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# JAMMU AND KASHMIR: CHANGING DYNAMICS



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**SURENDER SINGH**

# Indian Writing in English

Contemporary Trends and Concerns

Alka Sharma  
Satinder K. Verma



## Gandhi's Theory of Nation in Amitav Ghosh's *The Shadow Lines*

Vikram Singh  
Ritu

### Abstract

The present paper is an attempt to trace Mahatma Gandhi's theory of nation in Amitav Ghosh's well-known novel *The Shadow Lines*. Today, the world looks to be in *anari* hands. The clouds of Third world war are not gone yet. Everyone is performative nationalism. In such a tense atmosphere, it is imperative to look back at Mahatma Gandhi as a theorist, who has his original and genuine views about nation and nationalism. He never favours that the citizens' loyalty be judged by their stance over performative nationalism. Today's world, in fact, resembles the background when Gandhi put his critique of the aggressive version of nation and nationalism, which gained popularity in early 20<sup>th</sup> century. Recently USA and the countries of European Union have come ahead to destroy Ukraine indirectly, and Russia is destructing it with direct attacks. In this frenzied ambience, it is an appropriate context to go back and look at some of Gandhi's ideas and ideals as the situation of all such conflict lies in his ideas.

John Huizinga, a Dutch cultural historian, argues in his book *Men and Ideas* (1984) that the notion of nationalism, becomes a potent force to dominate by the later 19<sup>th</sup> and early 20<sup>th</sup> century. At the time, an urge to have one's own nation, one's own state and to assert itself at others' cost. This kind of aggression on in the name of nationalism was noticed in Indian also at that time. This aggressiveness of the notion of nationalism created furor among the contemporaneous intellectuals across the globe. In India, it has

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# Indian Writing in English

Contemporary Trends and Concerns

Alka Sharma  
Satinder K. Verma



## Preserving Native Cultural Identity in a Multicultural Society: An Evaluation of Jhumpa Lahiri's *The Namesake*

Vineet Kumar  
Upasana Singh

### Abstract

In the journey from womb to tomb, every human individual passes through different stages and attains various identities during this journey e.g. national identity, religious identity, institutional identity, cultural identity and so on. Some of them are labelled from the birth of a child for example – religious identity, cultural identity and national identity and some are obtained through association with the institutions like – schools, colleges, work places etc. Cultural identity is one of the identities a person gain from his/her birth. Like his parents' genes, this identity is also attached with him/her. Cultural identity is the sum of his parents' religion, nationality, language and other factors that help in building cultural identity of a person. When people migrate from one cultural or geographical location to another these identities travel with them and make it difficult for them to negotiate with other cultures. Because, what one culture prohibits, other cultures encourage. The present epoch is the epoch of globalization and almost every country of the world has become a multicultural space especially during and after colonization. The United States of America is a multicultural country that witnesses immigrants across the globe in form of IT professionals, refugees, war victims, illegal immigrants etc. Jhumpa Lahiri (b. 1967) is an American novelist, short-story writer, and essayist. She writes about Indians residing in the USA. Her writings

Indian Writing in English: Contemporary Trends and Concerns : 207

# Cutting-edge Research in Agricultural Sciences Vol. 8



B P International

# **Contemporary Environmental Challenges in India**

Dr.Vijai Krishna

© Author

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## Precise Nutrient Management in Agroecosystems and Associated Environmental Challenges

Ajay Kumar Mishra<sup>1\*</sup>, Roohi<sup>2</sup>, Sarita Mishra<sup>3</sup>, Dipti Grover<sup>4</sup> and  
Jyotiprakash Mishra<sup>5</sup>

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**Plant nutrition:** Plants use inorganic minerals for nutrition. Complex interactions involving weathering of rock minerals, decaying organic matter, animals, and microbes take place to form inorganic minerals in soil. Roots absorb mineral nutrients as ions in soil water. Many factors influence nutrient uptake for plants. Ions can be readily available to roots or could be “tied up” by other elements or the soil itself. Soil too high in pH (alkaline) or too low (acid) makes minerals unavailable to plants.

**Fertility or nutrition:** The term “fertility” refers to the inherent capacity of a soil to supply nutrients to plants in adequate amounts and in suitable proportions. The term “nutrition” refers to the interrelated steps by which a living organism assimilates food and uses it for growth and replacement of tissue. Previously, plant growth was thought of in terms of soil fertility or how much fertilizer should be added to increase soil levels of mineral elements. Most fertilizers were formulated to account for deficiencies of mineral elements in the soil. The use of soilless mixes and increased research in nutrient cultures and hydroponics as well as advances in plant tissue analysis have led to a broader understanding of plant nutrition. Plant nutrition

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# Common Birds of Chhilchhila Wildlife Sanctuary Haryana (India)



**Dr. Deepak Rai  
Piyush Goyal  
Gaurav Kumar  
Vanita**



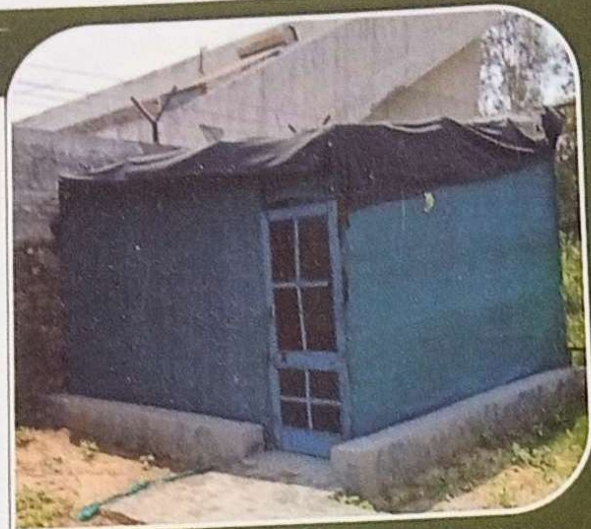
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कृषि के लिए उपयोगी पुस्तिका

# कंचुआ

प्रकृति का करिश्मा

डॉ. पूनम भारद्वाज



WILEY

Edited by Majeti Narasimha Vara Prasad

# Handbook of Ecological and Ecosystem Engineering



## 19

## Restoring Ecosystem Services of Degraded Forests in a Changing Climate

*Smita Chaudhry<sup>1</sup>, Gagan Preet Singh Sidhu<sup>2</sup>, and Rashmi Paliwal<sup>1</sup>*

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### 19.1 Introduction

Forests play a vital role in providing ecosystem services and help sustain humanity's well-being [1]. They are the most diverse ecosystems on earth and a storehouse of living carbon [2]. Forests are gaining attention due to their social, cultural, ecological, and economic advantages [3]. Nearly 30% of the world's land area is under forest cover that nurtures rich terrestrial flora and fauna [4]. According to the Food and Agricultural Organization (FAO)[3], approximately one-third of the earth's surface is covered by forests. Estimates of the "State of Forest Report 2017" published by the Forest Survey of India are that the country's total forest cover is 70.8 million hectares, 21.54% of the country's geographic area. Tree cover outside recorded forests is 9.38 million ha [5]. According to Kishwan et al. [6], approximately 173,000 villages in India are categorized as forest villages, indicating the dependence of communities and populations on forests.

Forests are a significant component of terrestrial ecosystems and provide food, fuel, fodder, fiber, medicines, and pulpwood, in addition to supporting commercial activities that support the livelihoods and employment of millions of people [7]. They also help sustain the ecological balance that is crucial for maintaining the overall growth of humankind. Critical functions of forests include primary ecosystem services such as climate regulation, water supply, air quality, soil enrichment, biomass production, and support for various natural resources [8, 9]. Direct and indirect benefits of ecosystem services provided by forests play a major role in determining their function in supporting rural livelihood [2].

However, in recent years, forests worldwide have shown significant deterioration [10] and transformation [11] due to society's enhanced demands for their goods and services. Human activities such as industrialization and urbanization, influence by different demographic and technological factors, have resulted in the degradation of forests [12]. Natural disturbances such as wildfires, high winds and storms, overgrazing, the spread of invasive alien species, and insect outbreaks can abruptly alter the dynamics and succession patterns in forests [13, 14]. Anthropogenic activities lead to forest loss, fragmentation, and degradation, which cause biodiversity loss and homogenization [15]. Increasing urbanization, forest fires, and conversion of



Anubha Kaushik  
C. P. Kaushik  
S. D. Attri *Editors*

# Climate Resilience and Environmental Sustainability Approaches

Global Lessons and Local Challenges





# Sustainable Solid Waste Management in India: Practices, Challenges and the Way Forward

# 17

Hardeep Rai Sharma, Balram Bhardwaj, Bindu Sharma, and  
C. P. Kaushik

## Abstract

Increasing population, volume, and complex nature of generated solid waste, improper implementation of existing rules, failure of waste disposal techniques, limitation of funds and infrastructure are the common causes of unsustainable solid waste management in many countries of the world including India. Further, traditional beliefs and approaches such as “out of sight, out of mind,” “not in my backyard (NIMBY)” and “flame, flush or fling” even towards the generated solid waste results in an unsustainable society which hinders sustainability. According to the World Bank forecast, annual global waste generation is expected to increase to 3.40 billion tonnes in 2050 (considering 2016 as a reference year). As per Waste Atlas 2017, India is the third-largest generator (volume basis) of municipal solid waste and will play an important role in addressing this global issue. A management system from generation up to final disposal of wastes in an environment friendly, economically affordable, and socially acceptable way is termed “Sustainable.” According to the Indian Planning Commission report of 2014, if effectively managed, the unused MSW will generate about 439 MW of

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Sustainable Agriculture Reviews 50

Vipin Kumar Singh  
Rishikesh Singh  
Eric Lichtfouse *Editors*

# Sustainable Agriculture Reviews 50

Emerging Contaminants in Agriculture

# Chapter 14

## Non-Judicious Use of Pesticides Indicating Potential Threat to Sustainable Agriculture



Ajay Kumar Mishra, Rahul Arya, Rakhi Tyagi, Dipti Grover,  
Jyotiprakash Mishra, Shobhit Raj Vimal, Sarita Mishra, and Sheetal Sharma

**Abstract** Worldwide, pesticides have proved to be a boon for the farmers by increasing agricultural yield and providing innumerable benefits to society directly and indirectly. For instance, India witnessed the green revolution during the 1960s that redefined the low input to high input more intense agriculture system that contributed to transforming Indian agriculture from food-deficit to food-surplus nation. Nevertheless, the issue of hazards posed by pesticides to human health and the environment cannot be ignored. Non-judicious overuse of pesticides is acting as the source of emerging contaminants in agro-ecosystems. It has been linked to a wide range of human health hazards, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive disorders, and endocrine disruption. Moreover, contamination of air, water and soil that end up adversely affecting the survival of other organisms such as non-targeted plants, birds, and aquatic flora and fauna has also been reported.

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## Applied Water Science: Remediation Technologies, Volume 2

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### About this book

#### **APPLIED WATER SCIENCE VOLUME 2**

The second volume in a new two-volume set on applied water science, this book provides understanding, occurrence, identification, toxic effects and control of water pollutants in an aquatic environment using green chemistry protocols. The high rate of industrialization around the world has led to an increase in the rate of anthropogenic activities which involve the release of different types of contaminants into the aquatic environment. This generates high environmental risks, which could affect health and socio-economic activities if not treated properly. There is no doubt that the rapid progress in improving water quality and management has been motivated by the latest developments in green chemistry. Over the past decade, sources of water pollutants and the conventional methods used for the treatment of industrial wastewater treatment have flourished.

Water quality and its adequate availability have been a matter of concern worldwide particularly in developing countries. According to a World Health Organization (WHO) report, more than 80% of diseases are due to the consumption of contaminated water. Heavy metals are highly toxic and are a potential threat to water, soil, and air. Their consumption in higher concentrations gives hazardous outcomes. Water quality is usually measured in terms of chemical, physical, biological, and radiological standards. The discharge of effluent by industries contains heavy metals, hazardous chemicals, and a high amount of organic and inorganic impurities that can contaminate the water environment, and hence, human health. Therefore, it is our primary responsibility to maintain the water quality in our respective countries.

This book provides understanding, occurrence, identification, toxic effects and control of water pollutants in an aquatic environment using green chemistry protocols. It focuses on water remediation properties and processes including industry-scale water remediation technologies. This book covers recent literature on remediation technologies in preventing water contamination and its treatment. Chapters in this book discuss remediation of emerging pollutants using nanomaterials, polymers, advanced oxidation processes, membranes, and microalgae bioremediation, etc. It also includes photochemical, electrochemical, piezoacoustic, and ultrasound techniques. It is a unique reference guide for graduate students, faculties, researchers and industrialists working in the area of water science, environmental science, analytical chemistry, and chemical engineering.

This outstanding new volume:



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# Bioethanol Production Technologies: Commercial and Future Perspectives

# 7

Meenakshi Suhag 

## Abstract

The demand of energy is continuously increasing, which is also increasing the demand of conventional fuel. The major demand of any country till date is fulfilled by conventional fossil fuels, however, the use of renewable energy, waste to energy and other non-conventional energy technologies are in progress. The conventional source of liquid fuels is limited to few countries and sources are getting exhausted in near future, so the alternate source of liquid fuel is current need of research. One such fuel is ethanol which is gaining importance nowadays due to its wide range of substrate and production methods. Ethanol is one of the most acknowledged engine fuels capable of partially substituting gasoline for the purpose of making gasoline-ethanol mixture in different ratios. Bioethanol production is one of the renewable methods of producing ethanol from different biological substrates and various routes. Bioethanol can be produced from various substrates such as sugar cane, wheat, corn, etc. Various countries are producing bioethanol from different routes and substrates. This chapter deals with all such possible technologies available for bioethanol production through different routes. The chapter also provides knowledge about the consequences and benefits of all generations of bioethanol.

## Keywords

Bioethanol · First generation fuel bioethanol · Second generation bioethanol · Third generation bioethanol · Lignocellulose biomass · Organic waste

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Research Article

# Saccharification and fermentation of pretreated banana leaf waste for ethanol production



Meenakshi Suhag<sup>1</sup> · Anil Kumar<sup>2</sup> · Joginder Singh<sup>3</sup>

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## Abstract

The present work reveals the potential applicability of banana leaf waste as feedstock for bioethanol production as very less work has been reported on this feedstock. For achieving the same, the performance of crude cellulases of *Aspergillus niger* JD-11 is explored for saccharification of untreated and pretreated (alkaline, dilute acid and steam) banana leaf waste. Therefore, to determine the best saccharifying conditions, the effects of various parameters such as enzyme loading (5–15 FPU/g), temperature (40–50 °C), surfactant addition (0.05–0.15% Tween 80 and PEG 6000) and substrate concentrations (2–6%) were studied at 150 rpm and pH 5.0. The crude cellulases yielded maximum reducing sugars (524.83 mg/g) from the dilute acid pretreated banana leaf waste at 45 °C, 15 FPU/g enzyme loading and 2% substrate loading in the presence of 0.15% PEG 6000 (w/v) as surfactant. The fermentation of enzymatic hydrolysate was carried out using initial reducing sugars concentration of 40 g/L in the medium at pH 5.5, 150 rpm and 30 °C for 30 h with the help of *Saccharomyces cerevisiae*. Ethanol production was estimated at every 6 h and maximum ethanol yield of 0.38 g/g sugar and productivity of 1.28 g/L/h was obtained after 12 h of fermentation of banana leaf waste hydrolysate. Thus, the easily obtained banana leaf waste could be a promising feedstock for bioethanol production.

**Keywords** Pretreatment · Saccharification · Cellulases · Banana leaf waste · Reducing sugars · Surfactants (PEG 6000 and Tween 80) · Fermentation · Ethanol

## Abbreviations

LB	Lignocellulosic biomass
w/v	Weight/volume
SSF	Solid state fermentation
MS	Mandels and Sternberg's media
rpm	Rotations per minute
mL	Millilitre
FPU	Filter paper activity units
DNSA	Dinitrosalicylic acid
FPase	Filter paperase
RS	Reducing sugars
PEG	Polyethylene glycol 6000
YPD	Yeast peptone dextrose
v/v	Volume/volume

## 1 Introduction

To achieve sustainable development as well as to combat the challenges of first generation biofuels, there is huge concern concurrently about the utilization of lignocellulosic materials/wastes which are abundant, easily available and relatively cheaper. Moreover, the bioconversion of these second-generation wastes, generated from many agricultural and forestry activities, to energy can not only promote self-sufficiency but also breed a new industry of jobs and hence economic growth leading to the upliftment of entire society [5, 52, 59]. Worldwide bioethanol articulated itself as most demanding engine fuel because it acts as octane enhancer for cleaner combustion in

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## UNIT 5 FUNDAMENTALS OF RISK AND VULNERABILITY

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### Structure

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### 1.0 INTRODUCTION

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Globally, natural disasters are ballooning in recent years and expected to speed up, placing more people/communities/nations at risk. Between 1998 and 2017, because of climate-related and geophysical disasters, 1.3 million people died whereas an additional 4.4 billion were injured and many displaced (Wallemacq, 2018; Sun et al., 2020). Increasing population growth, urbanization and climate change are the major culprits which multiplied the frequency, adverse impacts and human losses because of natural disasters. Disasters are the convergence of hazards and vulnerable situations, poses challenges for social, economical, environmental, infrastructure, technological development and educational progress. For better understanding and addressing natural hazards or risk issues, important aspects such as disaster risk evaluation and social vulnerability are needs to be considered. Improved consideration of these factors helps the scientists in systematic research and policy makers for decision making and for the development of progressive strategies to cope up more firmly with these disasters.

## Impact of Organisational Commitment on Employee Productivity During Covid-19: Evidence from Afghanistan And India

Mohammad Qais Rezvani<sup>a</sup>, Nirmala Chaudhary<sup>b</sup>, Ragif Huseynov<sup>c</sup>, Maohua Li<sup>d</sup>,  
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### ABSTRACT

The paper examines the impact of COVID-19 on competitiveness and how organizational commitment and productivity have changed as a result of changes in processes, practices, or regulations. This paper analyses how employees fared during COVID in two countries, namely Afghanistan and India and the impact on organizational commitment and productivity. The research paper is based on secondary data and conceptual analysis of COVID-19 conditions or how this covetous environment affects their competitors, work environment, or fight for their rights. Moreover, the authors delved into how human capital management lead to organizational efficiency. Factors like (1) workplace safety, (2) targeted recruitment, (3) self-managed decision-making teams and decentralization, and (4) pay policy were all investigated. Employee engagement is widely assumed to influence organizational commitment, employee productivity, employee dedication, and, most importantly, it will generate comparative advantages for organizations. The primary goal of this research was to discover how people work efficiently and effectively with commitment and dedication during COVID-19.

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### ARTICLE INFO

**Keywords:** Employee productivity, organizational commitment, Covid-19, Afghanistan, India.

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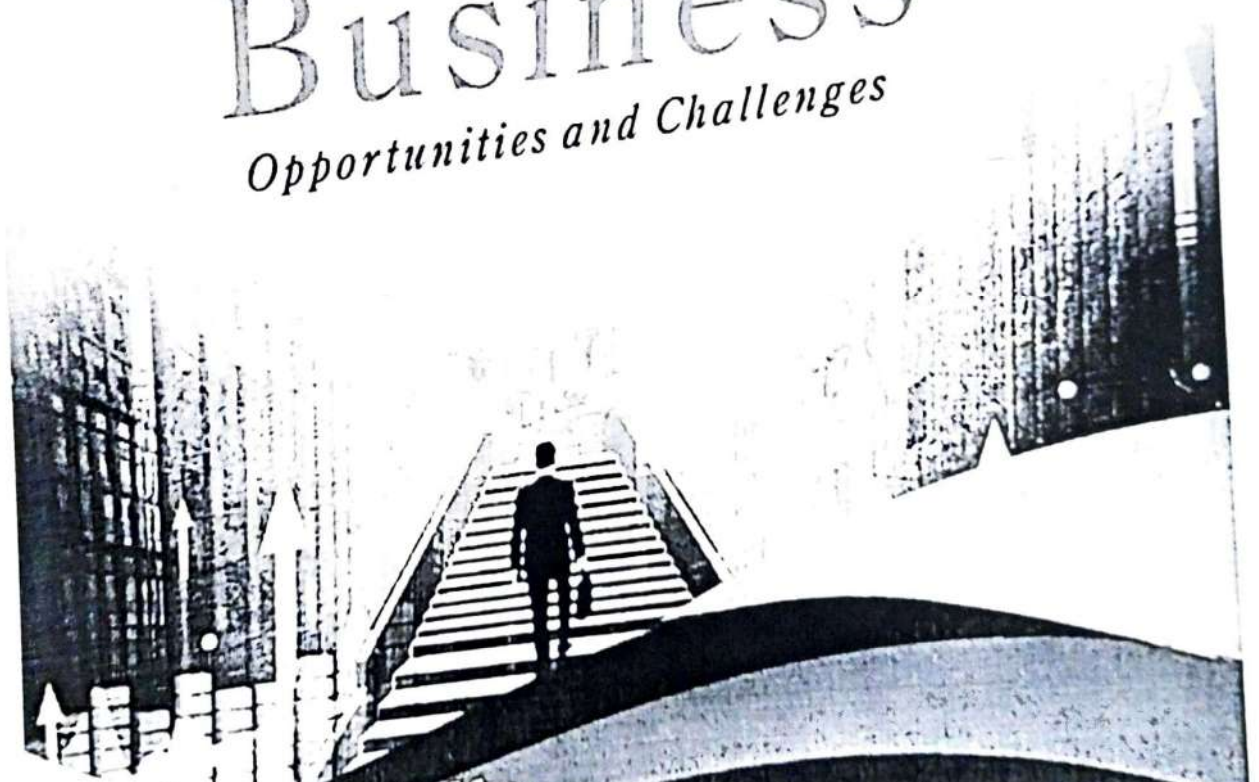
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# Exploring New Frontiers of the Business

*Opportunities and Challenges*



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## Organisational Culture, Organisational Commitment and Job Satisfaction: Empirical Evidence from Print Media industry

Dr. Ajay Solkhe & Shivangi Singh

### Abstract

Organisational culture refers to shared assumptions, beliefs, values and norms governing the work environment. It builds the sense of belongingness and identity among the members of an organisation. A strong organisational culture tends to create the loyalty and commitment thereby increasing the satisfaction level of employees towards organisation. The present study examined the effect of organisational culture on commitment and job satisfaction of employees working at old and established media house located in North India. A total of 150 respondents were selected through convenience sampling method. The cross tabulation and multiple regression analysis were employed to examine the relationship among them. The data has been collected through questionnaire method using five-point Likert scale. The reliability of instruments of organisational culture, organisational commitment and job satisfaction was well above the threshold limits which further indicates high degree of consistency. The study found out that the employees were satisfied with their job having high degree of commitment and loyalty towards the organisation. Therefore, there is a significant positive relationship between the organisational culture and organisational commitment. Similarly, it has been also been found that there exists a significant relationship between organisational culture and job satisfaction. On the basis of research findings and observations developed, it is suggested to the firms understudy to introduce the flexi-hour policies, recreational activities and wider access to promotional opportunities in order to increase the satisfaction and commitment level of employees towards organisation.

**Keywords:** Job Satisfaction, Loyalty, Organisational Culture, Organisational Commitment.

### Introduction- Conceptual Foundations

Culture refers to assumptions, beliefs, values and norms prevailing in the environment as it describes the behaviour pattern of people working therein. Culture can be learnt by the people working in their respective organisations. It influences the attitude and behaviour of employees and creates a influential work environment surrounding them. The term culture when combined

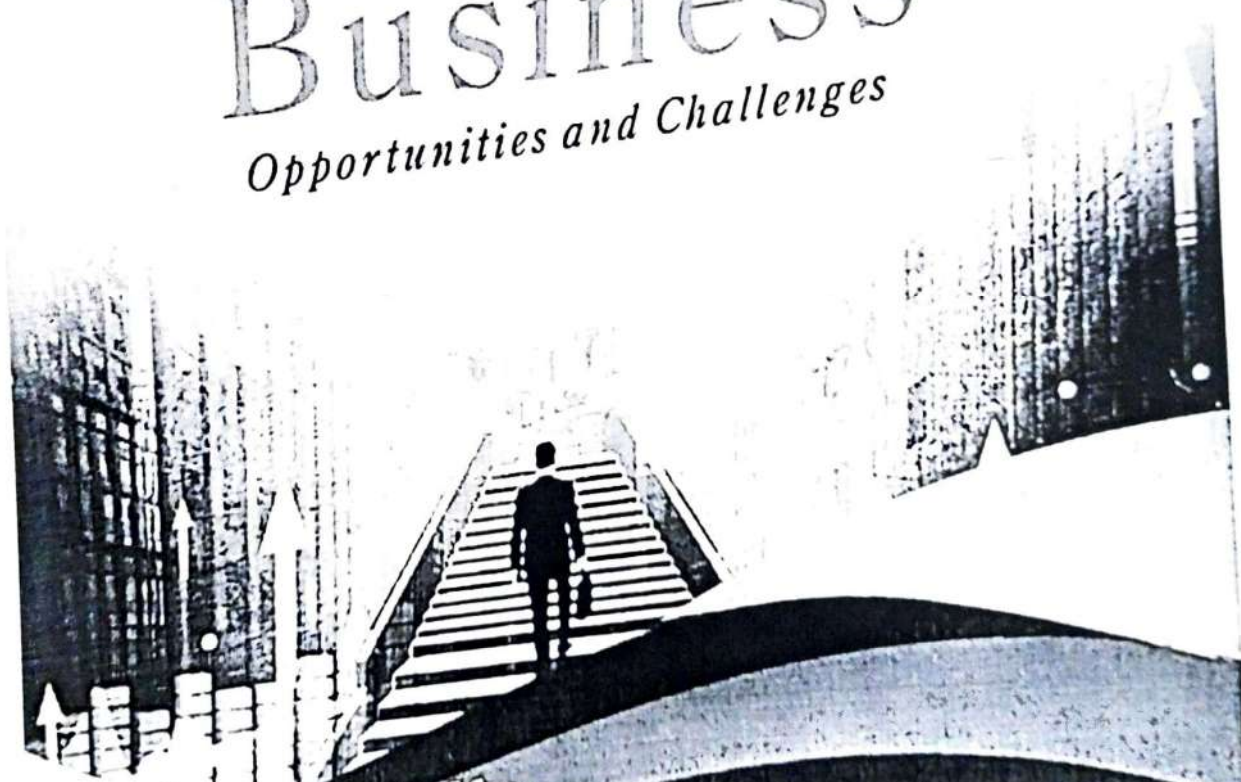
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# Exploring New Frontiers of the Business

*Opportunities and Challenges*



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## HUMAN RESOURCE DEVELOPMENT PRACTICES AND ITS IMPACT ON ORGANISATIONAL PERFORMANCE: EVIDENCE FROM INDIAN BANKING INDUSTRY

Dr. Ajay Solkhe<sup>1</sup>  
Dr. Priyanka Saini<sup>2</sup>

### ABSTRACT

*This research study set out to investigate the Holy Grail of establishing a causal link between HR and Organisational Performance. Researchers have built ample evidence that link HR practices with organisational performance over a period of time. Despite this outpouring of empirical researches, the HRD-OP paradigm is still unexposed by researchers leaving a few exceptions by Katou, (2008), Hassan (2007), Hassan et.al (2006) moreover such researches have largely conducted in the context of developed economies where HR practices have some amount of stagnancy, very few researches have attempted to explore this HR-OP link also known by different metaphors' such as "Black Box", "Russian Doll" and "Rubik Cube" from the perspective of HRD Mechanisms and that too in the context of emerging as well as developing economies like India. Banking Industry has witnessed a great deal of transformations since last two decades. Banking in our country is no longer the same as it used to be a couple of years ago, nor is it expected to remain the same a couple of years after. There are a lot of transformative efforts to bring the banking industry its lost sheen. Today industry is having 27 public sector banks, 22 private sector banks, 44 foreign banks, 56 regional rural banks, 1,589 urban cooperative banks and 93,550 rural cooperative banks. The present study is an empirical study. The researcher has made use of both field and documentary data to arrive at necessary conclusions. The present study is confined to Indian Banking Industry with special reference to Public and Private Sector Banks. A total of 400 managers representing senior, middle and junior management cadre working in the branches of NCR Region has been surveyed. This study reveals that the HRD Practices has positive impact on Organisational Performance. The study adds up to the less evidences exist at present in context of emerging economies like India that too in context of industry which is witnessing greater transformations in contemporary time. Not all banking organisations representing all banking formats have been included. Sample size could be increased to derive more relevant generalisations.*

Key words: IIRD, Job Satisfaction, Organisational Performance

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# HAZARDOUS GASES

RISK ASSESSMENT  
ON THE ENVIRONMENT  
AND HUMAN HEALTH

Edited by  
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The background of the book cover features a dark blue, starry space-like texture. In the upper left, there is a large, detailed model of a carbon nanosphere (C60 fullerene). To its right, a smaller 3D unit cell of a crystal lattice is shown. The lower half of the cover is dominated by a complex, multi-layered structure of interconnected spheres and lines, representing a functionalized nanomaterial or a catalytic surface. Various colored spheres (red, green, blue, purple) are scattered throughout, representing different atoms or functional groups.

# Functionalized Nanomaterials *for* Catalytic Application

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# Functionalized Nanomaterials for Catalytic Application: Trends and Developments

Meena Kumari<sup>1\*</sup>, Badri Parshad<sup>2</sup>, Jaibir Singh Yadav<sup>3</sup> and Suresh Kumar<sup>4†</sup>

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## **Abstract**

Catalysis by functionalized nanomaterials is the contemporary discipline of nanoscience which is expanding exceptionally to meet the upcoming global demands of mankind. Nanocatalysts, being lying at the frontier of homogeneous and heterogeneous catalysts, offer multiple benefits of atom economy, remarkable stability, enhanced activity, better selectivity, recoverability, reusability, and energy efficiency, thereby allowing optimum feedstock utilization and minimal chemical waste. However, with time, it was diagnosed that some of these very active nanocatalysts suffer with the limitation of stability causing them to agglomerate during catalysis, which was later resolved to a great extent by modifying their surface composition via functionalization. The functionalization of these nanocatalysts with various biocompatible and active species serving as weak ligands not only enhances their stability and selectivity but also facilitates their easy separation along with preventing their undue coagulation during catalysis. Besides these, the functionalization of nanomaterials also has considerable effect reflected in their structure, morphology, optical, electrical, magnetic, and other properties owing to the novel theory of quantum effects, enabling a control of their catalytic activity.

This Chapter will cover nanocatalysis, factors affecting catalytic performance, different functionalization strategies and application of these functionalized nanocatalysts in various fields.

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Advances in 21st Century Human Settlements

Mahabir S. Jaglan  
Rajeshwari *Editors*

# Reflections on 21st Century Human Habitats in India

Felicitations Volume in Honour  
of Professor M. H. Qureshi

 Springer

# Introduction: Environmental and Socio-economic Dimensions of Human Habitats in India



Mahabir S. Jaglan and Rajeshwari

**Abstract** The human habitats are nested in natural environment and the resources needed to build and sustain them come from the ecosystems they are set in. Development and management of the natural resources play an important role in their availability and accessibility to poor and disadvantaged sections of the society. The human dwellings and their environment in India have undergone fast transformation during last few decades in terms of their ecological settings, human–environment interaction, processes, and pattern of socio-economic development. The fast-expanding urban spaces and industrialisation since initiation of economic re-structuring in 1990s have transformed both rural and urban landscape beyond recognition. The agglomeration certainly provides increased economic impetus but poses significant social and environmental challenges too. The places of habitation in India are already struggling with poverty, slum, informality, pollution, and resource degradation. The present chapter discusses the issues pertaining to (1) changing livelihood–environment relationship; (2) economic growth and patterns of spatial disparities during post-reform period; and (3) emerging socio-spatial inequalities. Lastly, the chapter provides a brief account of the chapters organised under the sections namely Overview; Environment, Resource Base and Livelihood; Economic Dynamism and Development; and Socio-spatial Inequalities.

**Keywords** Human habitats · India · Livelihood–environment nexus · Post-reforms growth · Economic development · Socio-spatial inequity · Social wellbeing

## 1 Introduction

Human habitat is a place of living and organizing economic, social, and cultural activities essential for survival and existence of human society. This also encompasses the spaces of human works and socio-cultural functions. The human habitats have been primarily nested in the natural ecosystems that have been modified or altered to

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# Dynamics and Spatiality of Socio-economic Development during Post Liberalization Period: A Study of Ahirwal Region (Haryana), India



Ankita Yadav and Mahabir S. Jaglan

**Abstract** The socio-economic landscape of the state of Haryana has transformed fast following restructuring of economy, popularly known as economic liberalization, initiated in India during early 1990s. The Ahirwal, a distinct socio-cultural region of the state, had been historically marked by socio-economic backwardness. But during post liberalization era this region has experienced perceptible upward change in the parameters of development particularly on the account of speedy transformation of the economy. This region overtook rest of the state in terms of parameters of socio-economic development by the beginning of current century. But the processes of economic development in the region are strongly concentrated in Gurugram district which has emerged as a hub of neo-liberal economic activities in national capital region. It is transforming the social and economic characteristics of the region traditionally characterized by its socio-cultural homogeneity. This has created economic-spatial differentiations in the region with Gurugram on the top and Mahendragarh district on the bottom. It is a classic case of breaking down of a formal (socio-cultural) region under the mighty pressure of expanding functional (economic) zone in the vicinity of national capital. This model of development has created the spatial complex of finance capital accumulation and neo middle class prosperity on one side and socio-economically backward hinterland in its vicinity on the other side.

**Keywords** Ahirwal region · Socio-economic development · Post liberalization · Transformation · Economic-spatial differentiations · Regional disparity

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# Inequalities in Access to Groundwater for Irrigation in An Agriculturally Developed Region of India



Jitender Kumar and Mahabir S. Jaglan

**Abstract** The state of Haryana is a part of agriculturally developed region in north-west India. Irrigation system in the region is heavily dependent on groundwater resource which has got depleted during last two decades. Like other agriculturally developed states of India, decline in water table and diminishing accessibility of groundwater are big issues for the farmers in the state. Based on primary data, the present study assesses the levels and determinants of physical and economic accessibility of groundwater to farmers in different groundwater availability regimes. It brings out that there are striking inequalities in physical access to water between groundwater rich north-eastern region and water-scarce south-western region of the state. Furthermore, the physical accessibility of groundwater significantly varies across class size of farmers particularly in the latter region. There is also a huge gap in the economic accessibility of groundwater between north-eastern and south-western parts of the state. It also varies greatly across the class size of farmers and the magnitude of inequality is very high in groundwater scarcity region. Physical access to groundwater is largely determined by the cost of tube well irrigation and same is true in case of economic accessibility too. Overall the access to groundwater in the state is inversely proportional to the cost of groundwater extraction. Farm size and fragmentation of land holdings are other dominant factors in determination of groundwater accessibility in water-scarcity areas in south-western region of the state.

**Keywords** Haryana · Water table · Groundwater access · Irrigation cost · Amortized cost · Water rights

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# Socio-spatial Dimensions of Disease Transition and Health Preparedness in Haryana, India



Rajeshwari and Gulshan Mehra

**Abstract** Haryana is an economically progressive state of India that has taken a significant leap forward during past few decades. Its economic progress is reflected in various infrastructural indicators such as educational facilities, network of motorable roads with connectivity of each village, electricity and water supply and other infrastructural facilities. This chapter examines the progress and process of health and disease transition which depicts how shift in death and disease pattern has occurred since 1966 (the formation of state) to 2016. The shift in mortality is studied with medical record data and it reveals that shift has taken place in cause of death in the state. The analysis of disease pattern has been carried out at two levels, i.e., by using medical records and household data with self-reported illnesses. It reveals that though the burden of non-communicable diseases has increased, yet the state is carrying significant load of communicable diseases. This indicates that the health transition is not complete and the state is carrying dual burden of disease. The socio-spatial analysis reveals that societal stratification, education and occupation characteristics of the households continue to impact prevalence levels of diseases and health outcomes. In terms of health preparedness there are spatial and critical gaps, particularly at the level of primary health care infrastructure. The low utilisation levels of public health care facilities mainly on account of their poor quality, further indicates poor preparedness in combating existing diseases.

**Keywords** Mortality · Morbidity · Disease transition · Communicable diseases · Haryana · Health preparedness

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# Chapter 16

## Exploring Particle Size Transport Variability of Suspended Sediments in Two Alpine Catchments Over the Lesser Himalayan Region, India



**Omvir Singh**

**Abstract** Sediments discharged from mountain rivers show different emptying patterns and transport behavior due to rainfall erosivity, human actions, and types of surface materials. Despite the long history of geoscience studies in the Himalayan region, little is known about particle size transport variability and patterns of suspended sediments. Therefore, to know the sediment emptying patterns and transport behavior in the region, this study presents information on particle size variability of the suspended sediments discharged by the Lesser Himalayan catchments (Sainj and Tirthan) of Himachal Pradesh, India. The examination has revealed the prevalence of fine >coarse >medium-sized particles in the Sainj catchment, whereas it has been found in the order of fine >medium >coarse in the Tirthan. The evacuation of medium-sized sediments has been observed more in quantity than coarse sediments but less than the fine sediments. The concentration of fine-, medium-, and coarse-sized particles fraction in the total suspended sediment concentration does not change much from October to April (lean flow period) months. Apart from this, the fine fraction sized particle load has exhibited the lowest variations among all seasons. Overall, the study has indicated that the maximum erosion, transportation, and vacation of suspended sediments take place through the monsoon season from the two catchments. The results of the study will be beneficial for hydropower generation and reservoir sedimentation management in the Himalayan region.

**Keywords** Suspended sediments · Particle size · Transport · Reservoir · Lesser Himalaya

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# Groundwater Hydrology in Arid Rewari District of Haryana: Assessment, Development and Management Options



Omvir Singh and Rekha Sharma

**Abstract** Groundwater has come up as a remarkable resource of water supply. Its more and more need in agriculture, industries and domestic sectors makes it as an asset of vital concern. Accordingly, this investigation has attempted to assess the dynamic groundwater resources of arid Rewari district at block level in Haryana. The investigation rests on secondary data sources pertaining to levels of groundwater, rainfall, area under irrigation, groundwater structures, net irrigation demand of crops, technical stipulations of surface water bodies (river, canal, drain etc.) and water management structures. The yearly renewable groundwater resources of the district have been observed to be about 715 million cubic meters, while the yearly groundwater extraction has been to the tune of 965 million cubic meters, thereby leaving a deficit of 250 million cubic meters. This large deficit in groundwater resources of the district can be attributed to over-utilization of the resource in four blocks out of five. These findings indicate towards the design of speedy groundwater management plans in the district such as artificial recharge on large scale through rain water harvesting, regulation on development of groundwater in over-exploited and risky areas, development of groundwater sanctuaries, power tariff on withdrawal of groundwater, judicious use of water etc. These measures will certainly bridge the gap between groundwater availability and demand in the district.

**Keywords** Draft · Groundwater · Management · Recharge · Water budgeting · Rewari district

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# Trends in frequency and intensity of tropical cyclones in the Bay of Bengal: 1972–2015

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## 21.1 Introduction

Tropical cyclones (TCs) are among the destructive natural disasters having huge social, economic and environmental influences on the earth (Pielke et al., 2008). Usually, these TCs are strengthened by latent heat produced by water vapor condensation over tropical hot ocean basins (Rosenfeld et al., 2012). Thus, TCs occurrence is relatively higher during summer and autumn seasons when SST is higher in the tropical oceans (Gutzler et al., 2013). Although, six dynamic and thermodynamic factors namely high sea surface temperature (SST) ( $> 26.5^{\circ}\text{C}$ ), less vertical wind shear (VWS), high low-level cyclonic vorticity, substantial Coriolis force and sufficient amount of moisture at mid-tropospheric level have been considered favorable for the TCs formation (Gray, 1979).

Nearly 80–90 TCs form every year in the world oceans. Globally, TCs occur in seven ocean basins viz., northeast Pacific, northwest Pacific, North Atlantic, North Indian Ocean (NIO), South Indian Ocean, Australian Seas and southwest Pacific (Gray, 1979). On average, the NIO experiences approximately 7% of TCs that have formed globally (Neumann, 1993). Therefore, the NIO has not been included among the cyclonically active ocean basins. Every year, just 5–6 cyclonic storms reach up to TC strength (when maximum sustained wind (MSW) is  $\geq 34$  kt) (Singh et al., 2001). As per India Meteorological Classification (IMD) (I.M.D., 2011), nearly 80% of the NIO TCs occur in the BoB, which cause catastrophic damages in the adjoining coastal areas of India, Bangladesh, Myanmar and Sri Lanka. For instance, in 1999 Orissa super cyclone has caused roughly 10,000 deaths (Chittibabu et al., 2004), and in 2008 cyclone Nargis has resulted in nearby 138,000 fatalities in Myanmar (Fritz et al., 2009).

# Chapter 12

## Trends and Pattern of Rainfall over Semiarid Sahibi Basin in Rajasthan, India



Manpreet Chahal, Pankaj Bhardwaj, and Omvir Singh

**Abstract** Study of the spatial and temporal trends of rainfall is very important for water resources planning and management. Therefore, this study has been attempted to examine the spatial and temporal trends and pattern of rainfall over the semiarid Sahibi Basin in Rajasthan State of India for a period of 57 years (1961–2017). Rainfall data for nine stations located over the basin have been obtained from the Department of Water Resources, Rajasthan. Statistical methods such as Mann–Kendall test, Sen’s slope estimator, and linear regression were employed to detect the rainfall trends. Percent change for rainfall, and years of excess and deficient rainfall, have also been identified. The findings have shown high interannual variability in mean annual rainfall with an average of 633.95 mm (SD = 204.93, CV = 32.33). However, no significant rising or declining trend has been observed in the mean annual rainfall over the basin during the 57-year period, whereas Kotkasim and Tapukara stations have shown significant increasing and decreasing trends, respectively. Further, pre-monsoon season rainfall has shown a significant increasing trend. Spatial analysis has shown an increase in rainfall amount from northeastern and western parts to the southeast. The observed spatial and temporal differences in the amount of rainfall are high. These results may be valuable for efficient and sustainable planning and management of water resources for agricultural purposes in the basin.

**Keywords** Rainfall · Trend · Pattern · Monsoon · Sahibi Basin · India

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# Sedimentary Petrology

## Implications in Petroleum Industry

*Edited by Ali Ismail Al-Juboury*



Sedimentary Petrology - Implications in Petroleum Industry

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# Geostatistics and Geospatial Technologies for Groundwater Resources in India





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# Geostatistics and Geospatial Technologies for Groundwater Resources in India



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## Static correlation functions in the ground-state of a coupled electron-phonon quantum wire

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Devi Puttar<sup>1</sup>, Vishal Verma<sup>1</sup>, Vinayak Garg<sup>1,\*)</sup>, and R. K. Moudgil<sup>2</sup>

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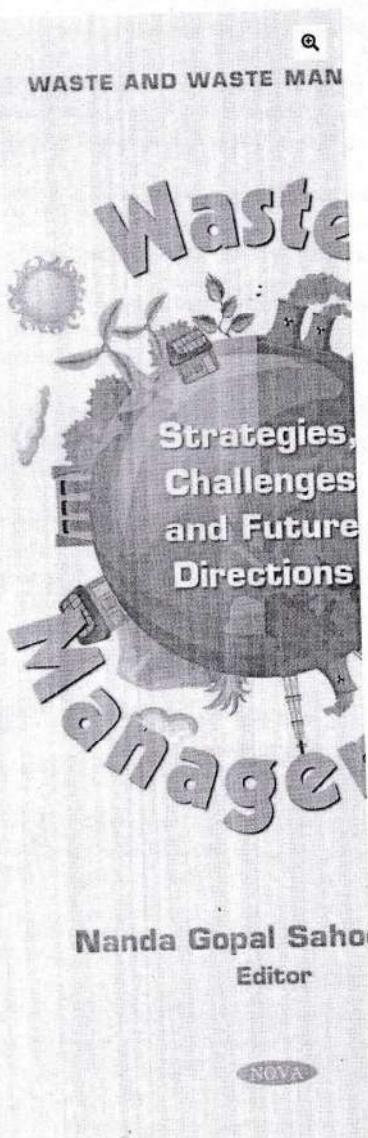
### ABSTRACT

In this paper, we study the role of electron-phonon ( $e-ph$ ) interaction effects on some static correlation functions *i.e.* static structure factor and pair-correlation function in the ground-state of an electron quantum wire along with the usual electron-electron ( $e-e$ ) interactions. The numerical calculations are performed using the self-consistent mean-field theory of Singwi *et al* over a wide range of electron number density parameter  $r_s$ . We find that the inclusion of  $e-ph$  interactions modify the correlation functions at each  $r_s$  to the extent that contact pair-correlation function now becomes positive which otherwise was found to be negative, at sufficiently high  $r_s$ . Our results are also compared with the random-phase approximation in order to highlight the importance of exchange-correlations among electrons.

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2. V. Garg, R. K. Moudgil, K. Kumar and P.



## Waste Management: Strategies, Challenges and Future Directions

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Nanda Gopal Sahoo, PhD (Editor)

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The management of waste is a sensitive issue which affects everyone all over the globe. With the advent of globalization and urbanization, the amount of waste generated has increased to an extent never seen before. Such an increase has come with threatening consequences. To make human life easier, several innovations have been introduced in recent years, such as the development of plastic goods and electronic items, which have led to an exponential growth in waste. Most waste is untreated and unutilized, and as such it is burned, mismanaged and dumped in landfills. This has endangered our ecosystem, polluted water bodies and caused ecological imbalance in the biosphere. Overall, this waste is spoiling the beauty of our planet and polluting the environment. To overcome this situation, many efforts have been made by the scientific community and municipal bodies to no avail. Thus, there is a great need for efficient scientific waste management approaches as well as advanced technology that can convert waste into value-added products. There are many ways to tackle this, but more research and development in this area is required to achieve desired results.

This book explores a new aspect of managing waste and developing efficient technology to convert this waste into value-added products. It reviews challenges and advancements in waste management technologies and gives direction for future planning. It also provides cutting-edge knowledge on classification and management of waste, recycling and upcycling of waste into value-added products or carbon nanomaterials, utilization of waste towards enhancing the global economy, the role of microorganisms for the treatment of waste, the role of nanotechnology in waste treatment and water purification, and management of e-waste and biomedical waste. This book will emerge as a reference guide that overviews up-to-date literature in the field of waste and its management, challenges, converting technology and future possibilities.

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## Investigation of fusion excitation functions for ${}^9\text{Be} + {}^{144}\text{Sm}$ system using CDCC approach

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The complex scattering and reaction dynamics in collisions involving weakly bound nuclei have been the subject of intense investigations in recent years, both theoretically and experimentally [1-3 and refs. therein]. In addition to the conventional processes occurring during nucleus-nucleus collision, there may occur some unusual processes when weakly bound nuclei are involved in collision. For instance, owing to the low breakup threshold, the weakly bound nucleus may break up in the field of the partner nucleus and several novel processes, such as incomplete fusion (ICF, when some but not all fragments fuse), sequential complete fusion (SCF, when all fragments fuse one after another post breakup), and non capture breakup (NCBU, when none of the fragments fuses with the target) may occur. The sum of direct complete fusion (DCF, where the whole projectile fuses with the target) and SCF is commonly termed as complete fusion (CF) and the sum of CF and ICF is called as total fusion (TF). It is of great interest to find the contribution of these various fusion processes in TF cross sections [4].

Thus, in the present work, we have studied the ICF, CF and TF excitation function for the  ${}^9\text{Be} + {}^{144}\text{Sm}$  system at near and above barrier energies by performing the Continuum Discretized Coupled Channels (CDCC) calculations [5] with the help of code FRESKO [6,7]. The projectile  ${}^9\text{Be}$  is assumed as a two body system ( ${}^9\text{Be} + n$ ) with a breakup energy of just 1.667MeV and having spin and parity  $3/2^-$  in its only bound state, the ground state. Both, the resonant states ( $1/2^+$  and  $5/2^+$  at energies 1.684MeV and 3.049MeV respectively) and the non-resonant continuum are taken into consideration for the present calculations. The

continuum spectrum is discretized using the standard binning method with a maximum excitation energy of 7MeV above the breakup threshold. The coupled equations are solved for total angular momenta up to  $j = 200$  and up to a matching radius of 60fm. The nuclear part of neutron - target potential used in the calculations is taken from the global parameterization of Koning et al. [8]. For core-target interaction, the Akyuz winther (AW) parameterization [9] is used.

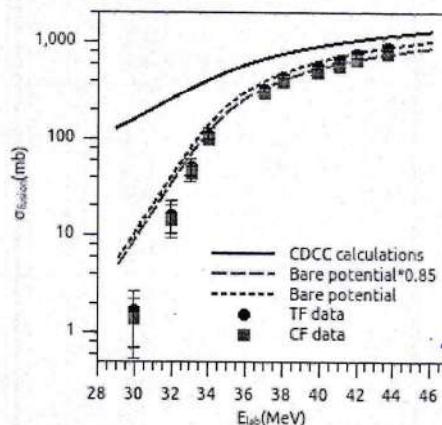


Fig. 1 (Color online) The calculated fusion excitation functions for the system  ${}^9\text{Be} + {}^{144}\text{Sm}$  are compared with the measured TF and CF data taken from ref. [10]. The solid line represents the CDCC results. The dotted line is the results of the calculations when no couplings are taken into account and the dashed line is the same multiplied by 0.85.

It can be seen from fig. 1 that the results of the bare calculations reproduce the TF data at above

## Study of decay of $^{260}\text{Sg}^*$ formed in $^{51}\text{V} + ^{209}\text{Bi}$ and $^{52}\text{Cr} + ^{208}\text{Pb}$ fusion reactions using KDE0(v1) Skyrme Force

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### Introduction

The study of superheavy nuclei (SHN) ( $Z > 100$ ) is exciting area of research in nuclear physics. There are many unanswered questions such as, how many elements can exist in nature?, how to increase the stability of SHN?, how to produce stable targets of SHN? and many more. The existence of superheavy nuclei is possible only by compensating the columbian repulsive force by shell stabilization. The superheavy nucleus can be synthesized by cold fusion ( $E^* = 10-20$  MeV) and hot ( $E^* = 30-40$  MeV) fusion reactions. Theoretically, both of these "cold and "hot fusion reactions refer to cold fusion which corresponds to the lowest interaction barrier and largest interaction radius, i.e., to a noncompact, elongated nuclear shape [1]. In the present work, we have studied the excitation functions (EFs) of  $^{260}\text{Sg}^*$ , formed in fusion reactions  $^{51}\text{V} + ^{209}\text{Bi}$  [2] and  $^{52}\text{Cr} + ^{208}\text{Pb}$  [3], based on Dynamical Cluster-decay Model (DCM) [1]. For the nuclear interaction potentials, we use the Skyrme energy density functional (SEDF) based on semi-classical extended Thomas Fermi (ETF) approach under frozen density approximation. The Skyrme force used is the new KDE0(v1) [4-6] force for our calculation for cross section and comparison with the experimental data taken from [2, 3]. Here, only the EFs for the production of  $^{260}\text{Sg}^*$  isotope via 2n decay channel from the  $^{260}\text{Sg}^*$  compound nucleus are studied at  $E^* = 20$  to 26 MeV for two incoming channel, including quadrupole deforma-

tions  $\beta_{2i}$  and "cold-optimum" orientations  $\theta_i$ . The calculations are made within the DCM where the neck-length  $\Delta R$  is the only parameter representing the relative separation distance between two fragments and/or clusters  $A_i$  ( $i=1,2$ ) which assimilates the neck formation effects.

### Methodology

The nucleus-nucleus interaction potential in SEDF, based on ETF method, is defined as

$$V_N(R) = E(R) - E(\infty) \\ = \int H(\vec{r}) d\vec{r} - \left[ \int H_1(\vec{r}) d\vec{r} + \int H_2(\vec{r}) d\vec{r} \right] \quad (1)$$

where  $H$  is the Skyrme Hamiltonian density, a function of nuclear, kinetic-energy, and spin-orbit densities, the latter two themselves being the functions of the nucleon/ nuclear density, written in terms of, so-called, the Skyrme force parameters, obtained by fitting to ground-state properties of various nuclei. There are many such forces, both old and new, and here we have chosen new KDE0(v1) Skyrme [6] force for our calculation. The radius vectors for axially symmetric deformed nuclei are

$$R_i(\alpha_i, T) = R_{0i}(T) \left[ 1 + \sum_{\lambda} \beta_{\lambda i} Y_{\lambda}^{(0)}(\alpha_i) \right], \quad (2)$$

with T-dependent equivalent spherical nuclear radii  $R_{0i}(T) = R_{0i}(T=0)(1 + 0.0007T^2)$  [7] for the nuclear proximity pocket formula, and  $R_{0i}(T) = R_{0i}(T=0)(1 + 0.0005T^2)$  for SEDF, where  $R_{0i}(T=0) = [1.28A_i^{1/3} - 0.76 + 0.8A_i^{-1/3}]$ .

Finally, the compound nucleus temperature  $T$  (in MeV) is given by

$$E^* = E_{c.m.} + Q_{in} = (A/10)T^2 - T. \quad (3)$$

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### Study of decay of <sup>260</sup>Sg\* formed in <sup>51</sup>V + <sup>209</sup>Bi and <sup>52</sup>Cr + <sup>208</sup>Pb fusion reactions using KDE0(v1) Skyrme Force

Aman Deep<sup>1,\*</sup>, Niyti<sup>2</sup>, Nirupama Kumari<sup>1</sup>, Rajesh Kharab<sup>1</sup>, and Sahila Chopra<sup>3</sup>

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#### Introduction

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where H is the Skyrme Hamiltonian density, a function of nuclear, kinetic-energy, and spin-orbit densities, the latter two themselves being the functions of the nucleon/ nuclear density, written in terms of, so-called, the Skyrme force parameters, obtained by fitting to ground-state properties of various nuclei. There are many such forces, both old and new, and here we have chosen new KDE0(v1) Skyrme[6] force for our calculation. The radius vectors for axially symmetric deformed nuclei are

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## Couplings to breakup channel and its effects on elastic scattering for ${}^9\text{Be} + {}^{80}\text{Se}$ system

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Very soon after the availability of radioactive ion beam (RIB) facilities, it was realized from the experimental evidences that the dynamics of reactions involving weakly bound nuclei are quite different from those induced by tightly bound nuclei. In particular, owing to low breakup threshold, the effects of couplings to breakup channel on elastic scattering and other reaction channels has attracted considerable interest [1-3]. The elastic scattering is the simplest process which occurs during nucleus – nucleus collision and is of paramount importance in understanding nuclear structures. As a result, a lot of theoretical and experimental work has already been carried out to study elastic scattering of a weakly bound projectile on a stable tightly bound target. A dramatic change in the behavior of elastic scattering angular distributions of weakly bound systems has been found in comparison to tightly bound systems in various studies but with ambiguous results.

Theoretically, the Continuum Discretized Coupled Channels (CDCC) [4] formalism provides an effective way to take into account the breakup couplings. Hence, the present work deals with the study of effects of breakup of weakly bound projectile  ${}^9\text{Be}$  on its elastic scattering by  ${}^{80}\text{Se}$  [ $V_B = 20\text{MeV}$ ] target at two energies,  $E = 30\text{MeV}$  (above the barrier) and  $19\text{MeV}$  (near below the barrier) with the help of the code FRESKO [5,6]. The three body CDCC calculations are performed by using two body ( ${}^9\text{Be} + n$ ) cluster structure of the projectile  ${}^9\text{Be}$  which has a breakup threshold of just  $1.667\text{MeV}$ . The discretization of the continuum is done through the binning method. The continuum up to an energy of  $7\text{MeV}$  above breakup threshold is used in the calculations. The  $1/2^+$  and  $5/2^+$  resonant states with energies

$1.684\text{MeV}$  and  $5.049\text{MeV}$ , respectively are also involved along with the non resonant continuum. For each bin we have considered states with orbital angular momenta associated with core-neutron relative motion in the range  $0 \leq l \leq 4$ . The wave function of the fragment target relative motion is expanded in partial waves up to 200 and coupled equations are solved up to a matching radius of  $60\text{fm}$ .

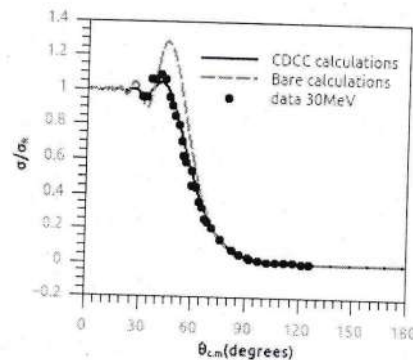


Fig. 1 (Color online) The comparison of elastic scattering data taken from ref. [7] with the predictions at  $30\text{MeV}$ . The solid (dashed) line represents the results of calculations with (without) inclusion of breakup couplings.

The neutron-target potential used in the calculations is derived from the global parameterization of Koning et al. [8]. For core-target interaction, the Akyuz Winther (AW) parameterization [9] is used for real part of the optical potential whereas an imaginary potential with parameters (depth  $50\text{MeV}$ , range  $0.9\text{fm}$



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## Average Neutron Multiplicity Measurements from the Fission Process of $^{48}\text{Ti}+^{232}\text{Th}$ System

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### Introduction

Understanding the concept of heavy-ion induced fusion-fission process is an important key to explore the mechanism of synthesis of superheavy elements (SHE). The study of fission dynamics in the actinide region has gained a lot of importance as it can be helpful in providing crucial information about the challenges en route to the formation of superheavy nuclei. The synthesis of SHE is being done in recent years both by using cold (where one of the reaction partners is spherical  $^{208}\text{Pb}$  or  $^{209}\text{Bi}$ ) and hot (using  $^{48}\text{Ca}$  induced actinide target) fusion reactions. Due to low rate of production, experiments on the synthesis of new elements need to last many months. Therefore, one of the main challenges is to search for the initial conditions that will favour the production of SHE. Alternatively, studies can be carried in detail about those processes that act against the CN formation, like, QF, and gain insight on their occurrence and properties [1]. Recently measurements were made by M.Thakur [2] and S.Appanannababu et al. [3] to understand the fragmentation dynamics of near superheavy systems using a spherical target of  $^{208}\text{Pb}$ . The present experiment is an attempt to study fission dynamics of a superheavy system  $^{280}\text{Cn}(Z=112)$  using a deformed target  $^{232}\text{Th}$ .

### Experimental setup

The experiment was carried out using the 15UD Pelletron+LINAC accelerator and NAND facility at IUAC, New Delhi. Pulsed beam of  $^{48}\text{Ti}$  having energy of 280 MeV was bombarded on deformed target of  $^{232}\text{Th}$  ( $250\mu\text{g}/\text{cm}^2$  and  $80\mu\text{g}/\text{cm}^2$  flourine backing). Two MWPCs with active area of  $10\times 20\text{cm}^2$  were used for the detection of fission fragments and they were placed at fission fragment folding angle of  $\pm 66^\circ$ . Neutrons emitted in coincidence with the fission fragments were detected using NAND detector array having 100 organic liquid scintillator (BC501A). Data acquisition was achieved using the upgraded indigenous VME controller ROSE and the NiasMARS software.

### Data Analysis

The data analysis was performed using ROOT software package. Since neutron detectors are sensitive to both  $\gamma$  and neutrons, pulse shape discrimination (PSD) based on zero-cross over technique and time-of-flight (TOF) method was implemented. Neutrons were discriminated from gamma rays using this method and further TOF spectra were calibrated using a precise time calibrator and the prompt  $\gamma$  peak as the time reference. To distinguish the neutrons and the  $\gamma$  events a two-dimensional gate is applied on the calibrated n-TOF. Further it was gated with fission events in order to obtain neutrons corresponding to fission only. The calibrated and gated neutron TOF was then converted into

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Study of mass angle correlations for the reaction  $^{28}\text{Si} + ^{160}\text{Gd}$  populating  $^{188}\text{Pt}$  compound system

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Introduction

The study of heavy ion induced fusion-fission reactions is a thrust area of nuclear science research for – the production of super heavy elements and to understand the mechanism of fusion fission reaction dynamics. A major hurdle in the super heavy elements formation is the Quasi-Fission (QF) or non compound nucleus fission. A large number of experimental studies were performed to understand the fusion fission dynamics of heavy ion induced reactions in  $A \approx 200$  mass region [1–4]. Fusion fission dynamics of interacting binaries depends on various entrance channel parameters, such as, product of projectile and target charge,  $Z_p Z_t$ , entrance channel mass asymmetry,  $N/Z$  ratio of reaction partners, projectile – target deformation etc. These entrance channel parameters play a key role in deciding the path of a heavy ion induced fusion fission reaction starting from interaction phase till it scissions. Fission fragment mass distribution, angular distribution and mass angle correlation are considered as the sensitive tools to investigate the presence or absence of QF in a given reaction. In the present work, we have performed mass angle correla-

tion study of fission fragments produced in the reaction  $^{28}\text{Si} + ^{160}\text{Gd}$  populating  $^{188}\text{Pt}$  compound system at various excitation energies.

Experimental Details

The experiment was performed using the General Purpose Scattering Chamber (GPSC) facility at Inter University Accelerator Centre, New Delhi. Pulsed beam of  $^{28}\text{Si}$  from Pelletron accelerator, in the laboratory energy range of 120 – 140 MeV, was bombarded on  $^{160}\text{Gd}$  target having thickness of  $220 \mu\text{g}/\text{cm}^2$ . The target was fabricated on  $20 \mu\text{g}/\text{cm}^2$  carbon backing. Fission fragments were detected using two large area (16 cm x 11 cm) multiwire proportional counters (MWPCs), mounted on each arm of the chamber. Complete details of the experimental setup are given in ref. [1].

Analysis and Results

The calibrated position and time of flight (TOF) information from the two MWPCs were used to obtain the emission angles of the fission fragments. The time difference method was used to extract the masses of complementary fission fragments [5],

$$m_1 = \frac{(t_1 - t_2) + t_0 + m_{CN}(d_2/p_2)}{(d_1/p_1) + (d_2/p_2)} \quad (1)$$

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## Fission fragment mass distributions from the statistical decay of compound nuclei in 200 mass region

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### Introduction

One of the main objectives of heavy ion induced fusion reactions is to synthesize super heavy elements. In heavy ion induced reactions, Fusion-Fission (FF) and Quasi-Fission (QF) or non compound nucleus fission processes are the competing processes at energies around the Coulomb barrier. The QF process, in which composite system breaks apart before attaining the mass and shape equilibration, is a major hurdle in the formation of super heavy elements (SHEs). The dynamics of these non compound nucleus fission processes should be understood to choose the suitable target-projectile combinations in order to synthesize super heavy elements.

Amongst others, fission fragment mass distribution is considered as a significant tool which helps us to distinguish between FF and QF processes [1-4]. In both the cases, full momentum transfer from projectile to target takes place. Anomalous change in the width of mass distributions with excitation energy is considered as the signature of QF or fission hindrance. The width of mass distributions depends upon various entrance channel parameters, such as, entrance channel mass asymmetry ( $\alpha = \frac{A_T - A_P}{A_T + A_P}$ , where,  $A_T$  and  $A_P$  are the mass number of the target and projectile, respectively), projectile-target charges  $Z_p Z_t$ , collision energy and projectile/target deformations etc. These parameters are often intercorrelated with each other. The role of these entrance channel parameters in fusion fission dynamics is still not fully understood. Relative value of  $\alpha$  w.r.t. Businaro-Gallone

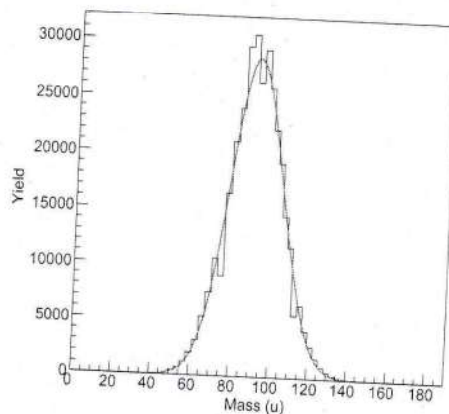


FIG. 1: Histogram of mass distribution (calculated) from the decay of  $^{188}\text{Pt}$  at  $E^* = 67$  MeV. Red line represents Gaussian fit.

mass asymmetry plays a crucial role in deciding whether the mass flows will be from target to projectile or from projectile to target [4]. Further recent experimental findings suggest the presence of QF in the fission of neutron deficient systems especially in mid mass region [5].

In the present work, in order to have a comparison of relatively neutron deficient compound systems with the statistical fission model, we have calculated the fission fragment mass distributions of compound systems,  $^{188,190}\text{Pt}$ ,  $^{191}\text{Au}$  and  $^{202}\text{Pb}$  using statistical model code GEMINI [6].

### Results and Discussion

Fragments mass distribution analysis from the simulated decay of excited nuclei,

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# 100 years of World Wars and Post-War Regional Collaboration and Good Governance

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# *Synergising Educational Concerns and Social Needs*

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2

## Quality Education: Systemic Issues of Access, Retention and Success

*Taruna Choudhery Dhall*

### Abstract

*A forward trajectory of human development cannot be visualised without the role of education. Recognition of education as an essential and powerful tool for social, economic and political transformation is universal. Nations effectively plan and invest their resources in education with an aim to create equitable and just societies. Flow of intrinsic transformational benefits of education are not obstructed or differentiated by linguistic, geographical or cultural differences. India has a rich heritage of education systems. Historical evidence informs that the world's first university was established in Takshila in 700 BC. The ancient Indian Education System, with a focus on promoting cultural unity, sense of responsibility and social values, has been a source of inspiration in evolving the modern education system. Since independence, India has made systematic progress in the field of education. Provision of educational opportunities at primary, secondary and higher education level to every section of the society is an appreciable proof in this direction. It is assumed that a staggering expansion of the education system would enthuse confidence in actualising the intended benefits but some public discourse to the contrary is not an exception. The paper attempts to revisit the systemic attempts in providing educational opportunities in the area of teacher education programmes (TEP), highlighting expressed concerns of the stakeholders with regard to 'success' of the system and suggest measures to address the same.*

**Keywords:** Learning Crisis, Affirmative Choices, Collaborative Continuum

### Background

The qualitative outcome of any programme within a system is visualised in terms of the associated objectives and provision of opportunities geared towards the expected outcome. Programmes are conceptualised to promote 'development' around the framework of 'national aims'. The spectrum of programmes in terms of their nature and expected outcomes is very wide. Some programmes are tuned to exhibit instant outcome, whereas some others are rooted in the gradual influence of the developmental process and may take decades to exhibit expected outcome. Opportunities provided





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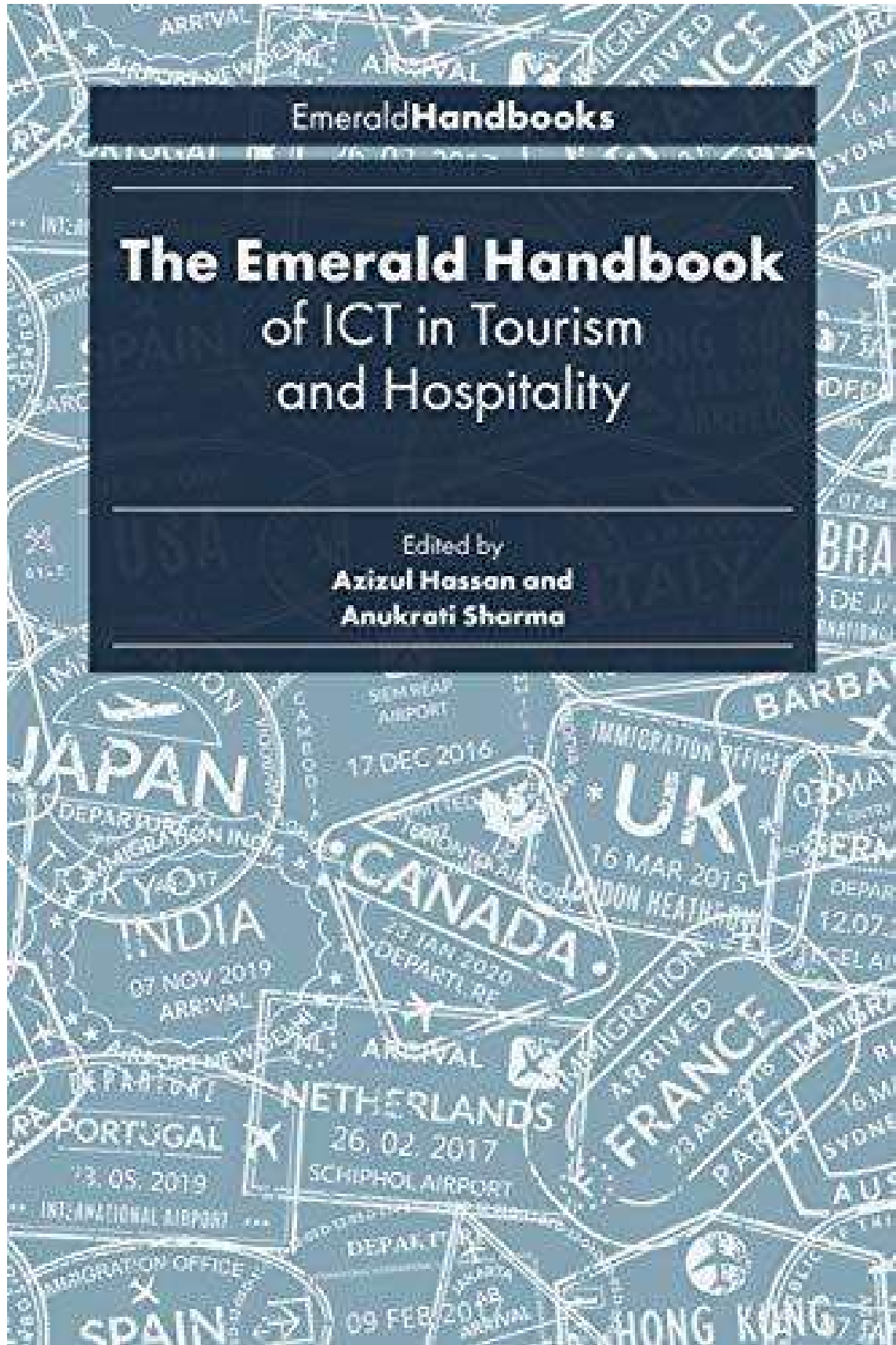
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Dr. Deepak Sinkar**

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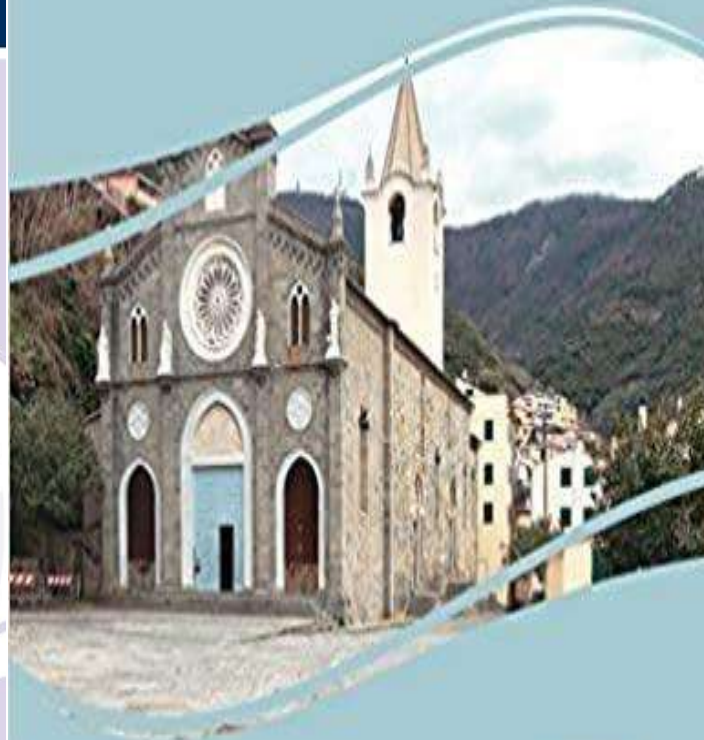
# The Emerald Handbook of ICT in Tourism and Hospitality

Edited by  
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