

# SDG 2030

INSIGHTS FROM INDIA  
FOR A SUSTAINABLE FUTURE



EDITOR: DR. K K SOMASEKHARAN MA MPhil PH.D

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**Gaveshana R& D Cell**

## **SDG2030: Insights from India for a Sustainable Future**

First published in 2026 January

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Published by

Gaveshana R&D Cell

Navajyothi College

Cherupuzha 670 511, Kannur, Kerala, India.

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Cover Design: Vaishnav C K

ISBN: 978-81-964390-8-8

₹450.00

*For Private Circulation only*

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## INTRODUCTION

In 2015, 193 member countries of the United Nations (UN) adopted the 2030 Agenda for Sustainable Development, marking a historic global commitment to dignity, peace, and prosperity for both humanity and the planet. This landmark agenda outlines 17 Sustainable Development Goals (SDGs) with specific targets to be achieved by the year 2030. The agenda encompasses a wide range of action areas, including poverty eradication, sanitation, education, health, and economic development, while simultaneously addressing social equity and environmental sustainability. This edited volume is a modest attempt to offer meaningful insights toward building a sustainable future.

It gives me immense pleasure to present this edited book titled *SDG 2030: Insights from India for a Sustainable Future*. This volume is the outcome of a concerted academic effort to compile scholarly contributions that aim to enrich discourse and inspire action toward a sustainable and inclusive future.

The book consists of 14 chapters, each offering diverse perspectives and practical insights on sustainable development.

The first chapter, *How Informal India Hinders the Path to Meeting SDG 2030: An Exploratory Overview for Research*, emphasizes the critical role of social sector investment in development and encourages researchers to explore emerging and underexplored areas related to sustainability.

The second chapter elaborates on the transformative potential of Farmer Producer Organizations (FPOs) in reshaping the

agricultural landscape of rural India and emphasizes their role in promoting rural transformation and collective empowerment.

Chapter 3 analyses how digital technologies are transforming microfinance delivery and enhancing women's access to credit, while also exploring regional variations in adoption behaviour, financial management practices, and social norms that shape empowerment trajectories in Kerala and Tamil Nadu.

Chapter 4 illustrates how SDG 4 (Quality Education) can be achieved through the introduction of progressive educational policies such as the Four-Year Undergraduate Programme (FYUGP). This article offers a theoretical and critical examination of the key features and emerging concerns of the FYUGP in Arts and Science colleges in Kerala.

The fifth chapter explains the transition of women from economic dependence to financial independence through microfinance initiatives. The study proposes policy recommendations aimed at enhancing microfinance initiatives to secure wider and long-lasting benefits for women.

Chapter 6 examines the influence of green brand image, brand credibility, green packaging, eco- innovation, and consumer environmental awareness on green purchasing behaviour among working women professionals in Tamil Nadu. This study further analyses the confidence of women professionals in relation to their propensity to purchase green products.

In Chapter 7, the authors explore Chimamanda Ngozi Adichie's illuminating work *We Should All Be Feminists* as an influential text that resonates with the principles of SDG 5 (Gender Equality) and women's empowerment. The chapter

highlights how Adichie's text raises awareness of persistent gender inequalities and encourages a rethinking of social attitudes in ways that align with the broader goals of SDG 5.

Chapter 8 discusses various government-led initiatives such as the Atal Innovation Mission, Skill India Mission, and Startup India, and their alignment with NEP 2020 objectives to foster innovation, enhance skills, and promote youth employment in line with SDG 4 (Quality Education).

In Chapter 9, the authors examine the impact of government policies on agricultural sustainability, drawing evidence from rural households in Kannur District, Kerala, with a focus on SDG 1 (No Poverty) and SDG 2 (Zero Hunger).

Chapter 10 evaluates the effectiveness of government initiatives such as the Jal Jeevan Mission, Jal Shakti Abhiyan, and Atal Bhujal Yojana, with particular emphasis on Jal Jeevan Mission activities in rural Palakkad, in alignment with SDG 6 (Clean Water and Sanitation).

Chapter 11 analyses the socio-economic and sustainable development impacts of Self-Help Group (SHG) participation on rural women in Kerala, corresponding to SDG 1 (No Poverty), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth).

In Chapter 12, the authors highlight the role of Big Data Analytics in Public Health from the perspective of SDG 3 (Good Health and Well-being). This chapter also critically evaluates the ethical and regulatory guidelines associated with Big Data Analytics (BDA) in public health applications.

Chapter 13 examines how literary works not only offer aesthetic value but also provide critical commentary on real-world challenges related to sustainable development. The author reads the renowned novel, *The Hungry Tide* by Amitav Ghosh, in line with SDG 6 (Clean Water and Sanitation).

The final chapter explores the influence of microfinance on women's empowerment, with a special focus on Kudumbashree, Kerala's flagship programme for women's empowerment and poverty alleviation. The chapter also identifies the challenges faced by beneficiaries in achieving independence, self-confidence, and entrepreneurship, thereby underscoring the importance of SDG 5 (Gender Equality).

I would like to wholeheartedly acknowledge the contributors to this edited volume for their valuable scholarly contributions. I extend my sincere gratitude to the Management of Navajyothi College for their constant support and encouragement. I also congratulate the entire Gaveshana (R&D) Team for their dedicated efforts in bringing out this publication in a time-bound manner.

**Dr. K K Somasekharan M.A., M.Phil., PhD.**

## CHAPTER TWELVE

### **Big Data Analytics in Public Health Based on SDG 3 – Good Health and Well-being**

Aswathi Babu\*

Honey Johnson\*\*

#### **1. Introduction**

Public health has traditionally relied on systematic data collection and analysis to understand disease patterns, assess population health risks, and formulate effective intervention strategies. However, the rapid digitization of healthcare systems and the proliferation of connected technologies have resulted in an unprecedented increase in the volume, velocity, and variety of health-related data. Conventional analytical methods are no longer sufficient to process and interpret such complex datasets. In this context, Big Data Analytics (BDA) has emerged as a transformative approach capable of revolutionizing public health practice.

Big Data Analytics refers to the application of advanced computational and analytical techniques—including machine learning, artificial intelligence, data mining, and predictive modeling—to analyze large-scale and complex datasets. In public health, BDA enables the integration of diverse data sources such as Electronic Health Records (EHRs), laboratory databases, genomic information, wearable sensors, social media content, environmental monitoring systems, and mobile health applications. The ability to synthesize insights from these varied

sources provides a comprehensive understanding of population health dynamics.

One of the most significant contributions of BDA to public health is its capacity to support real-time disease surveillance and predictive analytics. By analyzing historical and real-time data streams, public health authorities can anticipate disease outbreaks, identify emerging health threats, and implement timely interventions. This capability proved invaluable during global health emergencies such as the Ebola outbreak and the COVID-19 pandemic, where data-driven decision-making played a crucial role in mitigating disease spread and saving lives.

Furthermore, Big Data Analytics facilitates a shift from reactive healthcare systems toward proactive and preventive public health models. Instead of responding only after disease occurrence, public health agencies can leverage predictive insights to identify high-risk populations, design targeted interventions, and allocate resources more efficiently. These capabilities align closely with the objectives of Sustainable Development Goal 3 (SDG 3): Good Health and Well-being, which emphasizes universal health coverage, disease prevention, and health equity.

This chapter explores the applications, challenges, and future prospects of Big Data Analytics in public health, emphasizing its role in achieving SDG 3. Through a comprehensive review of literature, case studies, and technical frameworks, the chapter highlights how BDA can support global efforts to improve population health outcomes.

## 2. Background and Related Work

### 2.1 Emergence of Big Data in Healthcare

The concept of big data in healthcare emerged alongside the digitization of medical records and the widespread adoption of health information systems. Early implementations focused primarily on Electronic Health Records (EHRs), which enabled structured and systematic collection of patient data. Over time, the scope of health data expanded to include information generated outside clinical environments, such as wearable devices, mobile health applications, and online platforms.

Technological advancements in cloud computing, distributed storage, and high-performance computing have facilitated the storage and processing of massive health datasets. Researchers and public health professionals increasingly recognized the potential of these datasets to reveal hidden patterns, predict disease trends, and inform evidence-based policy decisions. As a result, Big Data Analytics emerged as an interdisciplinary field integrating computer science, statistics, epidemiology, and public health.

### 2.2 Review of Literature

Numerous studies have demonstrated the effectiveness of Big Data Analytics in improving public health outcomes. Predictive models have been used to enhance disease surveillance, forecast outbreaks, and evaluate intervention strategies. Behavioral and mental health research has benefited from the analysis of social media data and digital footprints to identify early signs of psychological distress. Environmental health studies have leveraged sensor data and satellite imagery to assess the impact of

pollution and climate change on population health. Collectively, these studies highlight the growing importance of Big Data Analytics as a foundational tool for modern public health systems.

### **3. Objectives**

The key objectives are:

1. To examine the role of Big Data Analytics in improving population-level health outcomes
2. To explore major applications of BDA in public health systems
3. To identify challenges and limitations associated with public health big data implementation
4. To assess ethical, legal, and regulatory considerations in public health analytics
5. To analyze future opportunities for leveraging BDA in achieving SDG 3

### **4. Research Methodology**

This chapter adopts a qualitative research methodology based on secondary data analysis. Peer-reviewed journal articles, government reports, policy documents, and case studies related to Big Data Analytics in public health were reviewed and synthesized. Selected case studies were analyzed to illustrate real-world applications and practical implications of BDA in public health decision-making.

## **5. Applications of Big Data Analytics in Public Health**

### **5.1 Disease Prediction and Early Warning Systems**

Big Data Analytics enables early detection of disease outbreaks by integrating data from EHRs, environmental sensors, social media platforms, and weather systems. Predictive models identify patterns indicative of emerging health threats, allowing public health authorities to initiate preventive measures.

### **5.2 Social Media and Search Engine Analytics**

Social media and search engine data provide real-time insights into public health concerns. Analysis of symptom-related keywords and online discussions enables early identification of disease trends before official reporting mechanisms.

### **5.3 Chronic Disease Management and Prevention**

Big Data Analytics supports chronic disease management by identifying risk factors, monitoring patient behavior, and evaluating treatment effectiveness. These insights facilitate targeted prevention strategies and personalized care.

### **5.4 Epidemiological Surveillance and Population Health Monitoring**

Continuous analysis of national health databases, surveys, and insurance records enables real-time monitoring of disease prevalence and health risk factors across populations.

## **6. Case Studies**

Case Study 1: Predicting and Managing the Ebola Outbreak (2014)

A rapid response system proved essential to manage the Ebola outbreak in West Africa which became one of the most destructive public health disasters of recent times during 2014. The prediction of virus spread alongside resource allocation optimization benefited significantly from the implementation of Big Data Analytics. The analysis combined mobile phone data with social media information and health records to monitor population movements as well as identify disease patterns across different areas so experts could forecast possible risk areas. The outbreak received visual representation through Geographic Information Systems (GIS) that also helped identify risk factors.

Researchers applied predictive models that relied on Ebola virus outbreak records to generate forecasts about how the disease could progress in the future. Through these models health authorities gained real-time disease spread predictions that let them optimize their resource distribution to at-risk areas. Through the implementation of BDA institutions could control virus spread by funding precise intervention measures. Medical supply distribution benefits from BDA as the methodology enabled needed health care resources to medical facilities fighting the outbreak. Through predictive analytics public health authorities made informed decisions which alongside response strategies saved potentially thousands of lives.

### Case Study 2: The Role of Big Data in Managing the Covid-19 Pandemic (2020- Present)

People relied on Big Data Analytics as their crucial tool to manage the challenges posed by the worldwide COVID-19 pandemic. The modeling system built with BDA provided vital information for both decision-makers and healthcare resource

planners who needed to understand virus spread and produce optimized resource allocation. Real-time mobile phone tracking and social media platform and electronic health records and public health surveillance system data were combined through aggregation to track pandemic progression. The collected information showed how people moved during the crisis and located dangerous hotspots as well as predicting disease outbreaks.

The implementation of predictive models using machine learning algorithms developed computational estimations of COVID-19 spread patterns across different regional areas. These predictions enabled governmental agencies and health organizations to create lockdown policies and allocate vaccines and hospital management strategies.

### Case Study 3: The Use of Social Media Information by Google Flutrends Provides Real-Time Disease Surveillance on Public Health

Public health benefits greatly from Big Data Analytics through Google Flu Trends as this system uses search engine data to generate instant flu virus prediction information. The system monitored flu symptom related Google searches including "fever" and "cough" to generate predictions which anticipated flu activity before official health authority reporting. Google Flu Trends analyzed search patterns from millions of global users to create estimates regarding the flu outbreak levels across different regions.

The analysis of historical search trends through Google Flu Trends permitted predictions about how the flu would spread throughout different geographic regions. Health authorities received early warning to prepare healthcare service capacity as well as notifying the public about flu hotspot locations. The

discontinued Google Flu Trends operation in 2015 revealed the ability of unconventional data sources to monitor public health trends even though it did not achieve accurate predictions. The project created opportunities for future projects to use social media data alongside online activities for predicting infectious disease spread patterns.

## **7. Technical Framework for Big Data Analytics in Public Health**

This section outlines data acquisition, integration, preprocessing, distributed processing frameworks, machine learning models, visualization tools, cloud computing infrastructure, and privacy and security mechanisms required for effective implementation of BDA in public health.

## **8. Challenges and Limitations**

Major challenges include data quality issues, privacy and security concerns, interoperability barriers, infrastructural constraints, and ethical considerations. Addressing these challenges is critical for sustainable and equitable public health analytics.

## **9. Future Directions and Opportunities**

Emerging trends such as AI-driven predictive healthcare, real-time surveillance, precision public health, collaborative data-sharing ecosystems, and advanced visualization tools are expected to further strengthen the role of Big Data Analytics in achieving SDG 3.

## 10. Conclusion

Big Data Analytics represents a paradigm shift in public health, enabling proactive, data-driven, and equitable healthcare systems. While challenges remain, responsible and ethical implementation of BDA has the potential to significantly improve global health outcomes and support the achievement of Sustainable Development Goal 3.

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# SDG 2030: INSIGHTS FROM INDIA FOR A SUSTAINABLE FUTURE

As the world races toward the United Nations' 2030 deadline, India stands at a critical crossroads in the journey toward dignity, peace, and prosperity. *SDG 2030: Insights from India for a Sustainable Future* provides a powerful examination of the nation's pursuit of the 17 Sustainable Development Goals. Bridging the gap between academic research and practical action, this book is an essential guide for anyone looking to understand or contribute to an inclusive and sustainable tomorrow.

Dr. K. K. Somasekharan, the Principal of Navajyothi College, Cherupuzha, brings over 30 years of distinguished academic and administrative experience to this volume. Throughout his prolific career, he has served numerous prestigious higher education institutions across Kerala, contributing significantly to the state's academic landscape.

A scholar at heart, Dr. Somasekharan holds a PhD in Economics. His extensive research background is reflected in his numerous publications across reputed journals and books, focusing on socio-economic development. This volume, *SDG 2030: Insights from India for a Sustainable Future*, represents his continued commitment to fostering academic discourse and inspiring collective action toward a more inclusive and sustainable world.



Gaveshana R&D Cell Publications, Navajyothi College  
Cherupuzha, Kannur [www.njc.ac.in](http://www.njc.ac.in) ISBN: 978-81-964390-8-8

