illustrations and Proofs of the Principle of Population, in which he did not yet describe the details of the contraceptive methods which he would later anonymously disclose in his so-called Diabolical Hand Bills.

Other personalities followed Place and Owen in the same concern, including Richard Carlisle, who in 1825 wrote his neo-Malthusian work entitled What is Love? These and other neo-Malthusian works were broadly disseminated in England during the first third of the 19th century; they had public impact and attracted governmental persecution. NeoMalthusianism travelled to North America via Robert Owen himself, when he founded his communist-inspired colony, New Harmony. As early as 1835, Robert Owen's son, Robert Dale, published the neo-Malthusian booklet entitled Moral Physiology in New York, various editions of which were issued until 1877 in England and the United States. Following this work, Charles Knowlton, a Boston physician, wrote Fruits of Philosophy.

Starting in 1854, concern for the condition of the proletariat and high infant mortality rates was spurred by the English doctor, George Drysdale, who published the first edition of his 3 book The Elements of Social Sciences under a pseudonym. The remedies for overcoming the three evils of poverty, prostitution and celibacy, which the author claimed afflicted humanity, were explained in this work. Drysdale's work inspired the creation of the first neo-Malthusian organisation in the world, The Malthusian League, founded by his brother, Charles Drysdale with Charles Bradlaugh and Annie Bessant in London in 1877. The spread of contraception gave way to a drawn-out lawsuit involving those who wanted to re-issue the book by the American physician, Charles Knowlton, in England. The court case involved Annie Bessant and Charles Bradlaugh, and was discussed in many countries. One key factor in the future development of neo-Malthusianism in continental Europe was Paul Robin's exile in England at that time. He was a member of the council of the First International. His contact with the neo-Malthusian English thinkers led him to propose including the population question in the programme for workers' emancipation as early as the 1870s, but his calls had no resonance on the international socialist agenda.

Despite this initial lack of understanding, the English league's activities in the United States and England led to the spread of neo-Malthusianism around Europe. This is how, via its own theoretical and practical production, the second independent European neo-Malthusian league was founded in the Netherlands in 1881 under the name De Nieuw-Malthusiaansche Bond, the secretary of which was the physician Jan Rutgers, who published the newsletter Het Gellukkig Huisgezin (The Happy Family). From its beginnings, this league had valuable support of a member of parliament, M. S. van Houten.

There is no indication that neoMalthusianism was legally persecuted in Holland like it was at first in England, but there were two public morality (re-population) leagues which attempted to combat the spread of neo-Malthusian theories and practices, called Rein Levenbeweging, based in Utrecht, with the newsletter Levenskracht; and the Vereeniging tot Bestrijding van het Nieuw-Malthusianisme, based in Gravenhage. In 1889 in Stuttgart, Germany, the neo-Malthusian league Sozial Harmonischer Verein was created, the secretary of which was the publicist, Max Hausmeister. We do not know whether he was also a physician, although sometimes he appears as such. The league's means of spreading information was the newsletter Die Sozial Harmonie. In 1911, the German 4 government – in the phase leading up to World War I – proposed banning the travelling sale of contraceptive products by modifying article 56 of the Industrial Code. In Sweden, one active propagandist of neo-Malthusianism at the turn of the century was the economist Knut Wicksell who with the anarchist and socialist Hinke Bergegren founded the Stockholm Sällskapet för humanitär barnalstring (Stockholm Association for the Humanitarian Reproduction). Bergegren (1861-1936) was jailed in Sweden in 1910 after a public conference entitled "Love witout children". There was a so-called "Hinke Law" against birth-control. Bergegren became in 1917 a member of the Communist Part. The French neo-Malthusian league was created in 1896.

In 1877, Paul Robin had drawn attention to the problems posed by Malthus's law and had published his work La Question Sexuelle. He had not earned the support of anarchist personalities such as Kropotkin whose technological optimism led to see the world's rising population as a negligible problem. Robin repeated the principles for future generations of "good birth, good education and good social organisation". Robin's view broke with Malthus' moral restraint. In its place, he emphasised the need

for voluntarily and consciously reduce fertility rates through sexual education, contraception, and women's freedom. With this, he proposed taking labour away from capital, weakening militarism, avoiding forced migration and most importantly, allowing working-class women to decide for themselves when to become pregnant. From France, and upon Robin's impetus, the neo-Malthusian objectives joined those of the workers' movement, and this was the neo-Malthusianism that took root in southern Europe and some Latin American countries.

In Switzerland, there was a neo-Malthusian group in Geneva that published the journal La Vie Intime from 1908 to 1914. Its most visible spokesman was Valentin Grandjean (1872- 1944), from a Calvinist family, who became a writer and later a Socialist deputy in the Grand Conseil of Geneva from 1904 to 1913. This group was directly influenced by French neo-Malthusianism. 5 The union of the European and American neo-Malthusian movements materialised in August 1900 in Paris, when the first International Neo-Malthusian Conference was held, and the International Federation of Human Regeneration was created. Attending this meeting were Paul Robin from France, Emma Goldman from the United States, Valentin Grandjean from Switzerland, the Spaniard Ferrer i Guàrdia, Dr Rutgers from Holland, and England's Dr Drysdale. It was agreed that each neo-Malthusian branch with headquarters in each country would be independent, and that committees and groups would be organised as needed, either in cultural centres or labour unions. Therefore, starting in 1900, neo-Malthusianism was firmly entrenched and organised in western and central Europe, as well as in the United States, where it was spread by Moses Harmann and his daughter, Lily, through the neo-Malthusian newsletter published in Boston, The Lucifer. They were joined by the anarchist Emma Goldman, in addition to sundry doctors and midwives. Thus Emma Goldman (1869-1940) was a participant at the first neo-Malthusian conference in Paris in 1900. She published Mother Earth between 1906 and 1917.

Environmentalists of the 1960s and 1970s revived the title of her journal. She was active as a neo-Malthusian before Margaret Sanger (1879-1966), who is rightly credited as the main force behind the social and legal acceptance of contraception in the United States. Sanger was an International Workers of the World organizer, and therefore familiar with anarchist ideas. She lived and learned about birth control techniques in Europe, she was friendly in 1911 in London with one associate of Ferrer

i Guàrdia (who had been executed in Barcelona in 1909 after an uprising against sending troops to Morocco), and after her return in the United States in 1914, she began to publish the journal The Woman Rebel which supported socialism, feminism and contraception. She was indicted for violating the Comstock Act of 1873 that forbade contraceptives. Sanger did no longer use the word “Neo-Malthusianism”, which (paradoxically) had become politically too radical, and used “birth control” instead, with emphasis on the prevention of abortions, to be substituted later by even less controversial words, “family planning” or “planned parenthood”.

one hundred years ago Malthus’s pessimistic prognosis was transformed into the idea of conscious, voluntary procreation. Poor people, and especially poor women, were deemed capable of “conscious procreation”. This was a feminist and proto-environmental movement. Instead, today’s neo-Malthusianism of the rich considers the larger reproductive rate among the world’s poor as a threat to their own environment through migration. In Hardin’s case this developed into a so-called “lifeboat ethics”. Hence, the need for top-down population policies. Instead, the neo-Malthusianism of 1900 was not a doctrine imposing population policies from above. It was the opposite.

In France and elsewhere, it challenged the political and religious authorities of the time through the idea of a “womb strike”, and also through anti-militarism and anti-capitalism. It defended “rational feminism”. Only strong-willed radicals dared preach contraception in late 19th century and early 20th century.

One main figure of neo-Malthusianism in Brazil was the feminist and anarchist Maria Lacerda de Moura who wrote several books in the 1920s and 1930s, one of them entitled “Love one another, and do not multiply”. Active feminists in French Neo-Malthusianism had been Marie Huot and Madaleine Pelletier, who since 1900 proposed not only contraceptives but also the legalization of abortion. She was persecuted and later confined to a psychiatric asylum, where she died in 1939.

Among the contraceptive methods recommended by the Neo-Malthusian movement in Europe and America, some were geared to women, but condoms were popular. Vasectomies were endorsed in French anarchist circles in the early 1930s - the state’s response was a court-case. Similarly to what today is happening with climate change, where anticipation leads to action (possibly too little and too late),

human demography became in Europe and America socially self-modifying, more so than it had been in other societies (except for small “primitive” groups which closely controlled reproduction). This is a good example of the reflexivity of human action in response to forecasts, predictions, or bad scenarios.

Unit IV

Human Rights and Gender Equality

Adam Smith, often hailed as the father of modern economics, approached the issue of wealth from a capitalist perspective. In his seminal work, The Wealth of Nations, Smith argued that individuals, by pursuing their own economic interests, could inadvertently benefit society as a whole. This concept, known as the “invisible hand,” suggests that the pursuit of wealth can lead to collective prosperity if managed within a fair and competitive market.

Smith believed that moral virtues such as fairness, justice, and empathy were essential in regulating the excesses of wealth accumulation. In his earlier work, The Theory of Moral Sentiments, he expressed concern that unrestrained greed could lead to inequality and corruption. For Smith, wealth creation was a morally acceptable endeavor, provided that it contributed to the well-being of society and did not come at the expense of others.

Karl Marx, a 19th-century philosopher and economist, offered one of the most radical critiques of wealth and capitalism. For Marx, the accumulation of wealth by the bourgeoisie (the capitalist class) was inherently immoral because it was built on the exploitation of the working class. In his view, wealth was not just a neutral resource but a tool of oppression that allowed the rich to dominate and impoverish the poor.

In Das Kapital, Marx argued that wealth concentrated in the hands of a few created deep social and economic inequalities. He believed that this concentration of wealth led to alienation, where workers became disconnected from the products of their labor and the larger social fabric. Marx’s solution was a classless society, where wealth would be distributed according to need rather than private ownership. His critique of wealth continues to fuel debates on income inequality and social justice today.

Philosophers throughout history have offered diverse perspectives on the morality of wealth. While some, like Aristotle and Adam Smith, acknowledge the potential benefits of wealth when used virtuously, others, like Marx and Singer, emphasize the dangers of inequality and exploitation. The central theme running through many of these philosophical discussions is the moral responsibility that comes

with wealth. Whether through charity, fair distribution, or social justice, the ethical use of wealth remains a critical issue in both personal and societal contexts.

In a world where wealth disparities continue to grow, these philosophical reflections offer valuable insights into how we might navigate the complexities of riches and ethics. Whether one views wealth as a path to virtue, a tool of oppression, or a means to improve the world, the moral questions it raises are more relevant than ever.

Poverty and inequality have long been concerns of development economics. A social development paradigm with an emphasis on pro-poor growth is replacing the trickle-down industrialization model. Eradicating poverty and rectifying extreme levels of inequality go hand in hand with economic growth. It is true that a broad-based participation of people in productive activities can increase a nation's total output of goods and services, and promote economic development. However, poverty and inequality are not just economic issues. They are ethical issues as well.

When we see people suffering from materially and psychologically desperate conditions, we are compelled to act. Father Adolfo Nicolas, superior general of the Society of Jesus, has spoken about four challenges facing humankind. In his 2008 speech addressing the students of Sophia University, he declared world poverty as a "social challenge," and called on us to work hard to eradicate it. He referred to the lack of worldwide access to learning opportunities as a "cultural challenge," and encouraged us to achieve education for all. He also mentioned the protection of the environment as an "ecological challenge," and encouraged us to live ethically to meet an "ethical challenge." These four challenges are all linked. The eradication of poverty is supported by equal access to quality education and a fairer society so that everyone who receives education can have more options in their lives and fulfilled their aspirations.

Universal access to education and a fair society is not just about promoting economic growth. They are about ensuring human dignity. These challenges call upon our sense of ethical responsibility. Inequality also tests our ethics. Inequality is not just about income gaps. We may not value the same things in life. People and a society may pursue different paths whose values cannot be compared by a simple measure of how much you possess. As Catholic social teaching suggests, we need to have faith in the poor to organize themselves and choose the life they wish. Still, an extreme

income gap in a society and between societies is alarming because it could erode social cohesion—a basic sense of trust between people who do not know each other.

A reasonable degree of social cohesion is needed so that a society (and the world) can function, and for people to have the chance to increase their opportunities in life.

Again, education is perhaps one of the most important public policies to address inequality and trust. Education can reproduce an unequal society if it is not offered equally to all. Equal and fair provision of educational services, however, can rectify issues of inequality. Education can also promote bonding of different groups when it draws children of different social, cultural and economic backgrounds. In both cases, a national government plays a critical role, even in this globalized and increasingly borderless world.

The biggest problem faced by developed countries and emerging markets is the concentration of wealth in the hands of a few. The pandemic accentuated the problem by pushing more than 100 million people into poverty worldwide. The wealth of billionaires grew by leaps and bounds during the same period. Many jobs were lost and the impact on education will have long-term repercussions that may lead to an increase in deprivation and inequality.

The so-called build-back-better plans seem to be failing along with the objective of using the pandemic as an opportunity. Colossal failure in pandemic planning and implementation of policies has increased the gap between the wealthiest 1% and the rest of the population, highlighting Thomas Piketty's words in 'Time for Socialism'. "I am now convinced that we need to think about a new way of going beyond capitalism, a new form of socialism, participative and decentralized, federal and democratic, ecological, multiracial, and feminist".

While the long march towards equality and participatory socialism may be a long shot, the debate over the nature and consequences of inequalities continues. Scholars like Piketty have established that inequality is essentially an ideological and political phenomenon rather than an economic and technological one. Based on the absolute moral responsibility principles, these scholars opine that most of the rich and ultra-rich earn either by producing luxury for the richest 1% or by exploiting the

necessities of the rest. In both cases, the concentration of wealth gives rise to inequalities.

Let's start with a basic social need like education. Good universities and institutions charge a fee which works in favour of the class of haves. The technological advancements allow the finance sector to operate with fewer people, more machines and divergent income spectrums. Privileges and wealth concentrate in the capitalist world, making certain skills valuable, products meaningful and also creating a class of people who can manage them. In many more ways, those who do well in a society are conditioned by inequality.

Scholars like Yaron Brook see disparities in income as an inevitable outcome of value creation and individual specialisation differences. They explain wealth as an individual possession and not that of any nation. The way national wealth is considered as a pie is criticised. The underlying assumption is that when individuals are set free, they tend to produce wealth in different quantities. They see inequality as the result of the functioning of an economy.

In the aftermath of the pandemic when the difference between the wealthiest 1% and the rest seems to be expanding, it is crucial to analyse certain important dimensions of wealth generation and devolution in the light of these arguments from both sides.

The wealth tax debate

Wealth tax is imposed on an individual's net wealth or the market value of their total assets minus liabilities. Recently, there have been discussions on imposing wealth tax in the US. This was to serve the debt-ridden economy and the treasury faced major opposition against the proposal. The number of OECD members that impose a net wealth tax increased from eight in 1965 to 12 in 1996, but dwindled to five in 2020. India also repealed its 1% wealth tax in 2016.

The reasoning that the wealth tax results in greater devolution of wealth seems to have been discounted by the discontent against risk-taking and entrepreneurship behaviour. Countries like Singapore intend to increase personal income tax (if not

wealth tax) for the ultra-rich to finance their post-pandemic rebuilding. Thus, the international consensus over an equitable society seems to stop with the debate over the imposition of wealth tax as a measure to check income disparities.

Occupational origins of inequality

Holding an account of the occupations that push the fortunes of the top 1%, two leading ways become visible. People dealing with occupations such as finance, elite medicines, law and management constitute almost half of the ultra-rich, while the other half benefits hugely from electronics, communication, computers and digital developments. It can be said that a one chunk of occupations deals with the luxury of the rich and the other with the survival of the struggling class.

The inconclusive debate over the successes of capitalism uses the reduction of poverty worldwide as a barometer. The world has managed to reduce the poverty headcount to around 10%. However, pro-capitalist policies have created a class of poor called the new poor which mainly consists of the urban, non-agricultural poor working in the most compromised sectors. This relates to the inequality debate as the disparities of income generation by the top 1% and the rest reserves implications in terms of greater devolution of wealth. Advocates of pro-poor policies suggest alleviation as the absolute moral responsibility of the governments and the ultra-rich.

A world more divided over income and possession of wealth is creating a class of poor that is hardly mentioned in the individual poverty debate. The debate over the dimensions of inequality is confined to the realm of academia at present. There is a striking need to address the consequences through fiscal measures.

UN Human Rights Treaty Bodies

The United Nations Human Rights Treaty Bodies are committees of experts created to monitor governments' implementation of specific human rights conventions. Currently, 10 of the human rights agreements drafted under the auspices of the United Nations are overseen by treaty bodies. Each committee's mandate is defined in the treaty it oversees or in a protocol to that treaty.

Each committee – with the exception of the Subcommittee on Prevention of Torture – issues concluding observations based on its review of each State party's reports regarding its implementation of the treaty's provisions, which generally must be submitted every few years. The same nine treaty bodies are also authorized to publish general comments (also called "general recommendations") interpreting the scope of each treaty's provisions or providing guidance on issues related to its mandate. Some treaty bodies also organize general or thematic discussions, which focus on a particular right or aspect of each convention.

Currently, eight of the 10 UN treaty bodies may also receive and decide individual complaints (also called "communications") regarding violations allegedly committed by those States that have authorized the committee to receive complaints against them. States generally can accede to the individual complaints mechanism by signing the relevant protocol or submitting the necessary declaration to the treaty. The committee issues a decision ("views") regarding each individual complaint, and while these decisions are not generally considered binding on States, they do represent a reasoned interpretation of the relevant treaty to which the States parties have agreed to be legally bound.

One additional UN treaty body – on the rights of migrant workers – will be authorized to receive individual complaints after 10 States have ratified the necessary instrument. Some treaty bodies also receive inter-State complaints, which is when one State alleges that another State has violated the relevant treaty.

Finally, some treaty bodies have the competence to consider requests for urgent action or early-warning procedures, which are aimed at preventing or halting serious violations of the relevant convention. Some bodies may initiate confidential inquiries when they receive information regarding grave or systematic violations, so long as the State concerned has agreed to those "inquiry procedures."

The United Nations Treaty Bodies

- The Human Rights Committee oversees implementation of the International Covenant on Civil and Political Rights (ICCPR) and may receive individual

communications relating to States parties to the First Optional Protocol to the ICCPR.

- The Committee on Economic, Social and Cultural Rights (CESCR) monitors compliance with the International Covenant on Economic, Social and Cultural Rights (ICESCR) and may receive individual complaints relating to States parties to the Optional Protocol to the ICESCR.
- The Committee on the Elimination of Racial Discrimination (CERD) oversees implementation of the International Convention on the Elimination of All Forms of Racial Discrimination (ICERD) and may receive individual complaints against States parties that have made the relevant declaration under Article 14 of the ICERD.
- The Committee on the Elimination of Discrimination against Women (CEDAW Committee) monitors compliance with the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), and may receive individual communications relating to States parties to the Optional Protocol to CEDAW.
- The Committee Against Torture (CAT) oversees implementation of the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment (Convention against Torture) and may accept individual complaints against States parties that have made the relevant declaration under Article 22 of the CAT.
- The Subcommittee on Prevention of Torture (SPT), which was established pursuant to the Optional Protocol to the Convention against Torture (OP-CAT), visits places of detention and advises States and National Preventive Mechanisms on best practices to prevent torture and ill-treatment.
- The Committee on the Rights of the Child (CRC) monitors compliance with the Convention on the Rights of the Child and its two protocols. The Committee accepts individual complaints against States parties that have ratified the Third Optional Protocol on a Communications Procedure.
- The Committee on Migrant Workers (CMW) oversees implementation of the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (ICMW). An individual complaints

mechanism is pending and will begin operating when 10 States parties have made the relevant declaration pursuant to Article 77 of the CMW.

- The Committee on the Rights of Persons with Disabilities (CRPD) monitors compliance with the International Convention on the Rights of Persons with Disabilities (ICRPD) and may receive individual complaints against States parties to the Optional Protocol to the Convention.
- The Committee on Enforced Disappearances (CED) monitors implementation of the International Convention for the Protection of All Persons from Enforced Disappearance (ICPPED) and may consider individual complaints against States parties that have recognized the Committee's competence pursuant to Article 31 of the Convention.

Resources for Advocates

For further information about the mandate, outputs, and jurisdiction of each UN human rights treaty body, see the IJRC page on each committee.View the exhaustion guide for an overview of how the UN human rights treaty bodies interpret and apply the procedural requirement of exhaustion of domestic remedies in their complaints processes.

Additional Resources

Each treaty body's decisions, concluding observations on States' reports, and general comments on treaty provisions can be most effectively searched through the UN Treaty Body Database, treaty body Jurisprudence Database, and other resources listed in the Jurisprudence and Documents Databases section of this Online Resource Hub. The UN also maintains a list of general comments issued by the treaty bodies.

IJRC's Country Factsheets for an overview of which UN (and regional) human rights treaties and complaint mechanisms a particular country has accepted. The UN Office of the High Commissioner for Human Rights (OHCHR) also maintains information on the current status of States' ratification and reporting on its Human Rights Bodies. UN Dag Hammarskjöld Library's UN Treaty-Based Bodies Research

Guide provides useful information on researching, citing, and identifying documents published by the treaty bodies.

The Life cycle approach on Human Development

Lifespan development involves the exploration of biological, cognitive, and psychosocial changes and constancies that occur throughout the entire course of life. It has been presented as a theoretical perspective, proposing several fundamental, theoretical, and methodological principles about the nature of human development. An attempt by researchers has been made to examine whether research on the nature of development suggests a specific metatheoretical worldview. Several beliefs, taken together, form the “family of perspectives” that contribute to this particular view.

. German psychologist Paul Baltes, a leading expert on lifespan development and aging, developed one of the approaches to studying development called the lifespan perspective. This approach is based on several key principles:

- Development occurs across one’s entire life, or is lifelong.
- Development is multidimensional, meaning it involves the dynamic interaction of factors like physical, emotional, and psychosocial development
- Development is multidirectional and results in gains and losses throughout life
- Development is plastic, meaning that characteristics are malleable or changeable.
- Development is influenced by contextual and socio-cultural influences.
- Development is multidisciplinary.

Contextual Influences on Development: Socioeconomic Status Culture

- Contextual perspectives, like the lifespan approach, highlight societal contexts that influence our development. An important societal factor is our social standing, socioeconomic status, or social class. Socioeconomic status (SES) is a way to identify families and households based on their shared levels of education, income, and occupation. While there is certainly individual variation,

members of a social class tend to share similar privileges, opportunities, lifestyles, patterns of consumption, parenting styles, stressors, religious preferences, and other aspects of daily life. All of us born into a class system are socially located, and we may move up or down depending on a combination of both socially and individually created limits and opportunities.

- Families with higher socioeconomic status usually are in occupations (e.g., attorneys, physicians, executives) that not only pay better, but also grant them a certain degree of freedom and control over their job. Having a sense of autonomy or control is a key factor in experiencing job satisfaction, personal happiness, and ultimately health and well-being (Weitz, 2007). Those families with lower socioeconomic status are typically in occupations that are more routine, more heavily supervised, and require less formal education. These occupations are also more subject to job disruptions, including lay-offs and lower wages.

Poverty level is an income amount established by the federal government that is based on a set of thresholds that vary by family size (United States Census Bureau, 2016). If a family's income is less than the government threshold, that family is considered in poverty. Those living at or near poverty level may find it extremely difficult to sustain a household with this amount of income. Poverty is associated with poorer health and a lower life expectancy due to poorer diet, less healthcare, greater stress, working in more dangerous occupations, higher infant mortality rates, poorer prenatal care, greater iron deficiencies, greater difficulty in school, and many other problems. Members of higher income status may fear losing that status, but the poor may have greater concerns over losing housing.

Today we are more aware of the variations in development and the impact that culture and the environment have on shaping our lives. Culture is the totality of our shared language, knowledge, material objects, and behavior. It includes ideas about what is right and wrong, what to strive for, what to eat, how to speak, what is valued, as well as what kinds of emotions are called for in certain situations. Culture teaches us how to live in a society and allows us to advance because each new generation can benefit from the solutions found and passed down from previous generations. Culture is learned from parents, schools, houses of worship, media, friends and others

throughout a lifetime. The kinds of traditions and values that evolve in a particular culture serve to help members function and value their own society. We tend to believe that our own culture's practices and expectations are the right ones. This belief that our own culture is superior is called ethnocentrism and is a normal by-product of growing up in a culture. It becomes a roadblock, however, when it inhibits understanding of cultural practices from other societies. Cultural relativity is an appreciation for cultural differences and the understanding that cultural practices are best understood from the standpoint of that particular culture.

Culture is an extremely important context for human development and understanding development requires being able to identify which features of development are culturally based. This understanding is somewhat new and still being explored. Much of what developmental theorists have described in the past has been culturally bound and difficult to apply to various cultural contexts. The reader should keep this in mind and realize that there is still much that is unknown when comparing development across cultures.

Development is Multidisciplinary

Any single discipline's account of development across the lifespan would not be able to express all aspects of this theoretical framework. That is why it is suggested explicitly by lifespan researchers that a combination of disciplines is necessary to understand development. Psychologists, sociologists, neuroscientists, anthropologists, educators, economists, historians, medical researchers, and others may all be interested and involved in research related to the normative age-graded, normative history-graded, and nonnormative influences that help shape development. Many disciplines are able to contribute important concepts that integrate knowledge, which may ultimately result in the formation of a new and enriched understanding of development across the lifespan.

The United Nations defines sustainable development as "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs".As such, sustainable development not only deals with environmental issues, but economic, social and cultural issues as well. Given the increased demands placed on societies and the environment due to, among other factors, increased

human migration, increased urbanisation and industrialisation as well as the ongoing depletion of non-renewable resources, it is clear that global action is needed to create a more sustainable future.

Given its primary role as knowledge producer, higher education can serve as a powerful means to help create a more sustainable future. Thus, the concept of 'education for sustainable development' has become, in recent years, one of the core educational initiatives to help address many of the problems associated with human development.

> Indeed, higher education's role in creating a sustainable future will presumably take on a greater importance as the world continues to become increasingly globalised and interdependent.

Access and sustainable development

According to UNESCO, education for sustainable development "empowers people to change the way they think and work towards a sustainable future". It therefore involves making access to good-quality education available at every stage of life. More specifically, it involves educating students on the necessity of sustainable development by integrating sustainable development issues into all aspects of teaching, research and service.

This means reorienting the education system at all levels to help people think and behave in ways that foster a more sustainable planet (for example, global citizenship, recycling, climate change, biodiversity, renewable energy and social responsibility).

In practice, it means equipping students with the requisite knowledge, skills, attitudes and values to create a sustainable future. To that end, students should cultivate critical and creative thinking skills, engage in authentic interdisciplinary learning activities and develop a value system that emphasises responsibility to self, others and the planet.

Thus, education for sustainable development and the UN Sustainable Development Goals (SDGs) go hand in hand. Indeed, an increasing number of universities are offering degree and certificate programmes in sustainable development.

Global problems require global action

In the current era, we face huge global problems (for example, the refugee crisis, global climate change, extreme poverty and illiteracy) and, presumably, these problems are best addressed through universal education and international cooperation.

Higher education not only has a role to play in that effort but it also has the capacity to play a leading role. These issues, and the factors driving these issues, have been discussed in previous University World News articles.

With a target date of 2030, the UN, through their SDG initiative, has set 17 broad and interdependent goals that are necessary for creating a sustainable future on our planet. The SDG initiative is a concerted universal agenda by the 193 member states of the UN and the global civil society and it represents a strategic framework and a bold normative vision of the future.

As a knowledge producer, the core mission of higher education cuts across all learning domains. Thus, higher education has a unique role to play in helping to achieve the SDGs. More specifically, Goal Four deals directly with education – its goal is to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”.

Since it is through good-quality education and lifelong learning that people are equipped with the requisite knowledge and skills needed to address a sustainable future, education becomes paramount in achieving all the SDGs.

In addition, higher education institutions can participate in the UN Higher Education Sustainability Initiative and the United Nations University provides many examples of sustainability in action.

Higher education institutions have a critical role to play in implementing and driving sustainable development initiatives through their institutional policies and practices. One of the key questions to be addressed is: what can higher education leaders, faculty and students do to implement sustainable development in their institutional vision, mission and values statements, their strategic plans and their organisational culture?

Addressing SDG Goal

Four Inclusion is broadly defined by UNESCO as "…a process of addressing and responding to the diversity of needs of all children, youth and adults through increasing participation in learning, cultures and communities and reducing and eliminating exclusion within and from education".

Equity is broadly defined as the fairness principle that every individual is entitled to just opportunity to access and participate in education. Equity therefore entails understanding student learning needs in order to mitigate obstacles to achieving student academic success.Since good practices start with good research, to help address inclusive and equitable quality education, the International Higher Education Teaching and Learning Association (HETL) has launched a book series titled International Perspectives on Equity and Inclusion.

In this forthcoming series, educational scholars from around the world address four key issues in higher education, each of which has been developed into its own volume:

- • Diversity and Gender Identities
- • Diverse Student Identities
- • Strategies for Fostering Inclusive Classrooms, and
- • Strategies for Facilitating Inclusive Campuses.

Lifelong learning is broadly defined to include all forms of learning (formal, non-formal, informal) that is undertaken throughout the course of one's life in order to acquire or improve one's knowledge, skills, competencies and values.

To help address lifelong learning opportunities for all, HETL has launched a book series titled Refugee Education. In this forthcoming series, educational scholars from around the world address three key issues in higher education relative to the refugee crisis, each of which has been developed into its own volume:

- • Integration and Acceptance of Refugees in Mainstream Society
- • Policies and Directions for Refugee Education, and
- • Language Teaching and Pedagogy.

These peer-reviewed volumes include case studies and other empirical research from which to draw real-world exemplars as well as theoretical models and frameworks that illustrate why inclusion, equity and lifelong learning have become a necessity in the modern era and how these issues are being implemented across the globe.

Meeting challenges and mitigating barriers

As noted by Taya Louise Owens: “It is important to note that sustainable development works as an organising principle because it recognises that complex natural and social systems are interconnected.”So, creating a sustainable future is much more than just creating green campuses or implementing recycling efforts or global citizenship initiatives. It may also involve implementing more blended learning programmes, creating more university partnerships involving sustainable development as well as integrating sustainable development issues and initiatives into the curriculum across all disciplines at all levels.

UNIT - V

The Proposal for Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all United Nations (UN) members in 2015, created 17 world Sustainable Development Goals (SDGs). The aim of these global goals is "peace and prosperity for people and the planet" while tackling climate change and working to preserve oceans and forests. The SDGs highlight the connections between the environmental, social and economic aspects of sustainable development. Sustainability is at the centre of the SDGs, as the term sustainable development implies.

The short titles of the 17 SDGs are: No poverty (SDG 1), Zero hunger (SDG 2), Good health and well-being (SDG 3), Quality education (SDG 4), Gender equality (SDG 5), Clean water and sanitation (SDG 6), Affordable and clean energy (SDG 7), Decent work and economic growth (SDG 8), Industry, innovation and infrastructure (SDG 9), Reduced inequalities (SDG 10), Sustainable cities and communities (SDG 11), Responsible consumption and production (SDG 12), Climate action (SDG 13), Life below water (SDG 14), Life on land (SDG 15), Peace, justice, and strong institutions (SDG 16), and Partnerships for the goals (SDG 17).

These goals are ambitious, and the reports and outcomes to date indicate a challenging path. Most, if not all, of the goals are unlikely to be met by 2030. Rising inequalities, climate change, and biodiversity loss are topics of concerns threatening progress. The COVID-19 pandemic in 2020 to 2023 made these challenges worse, and some regions, such as Asia, have experienced significant setbacks during that time.

There are cross-cutting issues and synergies between the different goals; for example, for SDG 13 on climate action, the IPCC sees robust synergies with SDGs 3 (health), 7 (clean energy), 11 (cities and communities), 12 (responsible consumption and production) and 14 (oceans). On the other hand, critics and observers have also identified trade-offs between the goals, such as between ending hunger and promoting environmental sustainability. Furthermore, concerns have arisen over the high number of goals (compared to the eight Millennium Development Goals), leading to

compounded trade-offs, a weak emphasis on environmental sustainability, and difficulties tracking qualitative indicators.

The political impact of the SDGs has been rather limited, and the SDGs have struggled to achieve transformative changes in policy and institutional structures. Also, funding remains a critical issue for achieving the SDGs. Significant financial resources would be required worldwide. The role of private investment and a shift towards sustainable financing are also essential for realizing the SDGs. Examples of progress from some countries demonstrate that achieving sustainable development through concerted global action is possible. The global effort for the SDGs calls for prioritizing environmental sustainability, understanding the indivisible nature of the goals, and seeking synergies across sectors.

Principles

The SDGs are universal, time-bound, and legally non-binding policy objectives agreed upon by governments. They come close to prescriptive international norms but are generally more specific, and they can be highly ambitious. The overarching UN program "2030 Agenda" presented the SDGs in 2015 as a "supremely ambitious and transformative vision" that should be accompanied by "bold and transformative steps" with "scale and ambition".

The SDGs apply to all countries of the world, not just developing countries like the Millennium Development Goals (MDGs) did (from the year 2000 to 2015). They target all three dimensions of sustainability and sustainable development, namely the environmental, economic and social dimension. Another aspect that makes the SDGs different to the MDGs is that the development and negotiations of the SDGs were not "top down" by civil servants but were relatively open and transparent, aiming to include "bottom up" participation.

The SDGs are emphasizing inclusiveness in the national context and also in global governance. For the national context this means a focus on marginalised groups that are affected by exclusion and inequalities. For the global context, inclusiveness means a special emphasis on the least developed countries. At the heart of the SDGs lies the pledge of the United Nations Member States to Leave No One Behind (abbreviated as LNOB). In other words: to reach the people and

countries who are furthest behind first. The LNOB concept is a politically and technically challenging approach that is ambiguous and open to interpretation. A study from 2024 investigated 77 voluntary national reviews and found that people with disabilities are most often identified as furthest behind (>70%), followed by women and girls (>60%), youth (ca. 50%), elderly (45%), children (>40%), and refugees and migrants (ca. 30%).

Goals and targets

The lists of targets and indicators for each of the 17 SDGs was published in a UN resolution in July 2017. Each goal typically has eight to 12 targets, and each target has between one and four indicators used to measure progress toward reaching the targets, with the average of 1.5 indicators per target. The targets are either outcome targets (circumstances to be attained) or means of implementation targets. The latter targets were introduced late in the process of negotiating the SDGs to address the concern of some Member States about how the SDGs were to be achieved. Goal 17 is wholly about how the SDGs will be achieved. The numbering system of targets is as follows: Outcome targets use numbers, whereas means of implementation targets use lower case letters. For example, SDG 6 has a total of 8 targets. The first six are outcome targets and are labelled Targets 6.1 to 6.6. The final two targets are means of implementation targets and are labelled as Targets 6.a and 6.b. However, the connection between means of implementation with outcomes is not well proven. The means of implementation targets (those denoted with a letter, for example, Target 6.a) are not well conceptualized and not formulated in a consistent manner. Also, measuring and tracking their indicators is difficult.

Indicators and data

The percentage of SDG targets measured using a single indicator (represented by bars, with an average of 62%) and the average number of indicators used per target (represented by markers, with an average of 1.5). For example, the progress towards SDG 6 is measured using 1.4 indicators per target, with 63% of targets having a single indicator. Indicators serve as the key tools for decision-makers to track progress towards the SDG targets. Therefore, they have a decisive impact on SDG implementation, as well as the ultimate determination of whether the world is closer to realizing the SDGs by 2030. National and local governments use the indicators to

measure own progress towards sustainable development, which they report in their voluntary national and local reviews. The indicators are now widely deployed at all levels of sustainability governance. As of 2023, there are 231 official indicators in use.

Each target is typically measured with only 1.5 indicators, which monitor quantifiable changes in proportion, rate, amount, and the like. 62% of the targets are supported by sole indicators, effectively equating progress measured on the 105 indicators with progress on the 105 targets.

The implementation of the SDGs is underpinned by statistical data that should be accurate, timely, and reliable. This data, in turn, must be broken down by, for example, income, gender, age, disability, and geographic location. For example, the earlier Millennium Development Goal Number 1 aimed to “halve the proportion of people” suffering from hunger or extreme poverty. In contrast, the SDG Number 1 aims to “end poverty in all its forms everywhere”. This is also called the central principle of leaving no one behind.

The United Nations Statistics Division (UNSD) website provides a current official indicator list which includes all updates until the 51st session Statistical Commission in March 2020.[17] The indicators for the targets have varying levels of methodological development and availability of data at the global level. Initially, some indicators (called Tier 3 indicators) had no internationally established methodology or standards. Later, the global indicator framework was adjusted so that Tier 3 indicators were either abandoned, replaced or refined.

The indicators were developed and annually reviewed by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs). The choice of indicators was delegated to statisticians who met behind closed doors after the goals and targets were established. However, scholars have pointed out that the selection of indicators was never free from politics. Statisticians received instructions from their governments, and the interests of powerful governments had a significant influence over the indicator selection process.

The indicator framework was comprehensively reviewed at the 51st session of the United Nations Statistical Commission in 2020. It will be reviewed again in 2025. At the 51st session of the Statistical Commission (held in New York City from 3 to 6 March

2020) a total of 36 changes to the global indicator framework were proposed for the commission's consideration. Some indicators were replaced, revised or deleted. Between 15 October 2018 and 17 April 2020, other changes were made to the indicators. Yet their measurement continues to be fraught with difficulties.

Custodian agencies

For each indicator, the Inter-Agency and Expert Group tried to designate at least one custodian agency and focal point that would be responsible for developing the methodology, data collection, data aggregation, and later reporting. The division of indicators was primarily based on existing mandates and organizational capacity. For example, the World Bank established itself as a data gatekeeper in this process through its broad mandate, staff, budget, and expertise in large-scale data collection. The bank became formally involved in about 20 percent of all 231 SDG indicators; it served as the custodian agency for 20 of them and was involved in the development and monitoring of another 22.

Details of 17 goals and targets

Goal 1: No Poverty

SDG 1 is to "end poverty in all its forms everywhere." Achieving SDG 1 would end extreme poverty globally by 2030. One of its indicators is the proportion of population living below the poverty line. The data gets analyzed by sex, age, employment status, and geographical location (urban/rural). One of the key indicators that measure poverty is the proportion of population living below the international and national poverty line. Measuring the proportion of the population covered by social protection systems and living in households with access to basic services is also an indication of the level of poverty.

Goal 2: Zero hunger

SDG 2 is to: "End hunger, achieve food security and improved nutrition, and promote sustainable agriculture." Indicators for this goal are for example the prevalence of diet, prevalence of severe food insecurity, and prevalence of stunting among children under five years of age.

Goal 3: Good health and well-being

SDG 3 is to: "Ensure healthy lives and promote well-being for all at all ages." Important indicators here are life expectancy as well as child and maternal mortality. Further indicators are for example deaths from road traffic injuries, prevalence of current tobacco use, and suicide mortality rate.

Goal 4: Quality education

SDG 4 is to: "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." The indicators for this goal are, for example, attendance rates at primary schools, completion rates of primary school education, participation in tertiary education, and so forth. In each case, parity indices are looked at to ensure that disadvantaged students do not miss out (data is collected on "female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples"). There is also an indicator around the facilities that the school buildings have (access to electricity, the internet, computers, drinking water, toilets etc.).

Goal 5: Gender equality

SDG 5 is to: "Achieve gender equality and empower all women and girls." Indicators include, for example, having suitable legal frameworks and the representation by women in national parliament or in local deliberative bodies. Numbers on forced marriage and female genital mutilation/cutting (FGM/C) are also included in another indicator.

Goal 6: Clean water and sanitation

SDG 6 is to: "Ensure availability and sustainable management of water and sanitation for all." The Joint Monitoring Programme (JMP) of WHO and UNICEF is responsible for monitoring progress to achieve the first two targets of this goal. Important indicators for this goal are the percentages of the population that uses safely managed drinking water, and has access to safely managed sanitation. The JMP reported in 2017 that 4.5 billion people do not have safely managed sanitation.[31] Another indicator looks at the proportion of domestic and industrial wastewater that is safely treated.

Goal 7: Affordable and clean energy

SDG 7 is to "Ensure access to affordable, reliable, sustainable and modern energy for all." One of the indicators for this goal is the percentage of population with access to electricity (progress in expanding access to electricity has been made in several countries, notably India, Bangladesh, and Kenya[33]). Other indicators look at the renewable energy share and energy efficiency.

Goal 8: Decent work and economic growth

SDG 8 is to: "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all." Important indicators for this goal include economic growth in least developed countries and the rate of real GDP per capita. Further examples are rates of youth unemployment and occupational injuries or the number of women engaged in the labour force compared to men.

Goal 9: Industry, Innovation, Technology and Infrastructure

SDG 9 is to: "Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation." Indicators in this goal include for example, the proportion of people who are employed in manufacturing activities, are living in areas covered by a mobile network, or who have access to the internet. An indicator that is connected to climate change is "CO_2 emissions per unit of value added."

Goal 10: Reduced inequality

SDG 10 is to: "Reduce inequality within and among countries." Important indicators for this SDG are: income disparities, aspects of gender and disability, as well as policies for migration and mobility of people.

Goal 11: Sustainable cities and communities

SDG 11 is to: "Make cities and human settlements inclusive, safe, resilient, and sustainable." Important indicators for this goal are the number of people living in urban slums, the proportion of the urban population who has convenient access to public transport, and the extent of built-up area per person.

Goal 12: Responsible consumption and production

SDG 12 is to: "Ensure sustainable consumption and production patterns." One of the indicators is the number of national policy instruments to promote sustainable consumption and production patterns. Another one is global fossil fuel subsidies. An increase in domestic recycling and a reduced reliance on the global plastic waste trade are other actions that might help meet the goal.

Goal 13: Climate action

SDG 13 is to: "Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy." In 2021 to early 2023, the Intergovernmental Panel on Climate Change (IPCC) published its Sixth Assessment Report which assesses scientific, technical, and socio-economic information concerning climate change.

Goal 14: Life below water

SDG 14 is to: "Conserve and sustainably use the oceans, seas and marine resources for sustainable development." The current efforts to protect oceans, marine environments and small-scale fishers are not meeting the need to protect the resources. Increased ocean temperatures and oxygen loss act concurrently with ocean acidification to constitute the deadly trio of climate change pressures on the marine environment.

Goal 15: Life on land

SDG 15 is to: "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss." The proportion of remaining forest area, desertification and species extinction risk are example indicators of this goal.

Goal 16: Peace, justice and strong institutions

SDG 16 is to: "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels." Rates of birth registration and prevalence of bribery are two examples of indicators included in this goal. An inclusive society has

"mechanisms to enable diversity and social justice, accommodate the special needs of vulnerable and disadvantaged groups, and facilitate democratic participation".

Goal 17: Partnerships for the goals

SDG 17 is to: "Strengthen the means of implementation and revitalize the global partnership for sustainable development." Increasing international cooperation is seen as vital to achieving each of the 16 previous goals. Developing multi-stakeholder partnerships to facilitate knowledge exchange, expertise, technology, and financial resources is recognized as critical to overall success of the SDGs. The goal includes improving north–south and South–South cooperation. Public-private partnerships which involve civil societies are specifically mentioned.

Global events

Global Goals Week is an annual week-long event in September for action, awareness, and accountability for the Sustainable Development Goals. It is a shared commitment for over 100 partners to ensure quick action on the SDGs by sharing ideas and transformative solutions to global problems. It first took place in 2016. It is often held concurrently with Climate Week NYC.

The Arctic Film Festival is an annual film festival organized by HF Productions and supported by the SDGs' Partnership Platform. Held for the first time in 2019, the festival is expected to take place every year in September in Longyearbyen, Svalbard, Norway.

Historical development of SDG

The sustainable development goals are a UN initiative. Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development containing the targets and indicators, July 2017 (UN resolution A/RES/71/313) UN SDG consultations in Mariupol, Ukraine. The Post-2015 Development Agenda was a process from 2012 to 2015 led by the United Nations to define the future global development framework that would succeed the Millennium Development Goals which ended in 2015.

In 1983, the United Nations created the World Commission on Environment and Development (later known as the Brundtland Commission), which defined sustainable

development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." In 1992, the first United Nations Conference on Environment and Development (UNCED) or Earth Summit was held in Rio de Janeiro, where the first agenda for Environment and Development, also known as Agenda 21, was developed and adopted.

In 2012, the United Nations Conference on Sustainable Development (UNCSD), also known as Rio+20, was held as a 20-year follow up to UNCED. Colombia proposed the idea of the SDGs at a preparation event for Rio+20 held in Indonesia in July 2011. In September 2011, this idea was picked up by the United Nations Department of Public Information 64th NGO Conference in Bonn, Germany. The outcome document proposed 17 sustainable development goals and associated targets. In the run-up to Rio+20 there was much discussion about the idea of the SDGs. At the Rio+20 Conference, a resolution known as "The Future We Want" was reached by member states. Among the key themes agreed on were poverty eradication, energy, water and sanitation, health, and human settlement.

In January 2013, the 30-member UN General Assembly Open Working Group (OWG) on Sustainable Development Goals was established to identify specific goals for the SDGs. The OWG submitted their proposal of 8 SDGs and 169 targets to the 68th session of the General Assembly in September 2014. On 5 December 2014, the UN General Assembly accepted the Secretary General's Synthesis Report, which stated that the agenda for the post-2015 SDG process would be based on the OWG proposals.

In 2015, the United Nations General Assembly (UNGA) created the SDGs as part of the Post-2015 Development Agenda. These goals were formally articulated and adopted in a UNGA resolution known as the 2030 Agenda. On 6 July 2017, the SDGs were made more actionable by a UNGA resolution that identifies specific targets for each goal and provides indicators to measure progress.[11] Most targets are to be achieved by 2030, although some have no end date.

Adoption

Transforming our world: the 2030 Agenda for Sustainable Development (UN Resolution A/RES/70/1), containing the goals (October 2015) A diagram listing the 17

Sustainable Development Goals.On 25 September 2015, the 193 countries of the UN General Assembly adopted the 2030 Development Agenda titled "Transforming our world: the 2030 Agenda for Sustainable Development." This agenda has 92 paragraphs. Paragraph 59 outlines the 17 Sustainable Development Goals and the associated 169 targets and 232 indicators.

The UN-led process involved its 193 Member States and global civil society. The resolution is a broad intergovernmental agreement that acts as the Post-2015 Development Agenda. The SDGs build on the principles agreed upon in Resolution A/RES/66/288, entitled "The Future We Want". This was a non-binding document released as a result of Rio+20 Conference held in 2012.

Implementation

Implementation of the SDGs started worldwide in 2016. This process can also be called Localizing the SDGs. In 2019 António Guterres (secretary-general of the United Nations) issued a global call for a Decade of Action to deliver the Sustainable Development Goals by 2030. This decade will last from 2020 to 2030. The plan is that the secretary general of the UN will convene an annual platform for driving the Decade of Action.

There are two main types of actors for implementation of the SDGs: state and non-state actors. The former includes national governments and sub-national authorities, whereas the latter are corporations and civil society.

International organizations

Many international organizations have committed to the SDGs since 2015. Examples for international organizations include: UN General Assembly, World Trade Organization, African Development Bank, UN Economic and Social Council, UN Security Council, Asian Development Bank. However, some international organizations, such as the World Bank, often have "cherry-picked" goals and engaged in selective mainstreaming.

In general, the SDGs might be a low priority for international organizations that have many other assignments that are often more binding, have more urgent deliverables, and have more repercussions in case of inaction. The breadth of the

SDGs, covering nearly all areas of global governance, is at odds with international organizations that over time have become highly functionally differentiated and that operate through intra-organizational compromises. Most international organizations primarily see the SDGs as separate goals rather than an integrated agenda, leading to the cherry-picking of those goals that best fit their agenda.

Cost estimates

The United Nations estimates that for Africa, considering the continent's population growth, yearly funding of $1.3 trillion would be needed to achieve the Sustainable Development Goals in Africa. The International Monetary Fund (IMF) also estimates that $50 billion may be needed only to cover the expenses of climate adaptation. The IMF has also taken the initiative to achieve the SDGs by offering their support to developing countries.

Estimates for providing clean water and sanitation for the whole population of all continents have been as high as US$200 billion. The World Bank says that estimates need to be made country by country, and reevaluated frequently over time. In 2014, UNCTAD estimated the annual costs to achieving the UN Goals at US$2.5 trillion per year.[103] Another estimate from 2018 (by the Basel Institute of Commons and Economics, that conducts the World Social Capital Monitor) found that to reach all of the SDGs this would require between US$2.5 and $5.0 trillion per year.

A cost estimate from 2020 stated that: "In developing countries, the [financial] gap is estimated to be US$ 2.5 trillion per year pre-COVID-19 pandemic, which was projected to have risen to US$ 4.2 trillion in 2020 alone." For example in Indonesia, the SDG financing gap (or costs to achieve the SDGs), was estimated in 2021 to be US$4.7 trillion. The same study explains that the SDGs are also an investable proposition. This means that the SDGs are also a business opportunity. The financial value of this opportunity amounts to "US$ 12 trillion per annum in four sectors alone – food, cities, energy and materials and health and well-being – with developing countries accounting for more than half the value of SDG business opportunities".

Uneven priorities of goals

There is a risk of countries favouring (or cherry-picking) certain goals, thereby creating trade-offs and threatening policy coherence. As a result, some goals are "left behind" and hardly prioritized. For example, global and domestic inequality only barely made it into the final set of SDGs as SDG 10, and this goal is still poorly supported and often marginalized.

In 2020, researchers conducted a content analysis of the voluntary national reviews of 19 countries of varying income levels to find out which SDGs receive more attention than the others in national policies. They found that SDGs 1 and 8 (on poverty eradication and economic growth) are by far most widely prioritized. Some commentators argue that insufficient capacity of many countries to fully implement all SDGs makes prioritization inevitable or even necessary.

The practice of prioritizing certain SDGs by national governments is real and happening. Which SDGs are prioritized depends at least in part on the level of economic development of respective countries. The goals that are prioritized often correspond with what their existing priorities were before the SDGs came about. This implies the SDGs themselves do not directly steer national policies but rather the goals are used to legitimize existing priorities of national governments.

In 2019 five progress reports on the 17 SDGs were published. Three came from the United Nations Department of Economic and Social Affairs (UNDESA), one from the Bertelsmann Foundation and one from the European Union. A review of the five reports analysed which of the 17 Goals were addressed in priority and which ones were left behind. In explanation of the findings, the Basel Institute of Commons and Economics said Biodiversity, Peace and Social Inclusion were "left behind" by quoting the official SDGs motto "Leaving no one behind."

SDG preferences in the World's five major SDG reports in 2019

SDG Topic	Rank	Average Rank	Mentions
Health	1	3.2	1814

SDG preferences in the World's five major SDG reports in 2019

SDG Topic	Rank	Average Rank	Mentions
Energy Climate Water	2	4.0	1328 1328 1784
Education	3	4.6	1351
Poverty	4	6.2	1095
Food	5	7.6	693
Economic Growth	6	8.6	387
Technology	7	8.8	855
Inequality	8	9.2	296
Gender Equality	9	10.0	338
Hunger	10	10.6	670
Justice	11	10.8	328
Governance	12	11.6	232
Decent Work	13	12.2	277
Peace	14	12.4	282
Clean Energy	15	12.6	272
Life on Land	16	14.4	250

SDG preferences in the World's five major SDG reports in 2019

SDG Topic	Rank	Average Rank	Mentions
Life below Water	17	15.0	248
Social Inclusion	18	16.4	22

Monitoring progress

Voluntary national reviews

Countries can carry out voluntary national reviews (VNRs), thereby documenting their progress in achieving the SDGs and sharing their experiences with other interested parties. VNRs are loosely based on common guidelines that the UN published for VNRs which makes it relatively easy to compare them. For example, as part of these guidelines, countries are asked to include a separate chapter on Leave No One Behind in which they explain how the principle has been translated into concrete actions. Annual synthesis reports summarise the VNRs across a group of countries. For example, the ninth annual VNR Synthesis Report was published in 2024 and included notable experiences and trends from 36 countries.

Financing for Development

The Financing for Development process is orbited around supporting the follow-up to the agreements and commitments reached during the three major international conferences on Financing for Development: in Monterrey, Mexico in 2002; in Doha, Qatar in 2008; and in Addis Ababa, Ethiopia in 2015. The process also follows up on the financing for development-related aspects of the outcomes of major United Nations conferences and summits in the economic and social fields, including the 2030 Agenda and the Sustainable Development Goals (SDGs).

The Addis Agenda provides a new global framework for financing sustainable development, which supports implementation of the 2030 Agenda, including the SDGs. The Agenda aligns all domestic and international resource flows, policies and

international agreements with economic, social and environmental priorities. It incorporates all the SDG means of implementation targets into a comprehensive financing framework, and serves as a guide for further actions by governments, international organizations, the business sector, civil society, and philanthropists.

The specific action areas of the Addis Agenda are:

- Domestic public resources;
- Domestic and international private business and finance;
- International development cooperation;
- International trade as an engine for development;
- Debt and debt sustainability;
- Addressing systemic issues;
- Science, technology, innovation and capacity building.

Integrated approach to the FfD follow-up

The Addis Agenda established an annual ECOSOC Forum on Financing for Development (FfD Forum), an intergovernmental process with universal participation mandated to discuss the follow-up and review of the financing for development outcomes and the means of implementation of the 2030 Agenda. The intergovernmentally agreed conclusions and recommendations of the FfD Forum also feed into the High-level Political Forum on Sustainable Development (HLPF).

The Addis Agenda moreover called on the Secretary-General to convene an Inter-Agency Task Force on Financing for Development with a mandate to:

- Report annually on progress in implementing the Addis Agenda and other Financing for Development outcomes and the means of implementation of the 2030 Agenda on Sustainable Development, and
- Advise the intergovernmental follow-up process on progress, implementation gaps and recommendations for corrective action, while taking into consideration the national and regional dimensions. The Task Force's annual report is the major

substantive input to the ECOSOC Forum on Financing for Development follow-up and supports the deliberations of the HLPF.

Related Forums

Member States mandated the Financing for Sustainable Development Office (FSDO) to promote and support an integrated, cross-cutting and holistic approach to the Financing for Development follow-up. FSDO acts as the Secretariat for the biennial ECOSOC Development Cooperation Forum (DCF), a global multi-stakeholder forum for action-oriented reviews of trends, progress and emerging issues in international development cooperation. The Addis Agenda recognizes the DCF as the primary platform for discussion on the quality, impact and effectiveness of development cooperation. The deliberations of the DCF are taken into account in the HLPF.

FSDO also provides Secretariat support to the UN Committee of Experts on International Cooperation in Tax Matters (UN Tax Committee), and disseminates the guidelines issued by the Committee through a capacity development programme aimed at strengthening the capacity of developing countries to develop more efficient and effective tax systems, with the ultimate aim to increase the mobilization of resources for investment in sustainable development.

Financing the SDGs

To achieve the Sustainable Development Goals (SDGs) as outlined in the 2030 Agenda will require actors across public and private sectors to work together at scale. The challenge of financing the SDGs is not just about mobilizing more money - it is more systemic and much deeper than closing any financial gap. The challenge is fundamentally related to effective governance and demands the re-orientation of how public and private actors interact with each other in a system that achieves results in the three dimensions of sustainable development: economic, social and environmental.

Understanding the scale and types of investment needed to achieve the SDGs are a key foundation on which governments can build effective SDG financing strategies. UNDP collaborates with regional partners across on both the public and private sectors with the objective of strengthening the effective governance of

financing for the SDGs. Country-based UNDP offices, work with governments to tailor and package services to suit their settings – whether these be focused on eradicating poverty in all its forms and dimensions; accelerating structural transformations for sustainable development; or building resilience to crises and shocks.

Principles of Good Governance

In general, good governance is perceived as a normative principle of administrative law, which obliges the State to perform its functions in a manner that promotes the values of efficiency, no corruptibility, and responsiveness to civil society. It is therefore a principle that is largely associated with statecraft. While the government is not obliged to substantively deliver any public goods, it must ensure that the processes for the identification and delivery of such goods are concrete in terms of i) being responsive to public demands; ii) being transparent in the allocation of resources and; iii) being equitable in the distribution of goods. The principle of good governance has also been espoused in the context of the internal operations of private sector organizations. In this way, corporate decision-making strategies integrate the principle of good governance and ensure that shareholder interests (i.e. public limited companies) and employees are taken into account.

The legal meaning of the principle of good governance

The concept of good governance as developed by the World Bank is essentially a touchstone upon which the prevailing administrative structure of a given country can be measured. Consequently, it provides ample evidence of the robustness of the structural suitability of donors as efficient vehicles of multilateral aid investment to developing countries. Good governance is therefore chiefly envisaged as a set of procedural tools to guarantee the efficacious improvement of the donor identified subject. Politically, however, the principle of good governance has not been very well received. For instance, governments may be reluctant to be held accountable to donor agencies, and they may sometimes display widespread hostility against such agencies (or other bodies) that is construed to be interfering in their (sovereign) domestic affairs. The real or imagined fears have stemmed mainly from the fact that the term “good governance” has largely been identified with “liberalism” and “laissez-faire” policies common in most developed countries. Further, the usage of the term “good” derives

primarily from subjective interpretations especially in the context of large multicultural and diverse economies that characterize the developing world.

The characteristics of good governance

Good governance has 8 major characteristics. It is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law. It assures that corruption is minimized, the views of minorities are taken into account and that the voices of the most vulnerable in society are heard in decision-making. It is also responsive to the present and future needs of society.

1. Participation

Participation by both men and women is a key cornerstone of good governance. Participation could be either direct or through legitimate intermediate institutions or representatives. It is important to point out that representative democracy does not necessarily mean that the concerns of the most vulnerable in society would be taken into consideration in decision making. Participation needs to be informed and organized. This means freedom of association and expression on the one hand and an organized civil society on the other hand.

2. Rule of law

Good governance requires fair legal frameworks that are enforced impartially. It also requires full protection of human rights, particularly those of minorities. Impartial enforcement of laws requires an independent judiciary and an impartial and incorruptible police force.

3. Transparency

Transparency means that decisions taken and their enforcement are done in a manner that follows rules and regulations. It also means that information is freely available and directly accessible to those who will be affected by such decisions and their enforcement. It also means that enough information is provided and that it is provided in easily understandable forms and media.

4**. Responsiveness**

Good governance requires that institutions and processes try to serve all stakeholders within a reasonable timeframe.

5**. Consensus oriented**

There are several actors and as many view points in a given society. Good governance requires mediation of the different interests in society to reach a broad consensus in society on what is in the best interest of the whole community and how this can be achieved. It also requires a broad and long-term perspective on what is needed for sustainable human development and how to achieve the goals of such development. This can only result from an understanding of the historical, cultural and social contexts of a given society or community.

6**. Equity and inclusiveness**

A society's well-being depends on ensuring that all its members feel that they have a stake in it and do not feel excluded from the mainstream of society. This requires all groups, but particularly the most vulnerable, have opportunities to improve or maintain their well being.

7. Effectiveness and efficiency

Good governance means that processes and institutions produce results that meet the needs of society while making the best use of resources at their disposal. The concept of efficiency in the context of good governance also covers the sustainable use of natural resources and the protection of the environment.

8. Accountability

Accountability is a key requirement of good governance. Not only governmental institutions but also the private sector and civil society organizations must be accountable to the public and to their institutional stakeholders. Who is accountable to whom varies depending on whether decisions or actions taken are internal or external to an organization or institution. In general, an organization or an institution is accountable to those who will be affected by its decisions or actions. Accountability cannot be enforced without transparency and the rule of law.

Achievement of good governance

Good governance, to be effective and sustainable, must be anchored in a vigorous working democracy which respects the rule of law, a free press, energetic civil society organizations and effective and independent public bodies such as the Commission for Human Rights and Good Governance, Prevention of Corruption Bureau and the Fair Trade Commission. The Commission is important in ensuring the promotion and protection of human rights, but also in ensuring both transparency and accountability on the part of the government. Good governance requires transparency and efficiency also in different government agencies.

At the political level democratic practices, including transparency in policy making and administration, are important aspects of good governance. This is signified by a pluralistic political system that allows the existence of diversity in political and ideological opinions. No wonder that good governance is said to be more easily achieved and guaranteed in a multi-party system than in a mono-party system. It also means the holding of regular elections applying the principle of universal franchise. In order to qualify as democratic, elections must be free and fair.

Good governance deals with the nature and limits of state power. The doctrine of the separation of powers is therefore relevant in the establishment of whether or not a country has a political system that is responsive to good governance. The doctrine of the separation of powers is based on the acceptance that there are three main categories of government functions: legislative, executive, and judicial. Corresponding to these are the three main organs of government in a state – the Legislature, the Executive and the Judiciary. The doctrine insists that these three powers and functions of government in a free democracy must be kept separate and exercised by separate organs of the state. It should be clear that good governance is an ideal which is difficult to achieve in its totality. Very few countries and societies have come close to achieving good governance in its totality. However, to ensure sustainable human development, actions must be taken to work towards this ideal with the aim of making it a reality.

Is Sustainable Development Feasible and achievable

Although it is clear that growth within the current economic paradigm is environmentally unsustainable, it is less clear whether the adoption of sustainable

development can save our planet from environmental collapse. Countries are aggressively trying to stimulate their economies and create new jobs while at the same time, it is becoming increasingly obvious that we urgently need to address a range of far-reaching environmental problems.

In 2011 the International Resource Panel, hosted by the United Nations Environment Programme (UNEP), warned that by 2050, the human race could be devouring 140 billion tons of minerals, ores, fossil fuels and biomass per year – three times its current rate of consumption. The report demonstrated that most of this consumption comes from the developed world (up to 40 or more tons per person in some developed countries compared to an average of four tons per year for people in places like India).

Some believe that sustainable development could bring about meaningful change. Sustainable development focuses on reducing the amount of required resources through improved economic management, product design, and technology. Environmental sustainability emulates the biosphere and functions as part of the ecosystem. This means being efficient, adapting to local conditions and using sources of energy which are renewable. At its best, sustainability incorporates the concept of cradle-to-cradle design, which factors the entire life cycle. Sustainable development supports economic growth. The Brundtland Report argued that economic growth was necessary for poorer nations to meet their needs; they also used this argument to support economic growth in all nations.

Criticisms of sustainable development

For many people concerned about ecological degradation, growth is an environmental anathema and sustainable development does not make sense. This idea was elaborated by Michael Redclift in his 2005 paper “Sustainable Development (1987–2005): an Oxymoron Comes of Age.”

A 1993 paper by Herman E. Daly and Kenneth N. Townsend argue that it is impossible for the world economy to grow its way out of poverty and environmental degradation. According to these authors, the term “sustainable growth”, when applied to the economy, is a “bad oxymoron.” The term sustainable development makes sense

for the economy only if it is understood as development without growth. “To delude ourselves into believing that growth is still possible and desirable if only we label it “sustainable” or color it “green” will just delay the inevitable transition and make it more painful.” The authors advocate a policy for the U.S. and other industrialized countries that prevent growth by taxing resource extraction, especially energy, very heavily.

Environmental sustainability precludes fossil fuels

Sustainable economic growth is utterly impossible as long as oil, coal and natural gas provide nearly 88 per cent of the world’s energy needs. According to EIA (the US Energy Information Administration), total world consumption of marketed energy will increase by 49 percent between 2007 to 2035. The International Energy Agency predicted that Chinese energy demand would soar 75 per cent by 2035, accounting for more than a third of the growth in global consumption.

The most egregious source of energy is coal, in India, more than 50 per cent of commercial energy demand is met with coal and according to 2008 statistics, coal accounts for 71 per cent of China’s energy mix. The US is not much better with 23 per cent of its total energy demand being met with coal. Economic growth that includes fossil fuels precludes the possibility of a livable planet.

Incorporating the environment into the economic system

For development to be truly sustainable, it must balance human welfare with the welfare of the planet. Sustainable development can avoid environmental degradation by integrating the environment into the economic system. Environmental economists argue that environmental degradation is a function of the failure of the market system to put a value on the environment.

Cost-benefit analysis (CBA) and economic instruments offer a couple of ways in which environmental values could be incorporated into economic activities. Economic instruments include taxes and charges on polluters that aim to internalize environmental costs into the decisions of companies and individuals. This provides an incentive to curtail environmental degradation.There are a number of other ways the environment could be factored into our economic decision-making. Measuring environmental damage includes the value of earnings lost through health problems

associated with pollution. It also includes health care and the costs associated with decreased agricultural yields.

In such a system, valuing the environment must account for future generations of humans and other species. The cost of ecological destruction must be prohibitive and not limited to monetary costs. This translates to criminal sanctions including jail terms.

Possibility of technology to maintain Environment

Technology is an important adjunct of sustainable development. Improving technology makes growth and environmental sustainability compatible. According to the Council of Academies of Engineering and Technological Sciences, economic growth can be made compatible with environmental enhancement, but "technologies affecting all societal activities must reflect the goals of sustainable economic development."

Environmentalists point out that a high of living standard is unsustainable. They say: "Economic growth can be made compatible with environmental enhancement only if the emission of pollution is less than that which can be assimilated and transformed by the natural environment. In order for resources to be conserved, all articles must be manufactured so as to be fully recyclable. Further, they must be manufactured, transported, used, and recycled with energy from renewable sources only. "The apparent conflict between growth and environmental sustainability may be at least partially addressed by new technological developments. A good example comes from recent advances in science. "With the recent advent of molecular design techniques, the modernized form of this broadly applicable technological tool has the potential to change the face of the four fundamental needs of humanity–health care, food supply, energy, and materials. This can be done in a way that provides a path to environmentally sustainable development for all citizens of the planet."

Ecological economics and decoupling

While conventional economics is concerned largely with economic growth and the efficient allocation of resources, ecological economics has the explicit goal of sustainable scale (rather than continual growth), fair distribution and efficient

allocation. The World Business Council for Sustainable Development states that "business cannot succeed in societies that fail," and societies that do not reduce their resource intensity are doomed to fail.

Ecological economics must reach far beyond the understanding of conventional economics and focus on people and nature. In economic and environmental fields, the term decoupling is used to refer to the ability of an economy to grow without incurring corresponding increases in environmental pressure. An economy that is able to sustain GDP growth without having a negative impact on the environment is said to be decoupled. We now have a leadership competency model for sustainability. The expansion of sustainable business opportunities can contribute to job creation.

Innovative economics internalizing ecosystems

There is no single economic answer to the environmental crisis we face. The closest thing we have to a useful approach is cultivating pragmatic innovation. Going forward, our economies must constantly adapt to meet present and future needs. While some would like to do away with the concept of profit, this may not produce the results they seek. Peter Drucker said that "profit for a company is like oxygen for a person. If you don't have it, you're out of the game. But if you think your life is about breathing, you're really missing something."

From this standpoint, a business should aim to make a profit to ensure it is financially sustainable, but this should not be at the expense of the planet or the life forms that inhabit it. We cannot continue to treat ecosystems as economic externalities. Conservation of resources is best served by putting a price on natural systems so that they are not overused and degraded. Internalizing these externalities entails using market strategies like ecotaxes and incentives, tradeable permits for carbon, and the encouragement of payment for ecosystem services.

Europe 2020-A Sustainable Growth Strategy

Europe 2020 is the EU's sustainable development growth strategy. The EU wants to become a smart, sustainable and inclusive economy with high levels of employment, productivity and social cohesion. Concretely, the Union has set five ambitious objectives – on employment, innovation, education, social inclusion and

climate/energy – to be reached by 2020. This includes building a more competitive low-carbon economy that makes efficient, sustainable use of resources. It also involves protecting the environment, reducing emissions and preventing biodiversity loss. The EU intends to boost sustainable growth through resource-efficiency in Europe. Economic growth will be decoupled from resource and energy use by:

- reducing CO2 emissions
- promoting greater energy security.
- reducing the resource intensity of what we use and consume

ADB strategy 2020

ADB Strategy 2020 is Asia's sustainable development growth strategy. ADB's efforts in greening economic growth aim at promoting environmentally sustainable and inclusive growth while addressing climate change.ADB is committed to doing a better job of managing biodiversity and natural resources. They realize that large-scale ecosystems are central to the future well-being of Asia-Pacific. They will focus on national leadership, innovative partnerships and integrated approaches.

ADB's climate change program focuses on five region-wide priorities: (i) expanding the use of clean energy; (ii) encouraging sustainable transport and urban development; (iii) managing land use and forests for carbon sequestration; (iv) promoting climate-resilient development; and (v) strengthening related policies and institutions. A range of approaches are necessary, including regulations, market-based instruments, voluntary schemes, and information disclosure. Environmental impact assessment and social safeguards processes are also important. In total, it is estimated that it will cost 8 trillion dollars in infrastructure investment to get to where they need to be.

Recognizing that many of the region's critical ecosystems transcend political boundaries and that several pollution issues have a transboundary nature, governance arrangements at the regional and subregional level are also increasingly becoming a necessity. This agenda is generally consistent with the green economy and green growth concepts as discussed in the Rio+20 process.

The Rio+ 20 Conference on Sustainable Development

The Rio+ 20 Conference on Sustainable Development provides a strategic opportunity for the global community to take stock of the current status of the environment and its links with supporting inclusive economic growth and poverty reduction.

The UNCSD will need to develop a new agreed vision and a set of solutions and mechanisms that can support and finance inclusive and environmentally sustainable growth. It is also important to develop mechanisms using innovative approaches that leverage both public financial resources and the private sector. To achieve this goal, there will need to be incentives to help shift economies to a sustainable path. This may include removing harmful subsidies and providing tax breaks and other incentives.

Governments will need to work together in support of strengthening the environmentally advantageous technologies of developing nations. This includes incentives such as market-opening measures, intellectual-property protection, support for universities and other research institutions. Governments will also have to pursue arrangements for monitoring and assessing environmental conditions and their economic implications.

Sustainable Development is an Ethical and Social Issue

There are important ethical and political and social dimensions associated with sustainable development. Government incentives, market-based mechanisms and even punitive measures are not adequate in and of themselves. Incorporating environmental sustainability on a broad scale is also a matter of cultural and social change. Ultimately, it reflects a dramatically transformed value system which acknowledges the overarching value of the natural world. One need only look at the domestic unrest in so many European countries to realize that growth (or the lack thereof) is also a social issue. As William Rees has said: “economic growth is a major instrument of social policy. By sustaining hope for improvement, it relieves the pressure for policies aimed at more equitable distribution of wealth.”

We need to develop new ethics and new forms of social decision-making that integrate the environment. We also need incentives to stimulate technological

innovation. It is not certain that sustainable development will succeed, but it may be the best chance we have not only to save our economies but to save our planet from an environmental destruction.

Important Questions

1) What is sustainable development, and how does it differ from traditional economic development?
2) Trace the historical evolution of the concept of sustainable development, including key reports and milestones.
3) What are the core principles of sustainable development, and how are they interconnected?
4) What are the three pillars of sustainable development (economic, social, and environmental), and how do they relate to each other?
5) What is the Brundtland Report, and what was its contribution to the understanding of sustainable development?
6) Define and differentiate between weak and strong sustainability.
7) What are some key indicators used to measure sustainable development?
8) How does the concept of "carrying capacity" relate to sustainable development?
9) How can economic growth be reconciled with environmental sustainability?
10) What are the economic costs and benefits of environmental degradation?
11) What are some examples of market-based instruments for environmental protection (e.g., carbon taxes, cap-and-trade)?
12) How can we incorporate the value of natural capital into economic decision-making?
13) What are the economic implications of climate change, and what are the potential economic gains from mitigation and adaptation?
14) What is the role of green technologies and innovation in promoting sustainable development?
15) How can we promote sustainable consumption and production patterns?
16) What are the potential economic benefits of investing in renewable energy and energy efficiency?
17) How can we address poverty and inequality within the context of sustainable development?
18) What are the economic challenges and opportunities of transitioning to a circular economy?
19) What is the role of governments in promoting sustainable development?
20) How can international cooperation be strengthened to address global environmental challenges?

21) What is the role of civil society organizations and the private sector in promoting sustainable development?

22) How can we improve the effectiveness of environmental regulations and policies?

23) What are the challenges of implementing sustainable development goals (SDGs) at the national and local levels?

24) What is the role of environmental impact assessments (EIAs) and strategic environmental assessments (SEAs) in promoting sustainable development?

25) How can we ensure that sustainable development policies are inclusive and equitable?

26) What are some examples of successful sustainable development initiatives from around the world?

27) How can we address deforestation and promote sustainable forest management?

28) What are the economic implications of biodiversity loss, and how can we promote biodiversity conservation?

29) How can we promote sustainable agriculture and food systems?

30) What are the economic challenges and opportunities of sustainable tourism?

31) How can we address water scarcity and promote sustainable water management?

32) What are the economic implications of climate change for developing countries?

33) How can we promote sustainable urban development?

34) What is the role of green finance in promoting sustainable development?

35) How can we use technology to accelerate the transition to a sustainable economy?

36) What are the potential impacts of climate change on global inequality and migration?

37) What are the ethical considerations of sustainable development?

38) How can we create a more just and sustainable world for future generations?