



Comparative analysis of discharge and sediment flux from two contiguous glacierized basins of Central Himalaya, India

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Received: 24 December 2022 / Accepted: 10 April 2023

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Abstract In the present study, suspended sediment load (SSL), sediment yield and erosion rates in Pindari Glacier basin (PGB) and Kafni Glacier basin (KGB) have been estimated using daily discharge and suspended sediment concentration (SSC) data for three ablation seasons (2017–2019). For this, one meteorological observatory and two gauging sites have been established at Dwali (confluence point), and water samples have been collected twice in a day for high flow period (July to September) and daily for lean period (May, June and October). An area-velocity method and stage-discharge relationship has been established to convert water level into discharge ($\text{m}^3 \text{s}^{-1}$). For estimating SSC (mg/l), collected water samples have been filtered, dried, analysed and confirmed with an automatic suspended solid indicator. Further, SSL, sediment yield and erosion rates have been computed using SSC data. The results reveal that mean annual discharge in PGB ($35.06 \text{ m}^3 \text{ s}^{-1}$) has been found approximately 1.7 times higher than KGB ($20.47 \text{ m}^3 \text{ s}^{-1}$). The average SSC and SSL in PGB have been observed about 396.07 mg/l and 1928.34 tonnes, and in KGB, it is about 359.67 mg/l

and 1040.26 tonnes, respectively. The SSC and SSL have followed the pattern of discharge. A significant correlation of SSC and SSL has been found with discharge in both the glacierized basins ($p < 0.01$). Interestingly, average annual sediment yield in PGB ($3196.53 \text{ t/km}^2/\text{yr}$) and KGB ($3087.23 \text{ t/km}^2/\text{yr}$) have been found almost identical. Likewise, the erosion rates in PGB and KGB have been witnessed about 1.18 and 1.14 mm/yr , respectively. Sediment yield and erosion rates in PGB and KGB have been found in correspondence with other basins of Central Himalaya. These findings will be beneficial for engineers and water resource managers in the management of water resources and hydropower projects in high-altitude areas and in the planning and designing of water structures (dams, reservoirs etc.) in downstream areas.

Keywords Discharge · Suspended sediment concentration · Sediment yield · Erosion rate · Pindari-Kafni glacierized basins · Central Himalaya

Introduction

Glaciers, the prime source of freshwater on earth surface, contribute significantly in generating and transporting water and sediments from mountainous region to oceans via rivers (Jain et al., 2003; Pellicciotti et al., 2010; Wada et al., 2011). It has been estimated that rivers transport about 95% of the total sediments entering the global oceans every year (Li et al., 2020). Among them, glacierized river basins transport enormous silt as compared to

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Delineation of groundwater potential zones using the AHP technique: a case study of Alipurduar district, West Bengal

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Received: 21 October 2022 / Accepted: 7 February 2023
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Abstract

Increasing population with increasing demand of groundwater affects the level of groundwater. In the context of considerable change in the use of groundwater pattern, particularly with continuous increase in demand for groundwater due to many reasons, the present paper attempts to delineate groundwater potential zones (GWPZ) using integrated remote sensing, geographic information systems (GIS) and analytic hierarchy process (AHP) methods. To transform and harmonize geographic data and weightage ranking to get reliable information, geographic information systems are combined with analytical hierarchical processes. The current study has been done in the district where many areas are under tea garden and cultivated land. The use of excess of groundwater results in a drop in the water level. The mapping and the identification of groundwater potential zones were done for the Ganga alluvial plain of Alipurduar District of India. The groundwater potential index (GPI) was computed based on several factors (e.g., land use–land cover, soil type, geology, elevation, slope, rainfall, normalized difference vegetation index, drainage density, pre- and post-monsoon groundwater depth, etc.). To generate the groundwater potential zone map of the study area, an overlay weighted sum method was applied to integrate all thematic criteria. Groundwater potential index maps have been classified into five zones. The excellent potential zone comprise 50.5% (1583.68 km²), good 27.4% (859.26 km²), moderate 11.3% (354.37 km²), poor 7.1% (222.66 km²) and very poor 3.7% (116.03 km²), respectively. After that, the maps were verified with groundwater-level fluctuation data of 30 observed wells through the ROC (receivers operating characteristic) curve. This paper has important implications for planning the sustainable groundwater plan and also different purposes, such as natural and artificial recharge, watershed delineation and proper water usage, can be effectively implemented in this agriculture-dominated areas in the district.

Keywords GIS techniques · Groundwater potential zone · Alipurduar · ROC · Weighted overlay

Introduction

In addition to being essential for human survival, groundwater is crucial for global food security, economic development, and population expansion. Groundwater resources are currently in danger of being inaccessible owing to overexploitation and inadequate management techniques. Throughout the planet, there is uneven distribution of groundwater. Also, it supports the survival of numerous people and is the only source of drinking water. The influence of groundwater from agricultural irrigation to industrial irrigation is massive and significant in the world. According to assessments conducted (IPCC 2018) at the worldwide level, basins are considered to be water stressed if their per capita water availability is less than 1,000 m³ per year (based on long-term average runoff) or if their ratio of withdrawals to

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Frequency Analysis of Flood Flow in Markanda Basin of Ghaggar River System in North Western India

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Received: 7 May 2022 / Revised form Accepted: 22 November 2022

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ABSTRACT

This study aims to estimate the probabilities of occurrence and return periods of peak flood discharges over the Markanda basin of Ghaggar river system in north western India. For this purpose, two most frequently employed probability distribution models, namely Gumbel Extreme Value (GEV) and Log-Pearson Type III (LP-III) have been used to estimate the future flood discharges by means of annual extreme flood series (Q_{max}) data from 1990 to 2013, available at eight gauge and discharge sites. Two goodness-of-fit tests, i.e., Kolmogorov-Smirnov and Anderson-Darling have been applied to the fitted probability distributions to identify the best-fit model. The Q_{max} for several return periods, for example 2, 5, 10, 25, 50, 100, and 200 years have been estimated and compared. The return period for the highest Q_{max} recorded at Jhansa (2670 m^3/s) gauge and discharge site has been computed as 9.5 and 8.2 years using the GEV and LP-III distribution model, respectively. The analyses have shown that GEV distribution model has produced the overestimated results in comparison to LP-III distribution model. Also, flood index has been computed for flood regionalization. The flood index values have been found variable at different gauge and discharge sites with an increase in return periods. Finally, the finding of this study will be valuable for water resource engineers in designing the hydraulic structures for the management of recurrent floods.

INTRODUCTION

Among natural disasters, floods have been recognized as one of the most recurring and destructive disaster causing immense loss of human lives, economy and environment. Approximately 82% of the population in 90 countries covering one-third area of total land is prone to floods (Adhikari et al., 2010). Floods affect approximately 520 million people every year globally, resulting in about 25,000 mortalities (Jha et al., 2012). Floods have caused approximately 6.8 million mortalities during 20th century (Doocy et al., 2013). It is projected that the frequency of extreme rainfall events will escalate and hydrological cycle may intensify, and consequently flooding events may rise in future due to warming of environment (Ingram, 2016; Tabari, 2020).

In India, floods are a frequently occurring disaster and approximately 40 million ha of land is affected by floods, of which about 8 million ha land faces flood every year (Ray et al., 2019). Singh

and Kumar (2013) have shown that a total of 2,443 flood episodes have caused nearly 44,991 deaths in total, with 1,551 deaths every year. The warming trend over the Indian Ocean has possibly increased moisture amount, thereby resulting in a rise in extreme rainfall (Rao et al., 2012; Roxy et al., 2015). An increase in frequency and duration of rainstorms has been observed over Indian region, especially during the monsoon period (Roxy et al., 2015). Additionally, the severity and intensity of flood disaster has increased over large parts of India in recent years (Singh and Kumar, 2013). Consequently, the impacts of floods may increase owing to increasing population and changing climate. In the light of these facts, the estimation of frequency, magnitude and return period of peak flood discharges can be extremely valuable in reducing the impact of future floods.

World over, researchers have used probabilistic models to estimate the frequency, magnitude and return periods of peak flood discharges at any given gauge and discharge site of a river for particular time intervals to mitigate their devastating impacts (Helsel and Hirsch, 2010; Millington et al., 2011; Benamer et al., 2017). These models are based on the premise of extreme events and have been recognized globally as an appropriate method to predict the flood recurrence intervals (Hosking and Wallis, 1997; Latt and Wittenberg, 2015; Kamal et al., 2017). These models minimize the substantial bias and error in designing flood estimations, predominantly at high return periods, causing either over or underestimation that may cause serious consequence in practice. Moreover, probabilistic models are best fit models to characterize the combined distribution of flood volumes, peaks and durations (Sahoo and Ghose, 2021). Several probabilistic models such as generalized extreme value, Gumbel extreme value (GEV), Pearson, Log-Pearson type III (LP-III), normal, log-normal etc. have been used commonly to estimate flood extremes (Gumbel, 1958; Chow et al., 1988; Abdul-Karim and Chowdhury, 1995; Wurbs and James, 2009; Millington et al., 2011; Kamal et al., 2017; Farooq et al., 2018; Sahoo and Ghose, 2021). Within these probabilistic models, GEV and LP-III are the two most widely used distribution methods which have provided reliable results for the Indian rivers (Hire and Patil, 2018; Pandey et al., 2018; Bhat et al., 2019; Kumar, 2019; Pawar et al., 2020; Umar et al., 2020; Adane et al., 2022; Murtaza et al., 2022). Apart from above, GEV is considered useful for small sample size, whereas LP-III model provides valuable results for large sample sizes.

Recently, discharge and sediment behaviour in river basins of

**FINANCIAL INCLUSION IN INDIA: NAVIGATING THE CONTRADICTIONS
BETWEEN INCLUSIVE GOVERNANCE AND NEO-LIBERALISM****Dr. Sunil Kumar**

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ABSTRACT:

This research paper aims to explore the paradoxical nature of the policy of financial inclusion in India within the context of inclusive governance. It investigates the social and political contradictions implicit in the implementation of financial inclusion initiatives in the country. The paper argues that while the policy of financial inclusion was initially framed as a means to achieve socio-economic inclusion and promote social welfare, it has now transformed into a tool for accommodating socially-inclusive development within the neo-liberal paradigm. The study employs qualitative research methods and analyzes secondary literature, newspaper reports, and government documents to examine the evolution of financial inclusion policies in India. It also evaluates the effectiveness of these policies in achieving their developmental objectives and explores the implications for well-being and individual entrepreneurship. Keywords: Financial inclusion, inclusive governance, neo-liberalism, socio-economic development, India.

KEYWORDS: Financial inclusion, International development, Public policy, Unbanked sections, Credit access, Vulnerable groups, Affordable cost, Poverty reduction, Socio-economic development, Market mechanisms, Global policy discourse, Neo-liberal programs, Microfinance industry, Financial sector reform, Village cooperatives, Cooperative credit network, Regional Rural Banks, SHG-Bank linkage program, Social banking, Development banking, Deregulation, Microfinance model, Index of Financial Inclusion, Priority Sector Lending, Internal accountability.

1. INTRODUCTION:

Financial inclusion, aimed at resolving socio-economic exclusion through market mechanisms, has gained significant attention in recent times. This paper focuses on the policy of Financial Inclusion in India, examining the social and political contradictions inherent in the idea of inclusive finance within the Indian context. The hypothesis of the paper is that the current approach to achieving socio-economic inclusion through the formal financial system serves as an instrument for accommodating socially-inclusive development within the neoliberal paradigm, undermining the very essence of development.

1.1. Background and Significance: The concept of financial inclusion has become a consolidated discourse in India, driven by the rise of the semi-formal sector and microfinance initiatives led by NGOs and the private sector. While inclusive development through the formal financial system was initially aligned with the imperative of social

RETHINKING DEVELOPMENT: A MULTIDIMENSIONAL PERSPECTIVE BEYOND GDP

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ABSTRACT:

This research paper critically examines the prevalent practice of comparing countries' economic growth and development primarily based on GDP. It argues that GDP-centricity fails to capture the multidimensional nature of development, neglecting broader societal factors and interactions. The paper explores the implications of GDP's centrality in development discourse and emphasizes the need for a comprehensive and qualitative approach to development. By analyzing the limitations of GDP-centricity and highlighting alternative perspectives, the paper aims to contribute to a more inclusive and people-centric understanding of development.

KEYWORDS: GDP-centric development, qualitative indicators, inequality, social justice, societal factors, comprehensive change, economic growth, social well-being, environmental sustainability, cultural preservation, disparities, marginalization, market fundamentalism, pricing of national products, pro-people development.

1. INTRODUCTION

The practice of comparing countries' economic growth and development mainly based on GDP has been prevalent in development discourse. However, this approach fails to capture the holistic and multidimensional nature of development. Development should be understood as a process of social change that positively contributes to universal social improvement, rather than simply focusing on quantitative GDP growth.

1.1. Background: The emphasis on GDP/GNP-centricity represents a narrow view of development that disregards the broader societal factors and interactions of social, political, cultural, and economic forces. The belief in globalization as a positive contributor to development is similar to the way GDP growth is considered a key element in the dominant development paradigm. However, this perspective does not marginalize the role of the state in the globalized world economy but rather requires state participation and compliance with international rules and regulations. GDP/GNP-centricity is a one-dimensional view of development that makes implicit assumptions about national income and the purposes of societies. Equating development with national income growth neglects the wider societal basis and the interaction of various forces in society. A comprehensive approach to development would seek to develop society as a whole and consider the broader aspects of comprehensive change in various spheres.

1.2. Research Objective: The objective of this research is to critically examine the limitations and implications of GDP/GNP-centric development and explore alternative perspectives and indicators that capture the multidimensional nature of development. By considering qualitative aspects and broader societal factors, this research aims to provide a more comprehensive understanding of development and inform the development

THE POVERTY OF "MAINSTREAM ECONOMICS": A CRITICAL ANALYSIS OF CAPITALISM AS A CLOSED SYSTEM

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ABSTRACT:

This research paper critically examines the limitations of "mainstream" economics in its treatment of capitalism as a closed, isolated, and self-contained system. While acknowledging the mathematical sophistication of modern economics, the paper argues that the prevailing emphasis on the individual as the economic agent and the symmetrical treatment of production and circulation overlook crucial aspects of capitalist dynamics. By exploring three historical examples, the paper challenges the assumption that capitalist growth is tethered to the growth rate of the population. It highlights the role of imperialism in sustaining capitalist growth, the existence of massive labor reserves, and the perpetuation of poverty and income inequalities. Ultimately, this research calls for an alternative understanding of capitalism that incorporates demand-side factors and acknowledges the interconnectedness of the global economy.

KEYWORDS: Mainstream economics, capitalism, growth theory, labor reserves, imperialism, income inequalities, poverty.

1. INTRODUCTION

The dominance of "mainstream" economics and its conceptualization of the capitalist economy as a closed, isolated, and self-contained system is a subject of critique. This approach has its limitations in exploration and needs a more comprehensive understanding of capitalism. This paper delves into these criticisms, aiming to broaden our comprehension of capitalism. Through the examination of historical instances and the questioning of conventional wisdom, this paper here seeks to illuminate the deficiencies of "mainstream" economics in grasping the intricacies of the capitalist system. Specifically, it challenges the notion that economic interactions take place in isolation, detached from external factors. The argument asserts that real-world economies are oversimplified by mainstream economics, which overlooks the influence of social, political, and environmental contexts. Furthermore, it explores the predominance of neoclassical growth theory and its limitations, examines the concept of labor as a "rent good" in capitalism, scrutinizes the role of imperialism in sustaining capitalist growth, and investigates the perpetuation of poverty and absolute income inequalities. Overall, the research paper underscores the importance of adopting a comprehensive and nuanced approach to comprehend economic systems, surpassing the boundaries of mainstream economics. Hence, this paper basically identifies the fallacy of the assumption of closed system and poverty of mainstream economics thought.

2. THE CLOSED SYSTEM FALLACY

The assumption of a closed system in mainstream economics refers to the belief that economic interactions occur within the boundaries of a self-contained system, where the effects of external factors are either negligible or completely disregarded. This assumption implies

शिक्षा व राष्ट्रीय शिक्षा नीति 2020 पर विवेकानंद का चिंतन

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सार

शिक्षा राष्ट्र के विकास और प्रत्येक व्यक्ति के जीवन में, विशेष रूप से आज के वैश्वीकृत प्रतिस्पर्धा माहौल में एक महत्वपूर्ण भूमिका निभाती है। भारत विविध और समृद्ध सांस्कृतिक विरासत वाला देश है। 19वीं शताब्दी में शिक्षा प्रणाली को एक आदर्श ढांचे में रखने के लिए कई महान शिक्षाविद अपने व्यक्तिगत विचारों और शिक्षा के दर्शन के साथ सामने आए। इन सबके बीच, स्वामी विवेकानंद (12 जनवरी, 1863 4 जुलाई, 1902) अपने विचारों और शिक्षा के दर्शन के साथ भारत के सबसे प्रभावशाली और प्रसिद्ध व्यक्तित्व, शिक्षाविद और सुधारक थे। उनके शिक्षा संबंधी विचार आज भी हमारी शिक्षा और जीवन के सभी पहलुओं को प्रभावित और प्रेरित करते हैं।

स्वामी जी वेदांत के दर्शन में विश्वास करते थे, जो मानता है कि मानव जीवन का लक्ष्य "सृष्टिकर्ता के साथ एकता" प्राप्त करना है। विवेकानंद न केवल वेदांत के प्रबल समर्थक थे बल्कि उन्होंने वेदांत को एक व्यावहारिक रूप भी दिया था। उन्होंने वास्तव में एक व्यक्ति-निर्माण करने वाली शिक्षा प्रणाली को मजबूत किया। वह कहते हैं कि ऐसी शिक्षा मनुष्य में पहले से ही विद्यमान पूर्णता की अभिव्यक्ति है।¹

स्वामी विवेकानंद हमेशा मानते थे कि गुणवत्तापूर्ण शिक्षा से ही राष्ट्र का विकास संभव है। गुणवत्तापूर्ण शिक्षा सुखी जीवन के लिए एक सुरक्षित पथ देती है, क्योंकि यह एक अच्छा रोजगार, प्रतिष्ठित संस्थानों में उच्च शिक्षा के अवसर और प्रगतिशील जीवन का आश्वासन देती है।

युवाओं में मजबूत चरित्र निर्माण का मुद्दा स्वामी विवेकानंद के सबसे महत्वपूर्ण विषयों में से एक है। उनके अनुसार राष्ट्र निर्माण की दशा में प्रत्येक मनुष्य में अच्छे व्यक्तित्व का विकास आवश्यक है। वे कहते हैं, "मनुष्य के निर्माण का अर्थ है शरीर, मन और आत्मा का सामंजस्यपूर्ण विकास लेकिन आधुनिक भारत ने जीवन के वैज्ञानिक और यांत्रिक तरीकों पर अत्यधिक जोर दिया है जो मनुष्य को एक मशीन की स्थिति में तेजी से बदल रहा है। नैतिक

¹ स्वामी विवेकानंद का दृष्टिकोण और भारतीय शिक्षा प्रणाली, डा. रूबी (2394-7500), 2022



Sati Partha: Meaning, History, Evolution its Form and Prohibition

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Sati Partha:

Sati Pratha was a Hindu custom. Sati word derived from the Sanskrit term which means pure or chaste. (Sarkar and Sarkar 2007) The idea of Sati was as much the pride and glory of Brahmanical Customs as the inhumane custom of self-immolation of sati. Pietro Della Valle who visited in 1623 gives an eye witness account of Sati, (Chitnis 2009) Bernier, a French physician explained sati in details with many live examples of widow with age of mature and premature. (Gupta 2006) Similarly, William Carey (A Christian Missionary) and Ibanbtootuta (a Morocco visitor) were also the eye witness of Sati practice in Bengal and Ajudhan (Punjab) respectively. William Carey called this sati practice a Murderous Pyre. (Smith 1885) The oldest account of Sati available by Diodorus of Sicily explained an event that happened in 316 BC. Many foreign visitors came in India time to time in which Alberuni, Marco polo, Nicolo Conti, Fernao Nuniz, Barbosa, Pelsaert, some English visitors William Hawkins, Edward Terry, William Metwold etc. and maximum of them explained practice of Sati in their written note or books. (Jain 2016) Inscription sources also confirm the practice of Sati. For examples Eran inscription, Jodhpur inscription, Patiala inscription etc.

This inhuman malpractice was present in various part of India mainly in Bengal, Rajasthan, Bihar, Utter Pradesh, Jammu & Kashmir (Singh 2010), (Pandey 2018) Punjab. (Gopal 2007). There were many example of this malpractice in all periods (Ancient, Pre medieval, Medieval and Modern) of Indian History. This practice was voluntary in ancient India but in Pre Medieval and Medieval period of India, it might have been forced on some widows from their relative or Brahmanical operators.

It was the most atrociously inhuman of all the Brahmanical Customs, yet the most universal, from the land of the five rivers, was the murder of widows by burning or burying them alive with the husband's corpse. (Smith 1885). Also, it is interesting to note that sometimes even the Muslim wives of Hindu husbands ascended the funeral pyre of their husbands. It was a curse and blot on the Indian society. (Chitnis 2009)

Hence there were example of many emperors of different dynasty like Maratha, Mughal Badshah Akbar, Jan-Ull-Abiddin (also known as Akbar of Kashmir) tried to prohibit this inhumane practice. Likewise, many philosophers, educators or historians like Bann Bhatt, Medhatithi (Singh 2010), and William Carey raised their voice against this inhuman practice at their time but they could not successes. Finally, the Englishman Lord William Bentick, with the help of an Indian reformer named Raja Ram Mohan Ray, passed an act in 1829 and firstly banned Sati in Bengal and then in whole India.

Keywords: Sati Partha, Husband's Corpse, Bramanical Custom, Inhuman Practice, Self-immolation.

Sati Partha in Ancient Period (Pre-Historic to 600AD):-

It seems that this practice was prevalent among the Aryans before their arrival in India. By the time they entered in India, this practice had ended in them too. It is not mentioned in Avesta or Rigveda,

It is clear that in ancient India we hear about remarriage of widows. The Atharva Veda tells us that in order to fulfil the formalities of the ancient Sati system, the wife used to lie down on pyre with her husband, but her relatives urged her to get up from the pyre. There are no any written evidence of Sati Partha in Ancient Indian Literature of Aryan, Buddha, Jainism or any other religions related books like Bramanical literatures, Grihasutras written by an Indian or any foreign visitor like Megasthenes (Sarkar and Sarkar 2007).

But the people thought that there was a life after death so we can see a sign of commencement of Sati Partha from all old civilisations like Mesopotamia, Egypt, Harappa etc. But these all civilizations' people believed in rebirth so they buried body of a king or a noble person with some important and precious daily use things, like people, servants, queen, maid, prostitutes, horses etc. (Chitnis 2009) For example, in Mesopotamia, Egypt civilization Pyramids are the graves of some noble people. In Harappan civilization there are some examples in Rakhigarhi (Haryana) and Lothal (Gujarat) of graves with couple buried. But near about the end of Indian ancient era we see Purans determine, the practice of sati was going ground in the society. Strabo also mentioned this practice in Taxila and Kath caste of Punjab.



Geoinformatics and analytic hierarchy process based drought vulnerability assessment over a dryland ecosystem of north-western India

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Received: 4 November 2020 / Accepted: 23 May 2022
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Abstract

Drought vulnerability is the extent to which an area is susceptible to damage as well as causing a threat to human society. Drought frequently occurs in the Indian state of Rajasthan, and so far, very little attention has been paid towards its vulnerability assessment. Therefore, the present study focuses on a spatial multi-criteria integrated technique for an all-out drought vulnerability assessment and mapping consisting of geographic information systems (GIS) and analytic hierarchy process (AHP) techniques. The data have been acquired from various secondary sources pertaining to a total of 16 indicators under meteorological (rainfall, temperature and evapotranspiration), hydrological (hydrogeology, elevation, groundwater level, groundwater development and surface water bodies), agricultural (available water holding capacity of soils, land use and slope) and socio-economic (density of population, female-to-male ratio, irrigated land, agriculture-dependent population and deep tube wells) drought categories. Further, spatial layers for each category have been developed by various GIS operations followed by the calculation of weights for each drought category and type employing pair-wise comparison matrices by means of AHP criterion. Afterwards, individual drought category and comprehensive drought vulnerability maps have been prepared by employing the weighted overlay technique. The generated maps have effectively displayed the areal spreads and levels of drought vulnerability with respect to normal, mild, moderate, severe and extreme category of droughts. The findings from this study have demonstrated a proneness of severe to extreme drought vulnerability in 25% area of the state. Distinctively, the eastern, western, central and small pockets of south-western parts of the state have witnessed severe to extreme drought vulnerability, while the remaining areas have demonstrated normal to moderate drought vulnerability. The results of the overall drought vulnerability have been validated by employing normalized difference vegetation index and past occurrence of drought disasters, which revealed an accuracy of 81%. The obtained results prove the effectiveness of geoinformatics and AHP techniques in comprehensive drought vulnerability assessment and mapping. Finally, the findings of the present study may be easily applied for designing suitable drought mitigation strategies of the vulnerable areas.

Keywords Drought severity · Meteorological · Hydrological · Agricultural · Socio-economic · Rajasthan

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Understanding energy and groundwater irrigation nexus for sustainability over a highly irrigated ecosystem of north western India

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Received: 11 August 2021 / Accepted: 15 November 2021 / Published online: 11 February 2022
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Abstract

This paper examines various features of energy and groundwater irrigation nexus in a highly irrigated ecosystem of north western India. The study is based both on primary and secondary sources of data. Electric tube-wells account for about 72 percent of the total tube-wells population and consume about 40 percent of the total electricity consumption. Power subsidies account approximately 46 percent of the total subsidies disbursed which stimulate the groundwater development. The area irrigated by means of tube-wells has enlarged from 22 to 58 percent. Rice and sugarcane crops are the key consumers of energy both in terms of average energy consumption as well as per hectare of cultivated land. The average use factor of tube-wells is about 7.5 times high during *kharif* than in *rabi* season. Farmers have yielded high economic productivity under all crops with the exception of rice than other states such as Uttar Pradesh, Bihar and Gujarat.

Keywords Energy · Groundwater · Irrigation · Productivity · Farmers · Perception · India

Introduction

Of late, groundwater irrigation has prospered as a key resource for assured supply of water to farmers. Its smoothness and flexibility in relation to other sources of irrigation has resulted in an increasing groundwater withdrawal (Srinivasan and Kulkarni 2014). About 75 percent of rural population and more than 50 percent of the total population in India, directly or indirectly depend on groundwater for their livelihoods (Sharma et al. 2004). Groundwater irrigation infrastructure contributes over 10 percent of India's gross domestic product and 60 percent of irrigation requirements (Shah 2007; Scott and Sharma 2009). It accounts for about 70–80 percent of the farm value output, which is 1.2–3.0 times higher than those of canal irrigation (Dhawan 1995; Sharma et al. 2004). Surprisingly, only 58 percent of the identified groundwater resources have been developed till

now, reflecting much scope for their development in India (Shankar et al. 2011). Groundwater development is modest in eastern region (less than 50 percent), whereas its development is more than 150 percent in the major food grains producing states of Punjab, Haryana and Uttar Pradesh. Currently, 972 out of 6881 blocks (groundwater observation units) in India are overexploited (CGWB 2017). In the north western states, which have been an epicenter of the Green Revolution like Haryana and Punjab, groundwater use exceeds natural recharge by 49 percent and 35 percent, respectively (CGWB 2017). In the state of Haryana, Singh and Kasana (2017) have used the data of 893 monitoring wells and observed a decreasing trend in groundwater level with decline of about 32 cm annum⁻¹. India's groundwater consumption dramatically increased from 50 in 1970 to 250 km³ in 2010 (Shah 2014). Of 250 km³, more than 90 percent is used for irrigation alone. Overall, the groundwater irrigated area increased from 12 million ha to 40 million ha in between 1970 and 2010 (MoSPI 2015). Due to the rapid growth in groundwater irrigated area, there has been a sharp growth in the electricity use in the agriculture sector, especially since the 1980s. The abstraction of groundwater for irrigation is closely coupled with access to subsidized or free electricity in the country (Rajan and Ghosh 2019; Sarkar 2020). Supply of free electricity has led to the

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Recent rainfall variability over Rajasthan, India

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Received: 30 April 2020 / Accepted: 15 December 2021

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Abstract

In this study, an attempt has been made to examine the recent rainfall variability by means of daily rainfall data of 33 well-spread stations over dryland ecosystem of Rajasthan in north western India during 1961–2017. For trend analysis, Mann–Kendall, Sen’s slope estimator, and simple linear regression test have been used (at 95% confidence level). The results have shown a high interannual variability in rainfall occurrence varying from 277 mm (in year 2002) to 839 mm (in year 1975) with mean of 583 mm over this dryland ecosystem. Most of the rainfall deficit years have occurred with El-Nino years. The mean annual rainfall has shown a marginal non-significant upward trend over the ecosystem. The station-wise mean annual rainfall has revealed a significant rising trend over Barmer, Churu, Ganganagar, Jaisalmer, and Pratapgarh stations. Interestingly, 3-year running average has shown a cyclic pattern of rainfall over dryland ecosystem under the changing climatic conditions. The spatial pattern has exhibited that the mean annual rainfall decreases from east and south east (more than 850 mm) to west and north west (less than 400 mm), which is mainly associated with the presence of Aravalli Mountains spreading north east to south west in central Rajasthan. Remarkably, majority of stations positioned in western parts of dryland ecosystem have shown increasing rainfall trends, whereas some stations located in eastern parts have recorded a non-significant declining trend. The magnitude of significant rising trend has varied from 5.34 mm/year (Pratapgarh station) to 2.17 mm/year (Jaisalmer station). Also, the frequency of heavy rainfall events has shown a positive trend with significant increasing trends over Bharatpur, Jaisalmer, and Pratapgarh stations, whereas Bundi station has shown significant decreasing trend.

1 Introduction

Rainfall and temperature are vital climatic parameters, which have been frequently used to identify the alterations in global climatic conditions (Mayowa et al. 2015; Sa’adi et al. 2019). Global ocean’s and land surface temperature trend has revealed a warming of 0.85 °C (ranging between 0.65 and 1.06 °C) during 1880–2012 (IPCC 2014). This rise in the surface temperature could result in changing rainfall patterns globally (Wang et al. 2016). For instance, Trenberth et al. (2007) have observed a rising trend in rainfall over Asia, Australia, northern Europe, North and South America, whereas decreasing trend over the Mediterranean area, southern Asia, Sahel, western and southern Africa. Likewise, Longobardi and Villani (2010) and Altava-Ortiz et al.

(2011) have shown a decreasing trend in average annual precipitation over Mediterranean basin and nearby regions. More recently, Adler et al. (2017) have not detected any significant trend in the global mean precipitation; however, a rising trend over tropical oceans and a declining trend over certain mid-latitudes areas has been detected. Nicholson et al. (2018) and Caloiero et al. (2018) have detected a significant downward trend in annual rainfall over West Africa, North Africa, and eastern Mediterranean. Besides, several other attempts have been made to examine the possible influences of changing climate on spatial and temporal rainfall trends (Loo et al. 2015; Mayowa et al. 2015; Xiao et al. 2016; Hu et al. 2017; Sein et al. 2018; Biasutti 2019; Haag et al. 2019; Sa’adi et al. 2019; Gebrechorkos et al. 2019).

Additionally, it has been well-recognized that the warming environment has enhanced the intensity of extreme precipitation more rapidly than mean precipitation (Kharin et al. 2013; Boucher et al. 2013; Berg et al. 2013; Fischer and Knutti 2016; Myhre et al. 2019). Hartmann et al. (2013) have observed that the occurrence of extreme precipitation events has increased over larger land areas than it has decreased in the second half of twentieth century. Therefore,

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Indian Economy during Pre and Post Covid-19: A Case of Intensification of Crises

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Despite deploying diversionary rhetoric, the NDA government has not been able to conceal two aspects of the Indian economic situation. The first, Indian economy was in a deep crisis even before the pandemic, the Covid-19 shock only intensifying a recession that had engulfed it. The second, extreme inequalities that characterize a class- and caste-ridden, patriarchal society remained a crucial driver during pre as well as post-pandemic recession.

ECONOMY BEFORE THE PANDEMIC

The estimates of GDP for 2019–20 released at the end of May made clear that growth in pre-Covid lockdown year 2019–20, as captured by a national income data series which in any case exaggerates the size and pace of expansion of the economy, was down to 4.2 per cent, the lowest since the new GDP series was launched. The discussions on growth slowdown during Pre-Covid attributed it to demand compression. That demand compression is the failure of this government with pursuing the capitalist path to address the extreme income inequalities. This extreme income inequality is due to withdrawing redistributing fiscal interventions, and engineering income redistribution in favour of the rich through regressive taxation policies and explicit and implicit transfers. Underemployment was high. Agricultural as well as industrial wages recorded exhausted growth or even declines in real terms. All this had an adverse effect on the growth, by depressing mass consumption demand and new investment in productive activities. Modi government adopted the irrational policies of demonetization and a goods and Services taxes regime, intensifying the crisis.

FISCAL CRISIS

The Budget presented by Finance Minister Nirmala Sitharaman this February shows a revenue shortfall. In 2019–20 when compared with the previous fiscal year, the Centre's revenue receipts grew by just 2.9 per cent, which implies that real revenues (adjusted for inflation) have in fact fallen. Net direct tax collection or gross direct taxes adjusted for tax refunds, declined in nominal terms from Rs 11.36 lakh crore in 2018–19 to Rs 10.49 lakh crore in 2019–20.

The factor dominantly responsible for this decline was the successive decisions of corporate tax concessions. Huge reductions have been given in the corporate tax rate from 30 per cent in 2019 to 15 per cent in 2021. It is very visible that the dependence of Central Government on exceptional transfers from the Reserve Bank of India and on receipts from the sale of public possessions to meet even day to day expenditures has increased significantly.

The picture is now clear. The neoliberal fiscal response curtailed government revenues and expenditures further, growth fell sharply and so did revenues. In the event, the government was trapped in a fiscal crisis and the economy in a recession even in pre covid period.

THE COVID SHOCK

Covid 19 made national isolation through closures of borders, and aggressive intra-border social distancing culminating in lockdowns, the widespread means of addressing the effects of the pandemic. As projected, this result in a sudden stop in economic activity in economy. The estimates from the Centre for Monitoring Indian Economy placed the unemployment rate at close to 25 per cent in April and May when the lockdown was most intense. The lakhs of households were reduced to dependence on crowded soup kitchens and community shelters. They all were overexploited migrant workers, who were at the lower ends of the job market and at margins of subsistence, now are without jobs and with no security of employment and no social security.

It is imperative that the state protects all in need of basic necessities through direct provision of essential goods free of cost as well as through money transfers to substitute for a part of the lost earning. It must also ensure that the huge informal



Research Paper

Gandhism and Globalization: An Analysis

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ABSTRACT: Gandhism humanizing the economic situation of the villages of India and therefore, it lays the greatest importance on the development of agriculture as well as cottage and village industries. Gandhian Model is to provide a basic standard of life through material as well as cultural upliftment of the Indian masses. After independence, India's development path shows a very little obligation towards these objectives although we have progress a lot in term of GDP and infrastructure. The process of Globalization further departs us from these Gandhian broad objectives. This paper reveals that the process of Globalization is converting the majority of the masses in to the marginalised sections. The story of Globalization can be named the story of exclusion. If, our policy makers have the sensitivity towards the values of our freedom struggle they have to change the process of Globalization. The present time has a great demand of such development which includes the all. Such process of development should have roots in Gandhism itself.

KEYWORDS: Gandhism, Swaraj, Soviets, Self-sufficiency, Globalization, Americanization, Inclusiveness, Golden Growth Rates.

Received 02 June, 2022; Revised 13 June, 2022; Accepted 15 June, 2022 © The author(s) 2022.

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I. CONCEPT OF GANDHISM

During freedom struggle, people thought to find an alternative path of development not unilaterally but they had different visualizations. Many people in India were willing to 'develop' as much as the British and some others wanted to industrialize as rapidly as the Soviets, there were others who kept alive the concept of small and cottage-scale development to be based in largely self-reliant rural communities. This point of view was most energetically propounded by Mahatma Gandhi who popularized the 'charkha' to symbolize the 'swaraj'. Mahatma Gandhi was not a professional economist and not developed a formal model of economic growth. But he advocated certain with regard to the development of Indian agriculture, industry etc. Acharya S. N. Agarwal brought out the "Gandhian Plan" in 1944 and re-affirmed it in 1948. The basic objective of the Gandhian Model is to provide a basic standard of life through material as well as cultural upliftment of the Indian masses. It firstly aims at humanizing the economic situation of the 5.5 lakh villages of India and therefore, it lays the greatest importance on the development of agriculture as well as cottage and village industries.

The Gandhian Model emphasizes on transformation of agriculture as the most important sector for planning in India. National self-sufficiency in foodstuffs and maximum regional self-sufficiency in food are the prime objectives of agricultural development under Gandhism. This has to be achieved not only by larger and better inputs but also through land reforms and organization of cooperative farms, etc. The primary aim of, Gandhian plan is the attainment of maximum self-sufficiency in village communities.

For this self-sufficiency, expansion of cottage industries remains support pillar agriculture. Spinning and weaving are the first place. It is important here to mention that Gandhi was not against the development of large-scale industries. Actually, the Gandhian Model recognizes the need for and the importance of certain selected basic and key industries in India. The Gandhian Model would like the development of basic industries. The most dynamic scientific aspect of the Gandhian Model is that the basic and key industries will be owned and managed by State- they will be in the public sector. In concrete term the Gandhian model of growth has the following points of planning.

- Employment-oriented planning to replace production –oriented planning.

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A Political Economic Analysis of Agrarian Crisis and Its Way Out

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ABSTRACT: Agriculture continues to be the major source of livelihood for most of the rural population of India even today. It also provides a large market for non-farm goods and services. Indian agriculture sector has faced many important agricultural changes/transformations during last seven decades of development. All these agricultural changes have adversely affected the condition of the farmers and have given rise to the present agrarian crisis. The poor section of the farmers, especially the small and marginal farmers and agricultural labourers, who constitute the vast majority of the Indian population, suffer the most. Millions of people's livelihoods have been destroyed in the last 30 years as a result of this crisis. One important feature of the current agrarian crisis is the stagnation in agricultural growth and agricultural production. The way out of the agrarian crisis should be based on an alternative approach to economic decision-making in general and agriculture in particular. The alternative approach should aim at protecting the farmer and agriculture from the disastrous consequences of integration with global capitalism and protecting it through deliberate intervention by the state.

KEYWORDS: Agrarian Crisis, Arhtiyas, Land Use, Agricultural Labourers, National Sample Survey Organization, Export Market-Oriented, Corporate-led Jobless Growth.

Received 03 July, 2022; Revised 15 July, 2022; Accepted 17 July, 2022 © The author(s) 2022.

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I. INTRODUCTION AND ROLE OF AGRICULTURE

A feature of the farmers' movement that has run successfully in the last one and half years should also be recorded that it inspired the attention of common people, policy makers as well as intellectuals to focus on agriculture, agrarian crisis and the condition of farmers in India. This movement highlighted the unique role of agriculture in stimulating the development of the country. Agriculture contributes to overall economic development by providing food for livelihood, supply of raw materials for industries and by earning valuable foreign exchange. Agriculture continues to be the major source of livelihood for most of the rural population of India even today. It also provides a large market for non-farm goods and services.

II. PERSPECTIVE OF AGRARIAN CRISIS

Indian farmer works in the midst of great obstacles in farming. On the surface, agricultural activities appear to be taking place in a private domain, and therefore the general public has a strong belief that most of the decisions in agriculture must be taken by the farmers itself. However, the reality is elsewhere. It is state policies that determine the prices of most of the factors/inputs needed for production in agriculture e.g. electricity, water, fertilizers, pesticides or minimum wages. Therefore, the role of the state in the decision-making process of farming is prominent and well established. Whether it is the credit policy of the central bank engaged in the operation of the credit market or the difficulties faced by agriculture and farmers in access to credit, all these are determined by the policy decisions of the governments. If the policy decisions of the governments create difficulties in access to institutional credit to the farmers, it forces the farmer to approach moneylenders and "Arhtiyas". Farmers often go to the "Arhtiyas" for their routine requirements of inputs. Hence, it reveals that the policies of the state are prime responsible factor for arising any crisis in agricultural production and income.

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Comparative Study of Non-Performing Assets (NPAs) in selected Public Sector Banks and Private Sector Banks in India

Swaty* and Mohan Kumar**

The banking industry plays a vital role in the economy of India. Measurement of loans from time to time and recovery mechanism of NPA is one of the burning topics in the banking industry, now a day. The asset quality in terms of NPA is constantly deteriorating in banks, especially the Public Sector Banks (PSUs) in our country and thus causing intolerable stress to the banking sector, regulators, and the Indian economy. In present paper the researchers have tried to analyse the problem of NPAs by doing the comparative analysis of public sector banks and private sectors banks in India. So, in present study two public sector banks i.e., State Bank of India and Bank of Baroda and two private sector banks i.e., AXIS Bank and HDFC Bank have been taken for the study purpose. The present study has been

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JOURNAL OF NATIONAL DEVELOPMENT, Vol. 35, No. 2 (Winter), 2022
Peer Reviewed, Indexed & Refereed International Research Journal

A Study on Stress Management among Students and Youth

Swaty* and Mohan Kumar**

Stress is definitely a big word with even bigger impact, however this can be dealt with small changes that we bring in our day to day life. Stress is a frustrating condition as it contains an excess of work and an overload which reduces the concentration, mentality and the normal working condition. Stress is experienced by managers, financiers, government officials, administrators, politicians, house wives and is most prevalent amongst students. Stress has become part of students' academic life due to the various internal and external expectations placed upon their shoulders. Adolescents are particularly vulnerable to the problems nowadays associated with academic stress as transitions occur at an individual and social level. It is essential to identify the cause of the stress so that it can be addressed meticulously and efficient interventions can be outlined. Stress is always seen as subjective process and encompasses individual's personal analysis and counter to a threatening event. Stress can result in depression, anxiety and many other hazardous conditions. The rise in the number of workshops being conducted for Stress Management, various articles being published, research reports etc. is an

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A Study of Feminism, Gender Inequality and Marriage in the Select Works of Anita Desai

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ABSTRACT

Women always face many problems in their life in various ways. Women were suppressed and ill treated by the opposite sex. Women were slaves to them and under their control. They didn't have the liberty or equality. Women were not free to act on their own. Many illegal activities and cruelties were done to them. For centuries, women in the traditional social order and system have always been considered subservient to men. In patriarchal Bourgeois society, the patriarchal community has been 'humiliated', 'afflicted', 'silenced' and 'tortured' socially and economically. With the post-modernizing age, women began to see the universe with their own eyes and not through the male gaze. Education was refused to them but the suppression was broke out by some of the great women and they proved their power. Anita Desai has been writing some of the best English language fiction in India for almost four decades. She's been shortlisted for the Man Booker prize thrice and won the Sahitya Akademi Award, one of India's most prestigious literary prizes, in 1978 for her second novel, *Fire on the Mountain*. Familial relationships and their evolution have been the main themes of Desai's fiction. The main motto of this paper deals with Feminism, gender issues and Marriage in the novels of Anita Desai. The purpose of our paper is to focus on the feminist message as articulated in Anita Desai's well reputed novels, *Cry, the Peacock* and *Where Shall We Go This Summer?*

Keywords: gender inequality, gender issues, marriage, Postmodern, Indian Feminism and equal rights.

OBJECTIVES:

- To study the issues related to gender inequality in Indian English literature with a special reference in the novels of Anita Desai.
- To study the impact of gender inequality on the overall development of women
- To study the feelings of physically tortured and mentally perturbed female protagonists against the patriarchal system.

INTRODUCTION

Anita Desai has treated psychological realities very minutely in her novels. Her purpose of writing is to discover herself and then aesthetically, convey the truth. She has tried to probe into the depths of a woman's psyche and showing its relation to society. And, this concern can be drawn through the portrayal of the neurotic like Maya and Sita. Both these women present sensitive individuals in their moments of intense struggle and their efforts to seek neurotic solutions. Anita Desai is widely recognized as the pioneer of psychological novel in modern Indian English literature. The prominent feature of her works is her art of the portrayal of characters. She examines the psychological inner workings of women and presents their reactions.


Her two novels *Cry, the Peacock* and *Where Shall We Go This Summer?* Present the traumatic experiences and mental tensions that Maya and Sita undergo. Desai explores the emotional world of neurotic Maya, who is haunted by a premonition of her husband's death on account of her belief in astrological prediction; while in Sita, Desai highlights the theme of repressed childhood neurosis. The repressed impulse and memories lie buried in the unconscious of the protagonist Sita but return later in a form of a full-blown neurotic picture during her fifth pregnancy. The theme of both novels is disharmony and discord confined to the family and at times to the mal-adjusted or ill adjusted self. Loneliness and unrequited love drives Maya to the jaws of death and violence, while Sita suffers from "Oedipus complex".

Maya and Sita are representatives of Postmodern Indian Feminism:

They both represent the Indian personality structure which is very complex and multilayered. During psychoanalytical study, we may realize Maya and Sita likely to be the representatives of repressed female community. Maya's unrespecting



Exploring spatial and temporal drought over the semi-arid Sahibi river basin in Rajasthan, India

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Pankaj Bhardwaj · Sreedhar Ganapuram

Received: 23 November 2020 / Accepted: 8 October 2021 / Published online: 21 October 2021
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Abstract Rajasthan state of India is prone to recurrent droughts; hence, exploring drought severities over the semi-arid Sahibi river basin is crucial for drought management. To investigate drought severity, the Rainfall Anomaly Index (RAI) was applied at two time spans, such as annual (January to December) and the monsoon season (June to September), using long-term daily rainfall data (1961–2017) for nine rain gauge stations. Similarly, for the examination of various drought characteristics like magnitude, duration and intensity, run theory analysis was used. Trends in rainfall, drought severity, magnitude, duration and intensity were computed by employing both parametric (simple linear regression) and non-parametric (Mann–Kendall and Sen's slope) tests, while spatial pattern maps of rainfall and drought characteristics were prepared using geographical information system. The analysis of rainfall records revealed a declining trend in eastern and central parts, whereas remaining areas of the basin witnessed an increasing trend during two

time spans. During the study period, drought occurrence varied both geographically and temporally. The extreme, severe and moderate drought events were more common during monsoon season. Amongst the stations, Tapukara, Bairath and Mundawar rain gauge stations experienced the largest number of drought events compared to other stations. At both time scales, the most extreme droughts in the Sahibi basin occurred in 1979, 1986, 1987, 1989 and 2002. At the annual time span, the basin had the longest drought duration of 300 days, with a drought magnitude of -758.3 mm. Likewise, the Tapukara rain gauge station had the longest dry spell of 310 days, followed by Behrod and Kotkasim (306 days each), Kotputli and Tijara (305 days each) and Mundawar (303 days). Finally, the findings of this study are expected to be useful to agricultural scientists, policymakers and water resource managers.

Keywords Drought · Severity · Magnitude · Duration · Trend · RAI · Run analysis

Introduction

Droughts are amongst the most complex, frequent, multifaceted, chronic, extreme and damaging climatic phenomenon (Hoque et al., 2019). Droughts are experienced by all climatic regions of the world over a period of days, months and years (Kim et al., 2015; Pei et al., 2019; Thomas et al., 2016). Recently, a rise in their number and severity was observed

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Exploring the trends and pattern of rainfall extremes over the semiarid Sahibi basin in Rajasthan, India

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Received: 27 October 2020 / Accepted: 12 May 2021
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Abstract

The present study has been attempted to examine the trend and pattern of rainfall extremes over the Sahibi basin in the Rajasthan state of India for a period of 57 years (1961–2017). The daily rainfall data for nine stations located over the Sahibi basin have been obtained from the Department of Water Resources, Rajasthan. A total of ten indices which reflect the number, magnitude, intensity, and duration of rainfall extremes have been used. Statistical methods such as Mann–Kendall test, Sen's slope estimator, and linear regression have been employed to detect the trends in rainfall extremes. The entire analysis has been performed for the annual and monsoon (June–September) period. The results have shown nonsignificant positive trends in very wet day rainfall and moderate rainfall days, whereas a decrease in consecutive dry days and other most of extreme rainfall indices has been observed. Thanagaji station has recorded maximum rainfall with a decreasing trend during the study period. Annual maximum 1- and 3-day rainfall has been found highest over Kotkasim station with a significant increasing trend. The number of extreme rainfall days over the basin has been found almost negligible. The trends and pattern of annual and monsoonal rainfall extremes over the Sahibi basin have been found almost identical as most of the mean annual rainfall occurs during the monsoon season. These results may be valuable for efficient and sustainable planning and management of water resources for agricultural purposes in the basin.

Keywords Rainfall extremes · Temporal · Spatial · Trend · Sahibi basin · India

Introduction

Extreme rainfall events are among the most damaging atmospheric disasters (Zin et al. 2010). These extreme rainfall events often cause flash floods and droughts which adversely affect the crop yields and strengthen conflicts among water supply and demand (Wang et al. 2014). Recently, it is extensively acknowledged that global warming may intensify the hydrological cycle, which will result in a change in frequency, intensity, duration, and amount of rainfall (Easterling et al. 2000; Meehl et al. 2000; Groisman et al. 2005). Any change in the mean value of extreme rainfall events may significantly

affect the natural and human systems (Wang et al. 2012). In recent times, researchers have extensively examined the extreme rainfall events and observed significant changes in their frequency and intensity under warming climatic conditions over several parts of the world (Shahid 2011; Degefu and Bewket 2014; Chi et al. 2016; Sigdel and Ma 2017; Armal et al. 2018; Gummadi et al. 2018; Sa'adi et al. 2019; Thevakaran et al. 2019; Geremew et al. 2020).

India has a long history of extreme rainfall events (Guhathakurta et al. 2011). These extreme rainfall events have triggered several destructive floods, which caused a huge loss to infrastructure and human lives in India (Gupta and Nair 2011; Singh and Kumar 2013). Floods associated with extreme rain events alone caused losses of approximately \$3 billion per year in India, which is about 10% of the global economic losses (Roxy et al. 2017). Therefore, several researchers have examined the trends in extreme rainfall events over the Indian region in recent years. For example, Roy and Balling (2004, 2007) have noticed a rise in rainfall extremity, particularly over southern peninsular and western parts of the country. Guhathakurta et al. (2011) have shown both positive

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Active and inactive tropical cyclone years over the Bay of Bengal: 1972–2015

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MS received 19 March 2020; revised 6 February 2021; accepted 8 February 2021

The present study examines the tropical cyclones (TCs) activity over the Bay of Bengal (BoB) during post-monsoon season (October–December) for the period 1972–2015 (44 years period). The study has explored the active and inactive TC years on the basis of mean ± 1 standard deviation, respectively. A total of nine active (when TCs frequency is ≥ 4 in a year) and 18 inactive (when TCs frequency is ≤ 1 in a year) TC years have been identified during the 44 years period. The mean frequency of TCs during the active TC years (4.22 TCs/year) is approximately five times higher than the inactive TC years (0.78 TCs/year). These active and inactive TC years have shown association to some extent with El Niño–Southern Oscillation and Indian Ocean Dipole events. Various environmental factors influencing the occurrence of TCs have been investigated, by analyzing the composites of nine active and 18 inactive TC years. Further, the existence of more precipitable water, strong convective activities, less sea level pressure, reduced vertical wind shear, upper-level easterly winds and high low-level cyclonic vorticity have provided favourable conditions for the TCs genesis during the active TC years.

Keywords. Tropical cyclones; El Niño–Southern Oscillation; Indian Ocean Dipole; post-monsoon season; Bay of Bengal.

1. Introduction

Tropical cyclones (TCs) are among the most disastrous weather phenomena, resulting huge economic, ecological and human life loss during their landfall, through associated strong winds, torrential rains, flooding and storm surges (Peduzzi *et al.* 2012). Several key thermodynamic and dynamic conditions are considered as essential for the TCs development like high sea surface temperature (SST) ($>26.5^{\circ}\text{C}$), increased low-level cyclonic vorticity, less amount of vertical wind shear (VWS), sufficient Coriolis force and substantial mid-troposphere relative humidity (RH) (Gray 1968, 1975; Webster *et al.* 2005). These parameters have also

been used often as predictors of TC activity (Chan and Liu 2004). The formation of TCs is very common over tropical and sub-tropical regions.

Earlier studies have shown that ~ 80 – 90 TCs form over the world every year (Gray 1979). The maximum number of TCs form over the western North Pacific Ocean (~ 26 /year) followed by the eastern North Pacific Ocean (~ 17 /year), the South Indian Ocean and the North Atlantic Ocean (~ 10 /year) and the North Indian Ocean (~ 7 /year) (Niyas *et al.* 2009). In recent decades, a significant change in the frequency of TCs has been reported globally. For example, Chan and Shi (1996) have shown that TC activity has increased significantly in the western North Pacific Ocean



Association between climatic variables and COVID-19 pandemic in National Capital Territory of Delhi, India

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Received: 6 July 2020 / Accepted: 23 September 2020 / Published online: 7 October 2020
© Springer Nature B.V. 2020

Abstract

Globally, since the end of December 2019, coronavirus disease (COVID-19) has been recognized as a severe infectious disease. Therefore, this study has been attempted to examine the linkage between climatic variables and COVID-19 particularly in National Capital Territory of Delhi (NCT of Delhi), India. For this, daily data of COVID-19 has been used for the period March 14 to June 11, 2020, (90 days). Eight climatic variables such as maximum, minimum and mean temperature (°C), relative humidity (%), bright sunshine hours, wind speed (km/h), evaporation (mm), and rainfall (mm) have been analyzed in relation to COVID-19. To study the relationship among different climatic variables and COVID-19 spread, Karl Pearson's correlation analysis has been performed. The Mann–Kendall method and Sen's slope estimator have been used to detect the direction and magnitude of COVID-19 trends, respectively. The results have shown that out of eight selected climatic variables, six variables, viz. maximum temperature, minimum temperature, mean temperature, relative humidity, evaporation, and wind speed are positively associated with coronavirus disease cases (statistically significant at 95 and 99% confidence levels). No association of coronavirus disease has been found with bright sunshine hours and rainfall. Besides, COVID-19 cases and deaths have shown increasing trends, significant at 99% confidence level. The results of this study suggest that climatic conditions in NCT of Delhi are favorable for COVID-19 and the disease may spread further with the increasing temperature, relative humidity, evaporation and wind speed. This is the only study which has presented the analysis of COVID-19 spread in relation to several climatic variables for the most densely populated and rapidly growing city of India. Thus, considering the results obtained, effective policies and actions are necessary especially by identifying the areas where the spread rate is increasing rapidly in this megacity. The prevention and protection measures should be adopted aiming at to reduce the further transmission of disease in the city.

Keywords Coronavirus · Climate · Correlation · Trend · NCT of Delhi

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Extended author information available on the last page of the article.



Characterization of meteorological drought over a dryland ecosystem in north western India

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Received: 15 May 2020 / Accepted: 8 June 2021
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Abstract

Droughts are the greatest and the most recurrent climatic hazard that frequently strikes India, fetching serious water deficiencies, economic failures and unfriendly social events. An investigation of regional droughts can help policy makers in achieving the goals of sustainable governance of water resources. Hence, this study examined the characteristics of meteorological drought over the dryland ecosystem of Rajasthan state in north western India, based largely on diurnal rainfall statistics of 33 stations for the period 1961–2017. For investigating meteorological drought, standardized precipitation index (SPI) was computed at various time spans such as early (June to August), mid (August to September), late (September to October) and whole *kharif* season (June to October) as well as annually (January to December) to study the deficiency or surplus of water about its normal availability. In the same way, primary drought attributes, for example severity, frequency, magnitude, duration, intensity, return periods and trends, were computed and their distribution maps were prepared by employing geospatial techniques. During the study period, nearly half of the years experienced a meteorological drought at all-time scales. Fascinatingly, more than 90 percent of them were of mild drought, whereas severe and extreme droughts were unusual. Surprisingly, during the year 2002, all stations experienced a mixture of normal, moderate, severe and extreme droughts. The drought frequency followed an order of mid-season > whole *kharif* season > early season > late season > annual. The western, northern and southern parts (low to moderately elevated) experienced wetter conditions (significant at 95% confidence level). In contrast, the north eastern, eastern and south eastern regions (moderately to highly elevated) witnessed increased drier situations, though statistically it was found non-significant. Finally, the results of this study suggest that the investigation of SPI-based meteorological drought will be helpful in developing effective drought management plans over the dryland ecosystem.

Keywords Drought · SPI · Severity · Magnitude · Return period · Trend

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Heat wave fatalities over India: 1978–2014

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The present paper is an attempt to study the heat waves associated fatalities over space and time in India. For this, 'Disastrous Weather Events' reports statistics have been used for the period 1978–2014. The analysis has shown that a total of 660 heat wave events have caused 12,273 fatalities (about 332 fatalities every year). Only five states namely, Andhra Pradesh (42%), Rajasthan (17%), Odisha (10%), Uttar Pradesh (7%) and Bihar (7%) have accounted more than 80% of the heat wave fatalities, although nine states namely, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Tripura, Sikkim, Mizoram, Uttarakhand and Goa have never reported heat wave events and fatalities during 1978–2014. Interestingly, each event has resulted about 104 fatalities in Andhra Pradesh state. Further, fatality and density rates have been witnessed to the tune of 0.35 and 3.81 respectively. Temporally, heat wave events have displayed large differences with a significant increasing trend ($P < 0.01$), whereas no trend could be noticed in fatalities. Majority of events have been witnessed in May and June months. It has been observed that men have been more harshly affected compared to women and children. Finally, it is believed that this study may provide new insight towards making better disaster management guidelines for minimizing the shocks of harsh temperature.

Keywords: Disaster management, extreme temperature, fatalities, gender differences, heat wave.

EXTREME temperature related events particularly heat waves have been well-documented as the most hazardous atmospheric occurrences, resulting in large number of casualties¹. Heat wave refers to a long duration of excessive heat particularly all along the summer season². A heat wave accompanied by humidity poses a bigger threat to humans³ and results in huge number of fatalities world-over⁴. In recent years, a rise in their occurrence, duration and intensity has been observed as a result of global warming⁵. With the increasing influence of anthropogenic factors on global climate, the frequency of intensified heat waves may increase further^{6,7}. Since 1980s, heat waves have increased roughly 2.7 times at the global level and have emerged as a serious threat to humans⁸.

In recent decades, some extreme heat wave events have resulted in thousands of deaths, attracting global atten-

tion. Heat waves account approximately 90% of the total extreme temperature events related fatalities⁸. During the summer season of 1980, about 10,000 deaths were reported owing to extreme heat in the United States⁹. In 1987, more than 2000 deaths were caused by a major heat wave event in Athens¹⁰. A heat wave event in Chicago during 1995 caused a total of 697 deaths and more than 3000 emergency department visits¹¹. Similarly, heat wave episodes of Europe during 2003 resulted in tens of thousands of deaths¹²; in California during 2006 resulted in over 600 deaths and more than 16,000 hospital emergency department visits¹³, Europe in 2006 resulted in 3418 fatalities⁴; Australia in 2009 resulted in 374 fatalities and 3334 illnesses¹⁴; Pakistan in 2015 resulted in 1200 fatalities¹⁵. Apart from these, several researchers have further examined heat wave related fatalities over European countries, United States and Australia^{16–18}. Besides the human fatalities, heat waves lead to crops failures and wild fires, which subsequently affect various social activities¹⁹.

India is a tropical country and frequently experiences severe heat wave conditions owing to its unique geographical and climatic set-up. Lately, global extreme temperature related fatalities have been examined, which revealed that India is the most severely affected country by heat waves in the world⁴. In India, heat wave conditions normally form between March and July months, which results in thousands of casualties every year²⁰. The heat waves of 1998 have caused about 2600 fatalities; of 2002, about 1000 fatalities; 2003, about 1300 fatalities only in Andhra Pradesh and of 2015, about 2677 fatalities in Andhra Pradesh and Telangana states of India^{20–23}. These studies were limited to an individual year, event and state, however, studies with respect to distribution of heat wave fatalities over India for a period range were completely lacking. Therefore, this study aims to examine heat waves occurrence and associated fatalities over space and time in India during the period 1978–2014. The findings of the study will help in evolving practical as well as operational risk management actions with respect to heat waves.

Data and methodology

The statistics of 31 states (comprising Union Territories) have been acquired from the yearly 'disastrous weather

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Interest of Consumers about Organic Food Products in Haryana

RUCHIKA AND MOHAN KUMAR

Abstract: The objective of this paper is to study the demographic attributes of consumers regarding their interest about organic food products. Researchers have taken a sample of 555 respondents for the analysis. The respondents for the study were chosen from the State of Haryana. Multistage stratified sampling technique was used for the study. Confirmatory Factor Analysis (CFA) was also used to verify and validate the structure of measurement items of consumers' interest. In demographic attributes gender and living area of respondents were studied. Further, 287 male respondents (51.71% of the total sample size) and 268 female respondents (48.28% of the sample size) were selected for the study. The sample comprises 286 rural area residing respondents (51.53%) and 269 urban area respondents (48.46% of the total sample size). Based on the gender and locality, statistical differences in consumers' interest regarding organic products have been analyzed by using independent t-tests. The study finds that respondents show interest towards organic food products. The study will be helpful to predict the scope of organic food products. The people who are interested in organic food products may be potential consumers for these products. Further it will encourage farmers to adopt organic farming as well as be helpful for government to make policies to promote organic food products in state of Haryana.

Key Words: Interest, Organic food, Respondents.

Introduction

There is a lively public debate whether or not organic food is healthier than conventional food. Research does not provide a clear answer. Some people think that use of synthetic pesticides and artificial chemical in food production leads to arousal of diseases from headaches to cancer and from birth defects to memory loss also. On the other hand, some people consider organic food products healthy, eco-friendly and tasty but these are costly as compared to conventional food items. Nowadays, organic farming is considered more ethical than conventional as it uses the organic pesticides which come from natural resources and are not

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Knowledge Management: Process and Challenges

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Dr. Mohan Kumar, Assistant Professor of Commerce, GC, Bahu, Jhajjar

Abstract:

Over the past several years, there have been intensive discussions about the importance of knowledge management within our society. The management of knowledge is promoted as an important and necessary factor for organizational survival and maintenance of competitive strength, but also to become innovative. It is a process that deals with the development, storage, retrieval and dissemination of information and expertise within an organization to support and improve its business performance.

Knowledge Management requires a major shift in organizational culture and a commitment at all levels of a firm to make it work. Through a supportive organizational climate, ideally, through knowledge management, an organization can bring its entire organizational learning and knowledge to bear upon any problem, anywhere in the world, at anytime.

The purpose of this paper is to raise awareness of knowledge management and its potential to support organizations in achieving their business objectives. This will be followed by consideration of some of the challenges with respect to its implementation in organization.

Keywords: Knowledge, Knowledge Management, Organization, Competitive Strength.

Date of Submission: 28-04-2021

Date of Acceptance: 12-05-2021

I. Introduction:

“A firm’s competitive advantage depends more than anything on its knowledge: on what it knows- how it uses what it knows- and how fast it can know something new”. HR Magazine 2009, p. 01.

Knowledge Management is a process that helps organizations find, select, organize, disseminate and transfer important information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning and decision-making. Now a day, organizations no longer competes solely on the basis of financial capital and strength, rather knowledge is the new competitive advantage in business. Knowledge Management is essentially about people- how they create, share and use knowledge. The Knowledge Management programmes should have both a “Collecting” and a “Connecting” dimension. The collecting dimension involves linking people with information. It relates to the capturing and disseminating of explicit knowledge.

Early in industrial era, organizations improved their efficiency, effectiveness and hence their competitive edge by automating manual labour and reducing redundancy. Many organizations have gone through massive restructuring to eliminate redundant workers and jobs. This movement has been swept up by Business Process Re-engineering that resulted in leaner organizations.

Knowledge Management is the management of corporate knowledge that can improve a range of organizational performance characteristics by enabling an enterprise to be more “intelligent acting”. It is a fundamental factor, whose successful application helps organization deliver creative products and services. Most organizations already have a vast reservoir of knowledge in a wide variety of organizational processes, best practices, know-how, customer trust, MIS, culture and norms. Therefore managing and utilizing knowledge effectively is vital for organizations to take full advantage of the value of the knowledge. The attention and importance given to the acquisition of knowledge management in literature as well as practice in the past years is also of necessity due to changes in the environment such as increasing globalisation of competition, speed of information and knowledge aging, dynamics of both product and process innovations and competition through buyer markets. It has been said that knowledge has the potential to be highly relevant to the interest of the business world in improving business performance. So, the knowledge management is essentially about getting the right knowledge to the right person at the right time. Its overall objective is to create value and leverage and refine the firm’s knowledge assets to meet organizational goals.

OBJECTIVES OF THE STUDY:

1. To understand the concept of Knowledge Management.
2. To study the process of knowledge management in business.



Distribution of cold wave mortalities over India: 1978–2014

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ARTICLE INFO

Keywords:

Extreme temperature
Cold wave
Mortalities
Spatial variations
Temporal variation
India

ABSTRACT

The present study explores the spatial and temporal pattern of cold wave related mortalities over India. The data for this study has been obtained from the annual reports pertaining to 'Disastrous Weather Events' published by India Meteorological Department, Pune for 37-years (1978–2014). The analysis reveals that a total of 8520 mortalities have been caused by 606 cold wave events, with an average of 230 mortalities per year. Only two states i.e. Bihar (44%) and Uttar Pradesh (31%) account for approximately 75% of total cold waves mortalities, while eleven states namely, Arunachal Pradesh, Assam, Goa, Karnataka, Kerala, Manipur, Mizoram, Nagaland, Sikkim, Tamil Nadu and Tripura have never experienced cold wave events and mortalities. Interestingly, each cold wave event has caused approximately 43 mortalities alone in Bihar state. Furthermore, mortality (standardized by population) and density rates (standardized by area) in India have been observed to be 0.24 and 2.65, respectively. In temporal terms, cold wave events and mortalities have shown large interannual variations without any significant increasing or decreasing trend. Most of the cold wave events and mortalities have been observed in January and December months. Males have been found to be more severely affected by the cold waves than females and children. Overall, the results of this research may provide an understanding to develop effective disaster management guidelines for temperature extremes safety and preparedness.

1. Introduction

Under the changing climate, there is an increasing concern in weather and climatic extremes, since these put forward major threats to the human being as well as environment [1–4]. Heat and cold waves are relatively less-known weather extremes as their consequences are not noticeable like others such as heavy rainfall, cloud bursts, cyclonic storm, thunderstorms and tornadoes. The periods of intense heat and cold wave can have serious economic, agricultural, societal and ecological consequences world-over, with heat being the most prominent weather-related destroyers [5]. Therefore, considerable amount of literature is available on heat wave mortalities globally [6–11] than cold wave mortalities [12–17].

In recent decades, an escalation (reduction) in the number of heat (cold) wave events, their durations and intensity has been witnessed [18–21]. More than 70% of the global land surface has observed a substantial reduction in annual incidences of cold days and nights [22, 23]. Moreover, such trends are expected to prolong in future [19], which may be accompanied with a rise in heat related mortalities but a decline in cold related mortalities.

In India, extreme temperature conditions usually occur during March to July (heat episodes) and December to February (cold episodes) months, which results into hundreds of deaths every year [24]. Concerning the impacts of extreme temperature, several studies have been conducted particularly for heat wave events and associated mortalities in India [7, 11, 25–31]. However, literature on extreme cold wave events and mortalities are scanty for Indian region. For example, De and Sinha Ray [32] showed approximately 3264 deaths owing to extreme cold conditions in northern India during 1978–1999. The cold wave event of January 2003 resulted a total of 900 deaths [28]. Besides, a survey regarding impact of cold waves on *rabi* (winter season) crops revealed an economic loss over ₹6230 million during 2006 in Rajasthan state alone [33]. However, these studies are restricted to a particular event or region and are for short span of time, hence, not enough to develop effective risk management measures to cope with cold waves.

In the light of above literature review, this study explores the spatio-temporal variation in cold wave events and associated mortalities over India. A comprehensive and systematic analysis by means of long-term data (1978–2014) is an important component of the study. The results of this study will be useful for policy makers in developing effective

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Impact evaluation of watershed management programmes in Siwalik Himalayas of Haryana, India

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Received: 12 June 2019 / Accepted: 8 June 2020
© Springer Nature B.V. 2020

Abstract

Watershed management is a holistic approach to address the problem of land degradation and to maintain ecological balance. Therefore, the objective of this study was to evaluate the impacts of watershed management programmes in Morni Hills of Siwalik Himalayas, India. A pretested structured questionnaire was administered on 120 randomly selected respondents from eight villages. Data were collected by personal interviews, group discussions and field observations. The respondents were questioned about their perception of different socio-economic, agricultural and livestock and environmental aspects. Descriptive statistics, chi-square test, independent sample t test, one-way ANOVA and satisfaction index were applied for data analyses. The result shows considerable improvements in the socio-economic, agricultural and livestock and environmental conditions. Increased employment opportunities, wages of labourers and per capita income had reduced the poverty and improved the living standard of local community. Increased agricultural productivity and yield had led food security in this area. Approximately 80% of respondents believed that watershed development programmes are prime requirement for the sustainable development. The overall satisfaction level of respondents' was about 56% by performance of management practices. This lower value of satisfaction level suggests that watershed managers should consider local people's knowledge about existing problems, their needs and obstacles in application of management practices. It is believed that findings of this study will be beneficial for watershed managers for effective execution of future projects.

Keywords Land degradation · Ecological imbalance · Watershed management practices · Sustainable development · Satisfaction level · Siwalik Himalayas

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Standardized precipitation index based dry and wet conditions over a dryland ecosystem of northwestern India

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ABSTRACT

Droughts are extreme meteorological and hydrological events having severe impacts on the natural environment and socioeconomic conditions of the affected region especially over a dryland ecosystem like Rajasthan state in northwestern India. Therefore, in this paper an attempt has been made to investigate the dry and wet conditions over the state based on standardized precipitation index (SPI). For this study, diurnal rainfall data of 33 stations have been procured and used for the period 1961–2017. The analysis has been carried out at different time scales i.e. early, mid, late, whole *rabi* season and annually. To examine the trends in rainfall and SPI, Mann-Kendall test has been applied. Spatial plotting of rainfall and SPI has been done by means of inverse distance weighting interpolation technique. The analysis has shown an increasing trend in annual SPI over majority of stations (23 stations), with significant increasing trend at 5 stations (significant at 95% confidence level). Seasonally, incremental drying conditions have been witnessed during mid- and late *rabi* seasons, which are opposite to early *rabi* season when about 70% of the stations have witnessed wetting conditions. Almost all the stations have evidenced severely dry years except Banswara, Barmer, Nagaur and Sirohi stations. Overall, the northwestern, southeastern and northeastern parts have suffered from high drought severity, whereas central regions have relatively low severity of droughts. Finally, the results of this study may be beneficial for decision makers in formulating water management policies to mitigate the impact of dryness and wetness.

ARTICLE HISTORY

Received 11 May 2020
Accepted 4 October 2020

KEYWORDS

Drought severity; rainfall; season; spatial distribution; trend analysis; Rajasthan

1. Introduction

Drought events and their related impacts on society and environment are expected to increase due to changing climate (Bates et al., 2008; Dai, 2011; Romm, 2011). Over the years, several drought indices such as Palmer Drought Severity Index (PDSI) (Palmer, 1965), Rainfall Anomaly Index (RAI) (Van Rooy, 1965), Surface Water Supply Index (SWSI) (Shafer & Dezman, 1982), Palfai Aridity Index (PAI) (Palfai, 1990), Standardized Precipitation Index (SPI) (McKee et al., 1993), Vegetation Condition Index (VCI) (Kogan, 1995), Effective Drought Index (EDI) (Byun & Wilhite, 1999), Reconnaissance Drought Index (RDI) (Tsakiris et al., 2007), Perpendicular Drought Index (PDI) (Ghulam et al., 2007), Standardized Runoff Index (SRI) (Shukla & Wood, 2008) and Standardized Precipitation Evaporation Index (SPEI) (Vicente-Serrano et al., 2010) have been developed and used by scientists for identification and management of drought around the world. Mishra and Singh (2011) have comprehensively reviewed the merits and demerits of these indices under diverse conditions. Of the above indices, SPI suggested by McKee et al. (1993) have distinct merits consisting of simplicity to calculate, broader applicability, tailored for multiple time scale, incorporates only rainfall as input data and least affected by geographical and topographical

differences (Bazrafshan et al., 2014). Of late, SPI has been extensively used in estimation, monitoring, watching and forecasting of droughts universally (Spinoni et al., 2014) as well as in several realms namely, Africa (Dhurmea et al., 2019; Dutra et al., 2013), Europe (Barker et al., 2016; Karabulut, 2015), North America (Ford & Labosier, 2014), South America (Seiler et al., 2002), West Asia (Awchi & Kalyana, 2017; Mossad & Alazba, 2018; Mustafa & Rahman, 2018; Zakhem & Kattaa, 2016) and South-East Asia (Bong & Richard, 2019; Du & Shi, 2013; Kundu et al., 2020; Rahman et al., 2018; Zin et al., 2013). Apart from this, SPI has been modelled using geostatistical techniques to generate spatial maps (Bhuiyan et al., 2006; Sharafati et al., 2020).

India has a history of droughts, facing 22 major droughts between 1871 and 2002. Likewise, about 16% of its total geographical area is drought prone, annually affecting approximately 50 million people (Prabhakar & Shaw, 2008). Droughts are of major concern in Rajasthan state of India because much of the state is highly drought prone experiencing drought very frequently (Dutta et al., 2015). The state has witnessed recurring and prolonged droughts of about 3–4 years in a cycle of 5 years with water scarcity almost every year, resulting a disruption in the socio-economic development. Pingale et al. (2014) have reported a significant increasing trend in temperature

SPATIO-TEMPORAL DYNAMICS OF BAY OF BENGAL TROPICAL CYCLONES: 1972-2015

Doctoral Dissertation Abstract (2019)

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Tropical Cyclones (TCs) are non-frontal low-pressure systems of synoptic scale with organized convection over tropical and sub-tropical waters. These TCs are among the most powerful and disastrous weather events, which often cause extreme socio-economic impacts in the coastal areas due to strong winds, intense rainfall and high storm surges resulting coastal inundation. Therefore, various researchers have extensively examined the TCs occurrence for different ocean basins world over particularly in the North Atlantic, the western and eastern North Pacific and the Australian region.

The North Indian Ocean, including the Bay of Bengal (BoB) and the Arabian Sea, accounts for just 7 per cent of global TCs. About 80 per cent of North Indian Ocean TCs originating in the BoB, tend to be the deadliest of any TCs around the globe. Adjoining coastal countries including Bangladesh, India and Myanmar have reported more than 75 per cent of the casualties caused by BoB TCs. However, studies on the BoB TCs are not well documented in comparison to other ocean basins. Also, the available studies are restricted to small time period, particular season and few parameters of the BoB TCs. None on the study has provided a meticulous

and comprehensive analysis about spatial and temporal variations of the BoB TCs comprising their frequency, intensity, duration, accumulated cyclone energy (ACE), power dissipation index (PDI), genesis location, track and landfall. Also, the influences of different modes of climate variability such as El Niño-southern oscillation (ENSO) and Madden Julian oscillation (MJO) over the BoB TC activity have not been well documented. Besides, no study has been attempted to identify the areas under the high risk of TCs extreme winds in the BoB. Therefore, to fill this research gap, the present study has been attempted to investigate the spatio-temporal dynamics of Bay of Bengal tropical cyclones.

Objectives of the Study

Major objectives of the study are:

- to study the climatological characteristics of TCs in the BoB during the period 1972-2015;
- to identify the influence of ENSO on the BoB TCs and associated alterations in the environmental conditions;
- to investigate the impact of MJO on the BoB TCs and related modulations



Advancing Agricultural Development in Haryana: A Comprehensive Analysis and Blueprint for Progress

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ABSTRACT

Haryana, a prominent Indian state with remarkable agricultural development, has witnessed substantial improvements in food grain productivity and per capita GDP. However, despite these achievements, the agricultural sector faces challenges such as mounting debt, declining profits, land fragmentation, and saturation in productivity. To address these issues effectively, it is essential to understand the current stage of agricultural development and identify strategic interventions. This paper presents an in-depth analysis of Haryana's agricultural landscape, examining land utilization patterns, agricultural landholdings, input usage, productivity trends, and credit dynamics. Drawing on the analysis, the paper offers a blueprint for further development, emphasizing sustainable practices and equitable growth.

Keywords: Productivity saturation, Agricultural landholdings, Input usage, Credit dynamics, Blueprint for progress, Economic prosperity, Per capita GDP, Gross domestic product, Sustainable practices, Equitable growth, Class relations, High-yielding varieties, Mechanization, Land productivity, Disguised unemployment, Financial institutions, Institutional credit, Productivity gap, Financial literacy, Inclusive financial services, Sustainable growth..

INTRODUCTION

Haryana, an agriculturally developed state in India, encompasses 44,212 square kilometers, contributing to 1.4% of the country's total area. The state has made significant strides in agricultural productivity, particularly in the production of food grains. In the year 2014-15, the agricultural productivity for food grains reached an impressive 3,772 kg per hectare, surpassing the national average of 2,070 kg per hectare (Deshpande: 2017). Haryana's economic prosperity is evident in its per capita GDP, which stood at INR 124,302 per annum in 2014-15 (at constant 2011-12 prices), far exceeding the national per capita GDP of INR 72,805 per annum. However, despite the state's impressive economic performance, there has been a substantial shift in the contribution of the agricultural sector to the gross domestic product (GDP). The share of the agricultural sector in the state's GDP has steadily declined from 60.7% in 1969-70 to 17.6% of the gross state value added (at constant prices of 2011-12) in 2017-18. Unfortunately, the success in agricultural productivity and economic growth has not translated into equitable benefits for the farming community.

The peasantry in Haryana is facing multiple challenges, including a heavy burden of debt, declining profits, land fragmentation, and a saturation in both productivity and production. This unfavorable situation has created a crisis-like scenario in the state's agricultural sector. To address these complexities and devise effective strategies for intervention, it is crucial to consider the objective stage of development reached by the society. An objective analysis of the prevailing conditions, encompassing social, economic, and political factors, is essential to identify appropriate tactics at the political, administrative, and policy levels. However, drawing generalizations for the entire country would be impractical due to India's vastness and diverse development patterns across regions. Given the specific context of Haryana, this paper aims to delve into the nature of agricultural production in the state. Through a detailed analysis of the prevailing situation, the paper seeks to identify areas that require intervention and propose suitable recommendations. By understanding the challenges faced by Haryana's agricultural sector and developing targeted interventions, the paper aims to foster sustainable growth and improve the livelihoods of the farming community. These insights can serve as a valuable reference for policymakers, administrators, and stakeholders to drive positive change in Haryana's agricultural landscape and contribute to the overall development of the state.

RESEARCH METHODOLOGY

The research methodology adopted in this study aims to assess the mode of production in the agricultural sector of Haryana, focusing on key indicators that determine the class relations prevalent in the society. The mode of production is crucial in understanding the development stage of a society, and it is closely linked to the class relations that govern the agricultural sector. For this analysis, the primary aspect of the system, which holds the essence of the whole, has

New Face of Education Sector Post Covid-19

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The COVID-19 pandemic has disrupted the lives of students in different ways, depending not only on their level and course of study but also on the point they have reached in their programmes. The prevalent pandemic has forced all the educational institutions across the India to suspend the teaching through physical classrooms which has forced the all the educational institutions to find the new alternatives to the classroom academic delivery. From the present paper, we can conclude that the covid – 19 pandemic has changed the whole face of education system. Going forward, digital education is likely to be integrated into mainstream education. The current system of education is providing education to the learners beyond geographical boundaries keep them safe at home. Innovative methods of teaching , learning and student assessment have become the need of time during this pandemic for educational institutions starting from schools to higher education also. Though there are some negative impacts of the digital education as discussed in this paper but our country will have go through a major transformation in education sector for the capacity-building of young minds both in school and higher education. It is the duty of central and state Governments to take appropriate steps to ensure the healthy and favourable environment for the progress of online education in the country in present pandemic of Covid - 19 by providing free and high speed internet and electronic gadgets to the needy ones. Moreover the government should take strict regulations to avoid retrenchments of faculty in private schools, colleges and universities. While finalizing this paper I am also infected from corona and the myself along with the entire nation is fighting to win over Corona, it is very important to bring a mental revolution by implementing an effective digital education system which may be beneficial for both educators and learners and overcome the drawbacks of the system.

Keywords: Pandemic, Educational institutions, Education.

Date of Submission: 05-10-2020

Date of Acceptance: 18-10-2020

I. INTRODUCTION:

To ensure the safety of the people of the country from the severe impact of COVID-19, the govt. of India, as a part of national lockdown, has closed all the educational institutions. The prevalent pandemic has forced all the educational institutions across the India to suspend the teaching through physical classrooms which has forced the all the educational institutions to find the new alternatives to the classroom academic delivery.

The COVID-19 pandemic has disrupted the lives of students in different ways, depending not only on their level and course of study but also on the point they have reached in their programmes. Those coming to the end of one phase of their education and moving on to another, such as those transitioning from school to tertiary education, or from tertiary education to employment, face particular challenges. They will not be able to complete their school curriculum and assessment in the normal way and, in many cases, they have been torn away from their social group almost overnight. Students who make the transition to tertiary education later this year are unlikely to take up offers to sit their year-end school exams (e.g., the International Baccalaureate) in a later session **(Sir John Daniel)**

The current pandemic is not only seen affecting the health of the citizens in the country but is also seen hindering various industries and shaking them to their roots. The national lockdown and the ascending health crisis were striking the education of the students as well, with their universities being shut and their syllabi stranded, until the industry decided to initiate a revolution instead. Reinventing their radicals and making a conscious choice to grow even in the time of crisis, the universities decided to digitalise the sector. The educational reform in India in the COVID-19 era seems to be a live example of how need truly is the mother of invention or reinvention, in this scenario. Allowing educational institutions to adopt online learning and infuse a virtual study culture, the pandemic is already steering the sector forward with technological innovation and advancements **(Kumar DNS)**

These nationwide closures are impacting over 91% of the worlds' student population. Several other countries have implemented localized closures impacting millions of additional learners. UNESCO is supporting

A POLITICAL ECONOMIC ANALYSIS OF INDIAN ECONOMY DURING POST LIBERALISATION

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ABSTRACT

The present paper revealed that most striking dissatisfaction of the growth performance under liberalisation is that of high fluctuation and largely correlated with only service sector. A clear feature of mismatch between sectoral share of employment and sectoral share of GDP emerged from the trend since independence. Service sector which exhibits a steep increasing trend in case of GDP contribution shows a very marginal shift. The overwhelming majority of workers are employed in a massive unorganized sector. The public sector employment continuously declined. Enlargement of private sector employment was not able to effectively offset the deceleration experience in the public sector employment. The exploitation of women are continuing segregation in the labour market with women working in low paid sectors, discrimination in wages and increasing domestic burdens. Among all religious groups except Islam WPR is more than national average. The benefit of productivity increase under liberalisation did not accrue to workers but they are facing a corollary of the decline in the share of wages in net value added. India has got more unequal over the last two decades—India's Gini coefficient, the official measure of income inequality, has gone increased. The inequality is reemphasised with the declining per capita availability of cereals and per capita calorie intake.

KEYWORDS: Globalization, Exclusion, Washington Consensus, Idiosyncratic Pattern of Development, White Collared Employment Opportunities, Purchasing Power Parities per capita, Golden Growth Rates, Head Count Ratio, Gini coefficient, MPCE, Socio Economic Cast Census, Hindu¹ Rate of Growth.

I. INTRODUCTION

The 1990s marked a significant departure from the old paradigm of development and ushered in to hegemony of a new thinking which is centred on growth rate and super-enhancement of the surplus value with an exit of the state through massive privatisation and the pre-dominance of market forces. It is the “ideology of globalization” where only the free flow of market dynamics could survive. “When the ideology of liberalization began to dominate economic thinking, the focus of attention shifted. Development policy was effectively restricted to two major strategies: first, withdrawing or diluting interventions that resulted in any deviation of domestic price levels and relative prices from international or “border” prices; and second, facilitating and supporting private investment to encourage its reallocation into areas in which the country had a competitive advantage in both production and trade” (Chandrasekhar and Ghosh, 2015). In India, rhetoric objectives of different plans include to securing rapid economic development and expansion of employment, reduction of disparities in income and wealth, prevention of concentration of economic power and creation of values and attitudes of a free and equal society. But, the performance of the Indian economy in the last two decades makes a significant departure from that in earlier decades in terms of these objectives. It is in this context that this paper in its first section relates to trajectory of economic growth that tell us that what is the real truth of excitement about growth and what are the role of its sectoral contributors.

The second section focuses first, on employment growth and sectoral share of employment, and then looks at the evidence of possibly significant links, such as nature of employment and social distribution, structural changes, shares of wages in the national income and growing wage inequalities.

In the last but not least, the third section establishes the relationship between macroeconomic policy changes and social discrimination as well as exclusion. This section puts forward the argument that unviable path of development adopted under liberalisation in India leads to create gender, caste

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Use of Plastic Cards in Banking: A Study

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ABSTRACT

Banks, now a days, are adopting new technological services like plastic cards, PC banking, Electronic Funds Transfer (EFT), Internet banking etc. to approach the maximum customers inspite of having less physical branches (**Venkatesan and Kumar, 2007**). Plastic cards are one of the innovations through which the customers can make use of banking services just by owning the card issued by bank without restricting themselves in the official banking hours. Plastic cards as the component of e banking have been in use in the country for many years now. However, the card-based usage has picked up only during the last few years. Payment by cards is now becoming a much preferred mode for making retail payments in the country (**Report on trend and progress of banking in India 2006-07, RBI**). The main objective of the paper is to find out the views of the respondents regarding use of plastic cards in banking. While preparing this paper a sample of 50 respondents was taken from Rohtak city of Haryana. The future of plastic cards is bright in India, as these are becoming popular among customers as well as banks due to their characteristics. Though the results of the study show that use of plastic cards leads the tendency of over-spending in the people and still plastic card is not the most preferred way to pay utilities and travelling bills by majority of respondents. The plastic cards have immense opportunities in a growing economy like India in both urban as well as rural areas. All types of banks whether public, private or foreign are contributing positively towards the development of plastic cards in India.

Keywords: Plastic Cards, Banking, Payments.

Introduction: Electronic banking is the new trend significantly adopted by banking sector worldwide due to its wider scope for the customers as well as banks at large. Various sophisticated products have been launched by the banks which help them to meet the basic requirements of their customers. Banks, now a days, are adopting new technological services like plastic cards, PC banking, Electronic Funds Transfer (EFT), Internet banking etc. to approach the maximum customers in spite of having less physical branches (**Venkatesan and Kumar, 2007**). Plastic cards are one of the innovations through which the customers can make use of banking services just by owning the card issued by bank without restricting themselves in the official banking hours. Plastic cards as the component of e_banking have been in use in the country for many years now. However, the card-based usage has picked up

E-Way Bill in GST: Provisions and Problems

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ABSTRACT

A waybill is a receipt or a document issued by a carrier giving details and instructions relating to the shipment of a consignment of goods. It is an electronic document generated on the GST portal evidencing movement of goods. It is compulsory for every registered person to generate e-way bill for consignment of goods having value more than fifty thousand rupees. Validity period for an e-way bill or a consolidated e-way bill shall be based on the distance and type of cargo. The present paper aims to know about various provisions and problems relating to E-Way bill under GST. The e-way bill provisions were aimed to remove the difficulties of the old billing system prevailing under VAT in different states, abolition of the check posts, simplifying the procedures and make uniformity in the laws throughout the country. Though some of the benefits like abolition of check posts, reduction in transportation cost and time, uniformity in e_way bill generation has been achieved but still there are some issues which need to be taken care of have been discussed in suggestions to make the e_way bill system stronger one.

Keywords: E_way Bill, Document, Provisions

A Study of India's Foreign Trade and its Changing Pattern

Mohan Kumar*

Foreign trade includes all imports and exports to and from a country. The present paper focuses on the main features of India's foreign trade. This paper enriches us with some facts such as direction of India's foreign trade, composition of our exports, composition of our imports, India's services trade. Prior to the 1991, India was a closed economy as the average tariffs exceeding 200 percent and the extensive quantitative restrictions on imports were imposed. Foreign investment was strictly restricted to only Indian ownership of businesses. Since the liberalization, India's economy has improved mainly due to increased foreign trade. India's foreign trade has great significance for its Gross National Product (World Bank, 2011). In 1980-81, India's foreign trade constituted 12% of its GNP whereas in 2001-02 it increased to 23.4% of Gross National Product. After independence, there was change in the composition of India's export trade. Before independence, India used to export agricultural products and raw materials. Now on export side, various types of finished products have been added to the number of export commodities. In the post-independence era, composition of India's import has also undergone a change. Prior to independence, India's balance of trade was favourable. But soon after independence, it became unfavourable. Most of India's foreign trade is by sea routes. About 68% of India's trade is by sea. India has very little trade relations with neighboring countries like Nepal, Afghanistan, Burma, Sri Lanka etc. India's foreign trade depends mostly on foreign shipping companies, insurance companies and banks. After independence, government has been paying special attention towards these aspects of foreign trade.

[**Keywords** : Foreign Trade, Composition, Independence]

1. Introduction

Foreign trade plays an important role in the economic development of a country. It is said, "Foreign trade is not simply a device for achieving productive

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Green Marketing in India : Need and Challenges

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The term green marketing is the buzzword used in industry which is used to describe business activities which attempt to reduce the negative effect of the products/services offered by the company to make it environmentally friendly. Increasing awareness on various environmental problems has led a shift in the way consumers go about their life. There has been a change in consumer attitude towards a green lifestyle people are actively trying to reduce their impact on the environment. A number of environmental laws have been promulgated in the country to prevent environmental degradation. Both Govt. and Non-Govt. Organizations have floated green companies to combat the ever increasing problems of pollution and fast depletion of natural resources. Additionally the development of green marketing has opened the door of opportunity for companies to co-brand their products into separate line; such marketing techniques will be explained as a direct result of movement in the minds of the consumer market. However, this is not widespread and is still in its infancy. In this research paper the main emphasis has been made on concept, need & importance of green marketing and discusses its practice in the Indian context. The study concludes that green marketing is something that is continuously growing in both practice and demand.

[**Keywords :** Green Marketing, Green Products, Eco friendly, Environmentally safe, Recyclable]

1. Introduction and Evolution of Green Marketing

According to American Marketing association, green marketing is the marketing of products that are presumed to be environmentally safe. Thus green

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AN ANALYSIS OF ENVIRONMENT CRISIS AND SUSTAINABLE ENVIRONMENTAL NEEDS

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Abstract

The world faces a series of environmental crises that reach every corner of the globe. This is primarily due to the unprecedented growth in the world economy over the past 60 years. The environmental, social and economic challenges these poses are all interconnected. This study attempts to analyze the relationship of the per capita GDP of countries with their respective global CO2 emission, the class character of environmental change in the developing countries and a brief discussion on the evolved contradictions in the international conventions and treaties. This will help to understand the profound changes affecting the global environment.

Keywords: Climate Change, Greenhouse Gases, International Panel on Climate Change, CO2 Emission, International Energy Agency.

Introduction

Climate change is primarily caused by the building up of greenhouse gases (GHG), e.g. carbon dioxide, methane, nitrous oxide and others in the atmosphere (Rashmi & Stapathy, 2010). Climate change can slow down the pace of development either directly through increased exposure to climate variability or indirectly through erosion of the capacity to adapt. It also poses a significant threat to the physical health of indigenous communities and their ability to sustain their traditional life, languages, cultures and knowledge (Chaturvedi, 2010). The problem of climate change came into force in 1988 when North America suffered a severe drought and a scorching summer (Pachauri, 2003). However, it has reached the top of the international agenda nowadays. At the initial stage, several suspicions existed in the developing countries that the scientific evidence being put forward in support of changes in the earth's climate system was essentially a means to create impediments to the growth of the developing world. The suggested solution was a shift to using new fuels that were low in carbon intensity. All the debates about climate change, causes, consequences, timing, trajectory and remedies are continuing on the regional and international levels. Some

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Challenges and Opportunities in Higher Education in India: A Study of Commerce Students

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Abstract

The system of higher education is one of the largest systems in the world. Higher Education, in India, starts with three years graduate courses in Art, Commerce or Science followed by Postgraduate courses which are of two years' duration generally. In India, the Ministry of Human Resource Development (MHRD), Department of Higher Education is the Apex body of governance acting as an umbrella organization which delegated the responsibility to evaluate the quality of institutions and programmes to University Grant Commission (UGC). However recently, the Govt. of India has proposed to complete overhaul of apex higher education regulator – University Grant Commission, repeal of the UGC Act 1951 and a fresh legislation to set up as the Higher Education Commission of India (HECI). The main objective of the present research paper has is to understand the present status and emerging challenges of higher education in India especially in commerce education. Primary data was collected from 40 respondents taken, from Rohtak City of Haryana for this study. Commerce education is the area of education which develops the required knowledge, skills and attitude for the success handling of trade, commerce and industry. The present study shows that some of the main problems which are being faced by commerce students are lack of communication skills and competitive skills which is a serious concern. The main suggestions of the study include redrafting the curriculum and to impart practical and application based knowledge knowledge to the students.

Key Words: Higher Education, Communication Skills, Competitive Skills, Curriculum.

The system of higher education is one of the largest systems in the world. There has been a remarkable change in this system after the independence, particularly after 1990s. Higher Education cultivates human mind and makes them important and useful players in the economy of a nation. Higher Education, in India, starts with three years graduate courses in Art, Commerce or Science followed by Postgraduate courses which are of two years duration generally. Professional courses like MCA and MBA takes two to three years after graduation. Similarly engineering and medical courses take 4 to 6 years after completion of higher secondary. The students who can't attend regular classes for various reasons may pursue their education through distance learning institutes. In India, the Ministry of Human Resource Development (MHRD), Department of Higher Education is the Apex body of governance acting as an umbrella organization. Indian higher education consists of several regulatory bodies performing overlapping roles in addition to influences from few other ministries too. The judicial interventions have at several times complemented or contradicted the objectives associated with higher education (Agarwal, 2006). The Ministry of Human Resource Development of the Central government delegated the responsibility to evaluate the quality of institutions and programmes to University Grant

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