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Diversity of Fern and Fern Allies of Gokak, Ramdurg and Badami Hills, Western Ghats, Maharashtra, India

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Abstract:
Survey of the ferns from Gokak, Ramdurg and Badami Hills, Western Ghats, was carried out. Distribution of 18 fern species belonging to 09 genera and their species has been described in present communication. The current effort was undertaken to number the non - flowering plants, especially ferns, in the hills of Western Ghats (Sahyadhri hills). It is a rich biodiversity area in Sahyadri ranges, Western Ghats of the ferns from this area.
Keywords: Diversity, Allies Gokak, Ramdurg, Badami Hills.

Introduction:

Maharashtra is the central state of India. The Sahyadri range is the physical backbone of Maharashtra. The region between the Arabian Sea and the Sahyadri Range is called the Konkan. The Konkan is the very best and a beautiful area and it's a god's gift to us having most of the diversity. **Western Ghat is varied flora, fauna and landscapes. The area is one of the worlds "Mega Biodiversity Hotspots".** Diversity of life on earth has always remained a striking feature of troposphere and important area of investigation for biologist. These are some of the places that harbour rich diversity of endangered species both in the aquatic and terrestrial ecosystems.

The present authors are engaged in studies of the fern diversity of the Sahyadri Hills of the Western Ghats further north in Maharashtra State.

Western Ghats is very rich and varied in flora because of its diversified topography and varied climatic conditions. The ferns and fern allies (Division: Pteridophyta) comprise an integral component of this flora. A comprehensive study of ferns and fern allies of Northern Western Ghats hills of Maharashtra has not been conducted till date, except for some reports by Carstensen, G.H. (1891), Mahabale, T.S. (1938), Shende, D.V. (1945), Beddome (1883), Bole & Almeida (1977 & 1989), Naiknaware (1983) and Manickam & Irudayaraj (2009). Recently, Jadhav et., al (2011) studied the ferns and fern allies of Koyna-wild life sanctuary. However, these reports give a vague distribution of the studied species and lack location specific data. This underlines the need for an in-depth exploration and documentation of pteridophytes in this region. Therefore, the present study aims to provide a basic understanding of pteridophytic flora in the Northern Western Ghats, which may in turn provide direction to future workers in this field. This paper reports 41 species of ferns collected from six hills of Northern Western Ghats (Maharashtra).

Material and Methods:

Study area

Survey of the ferns in the study area was undertaken during the year 2021-2022. Field notes were prepared at the time of collection to record habit, habitat and localities. The specimens were identified by following floras and manual are used **(**Beddome R.H. (1970), Manickam and Irudayaraj, (1992) Pardeshi (2009). Sachin Patil, et al. (2012) Neel, et al. (2018) and Vitthal N. Rathod (2022.**)** and deposited in the herbarium of Botany Department, Z. B. Patil College, Dhule.

Methods of identification and classification of ferns Identification of different fern species was performed by using floras described by Beddome (1883), Blatter & Almeida (1922) and Manickam & Irudayaraj (1992).

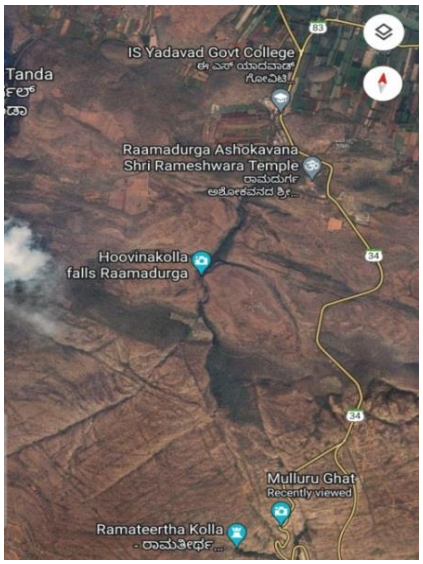
The category of rarity of ferns was determined based on the occurrence of a species at different localities of hills and hillocks in the northern part of Western Ghats. For each locality, 7 sites were studied (6 hills × 7 sites/hill = 42 sites). The minimum distance between two sites was 6 Kms. If the species was found in more than 20 sites (50%), the species was considered to be common in the studied area. If the frequency of species was Sachin Patil : Diversity of Ferns in the Hills of Northern Western Ghats, Maharashtra, India 159 between 15 – 20 sites (25 – 50 %), it is considered as occasional, whereas if the species was found in 5–15 sites (more than 12.5% and less than 25%), the species was considered to be threatened. Likewise, if the frequency of a species was below 5 sites, it was considered as rare for the study area.

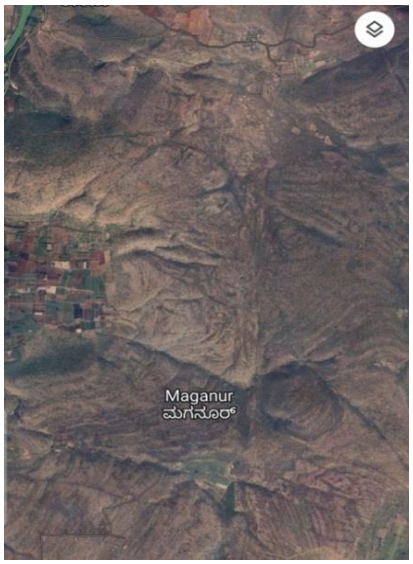
Diversity Of Fern And Fern Allies Of Gokak, Ramdurg And Badami Hills.
(Occurrence, Habitat And The Distribution Of Ferns In)

Sr. No.	Species name	B	G	Sh	Sa	D	R	M	H
1.	Selaginella bryopteris	+	-	-	-	-	-	-	-
2.	Selaginella ciliaris								
3.	Ophioglossum costatum	-	+	-	+	-	-	-	-
4.	Ophioglossum gramineum	+	+	+	+	+	+	+	+
5.	Ophioglossum gomezianum	+	+	+	+	+	+	+	+
6.	Ophioglossum sp. aff parvifolium	+	-	+	+	-	-	-	-
7.	Ophioglossum aff. eliminatum	-	+	-	-	-	-	-	-
8.	Parahemionitis aerifolia	+	+	+	+	-	+	-	+
9.	Adiantum inscisum	+	+	+	+	+	+	+	+
10.	Adiantum cappilus veneris	-	+	+	+	-	-	-	+
11.	Adiantum philipense	-	+	+	+	-	-	-	+
12.	Oeosporangium tenuifolium	+	+	+	+	+	+	+	+
13.	Oeosporangium elegans	+	-	+	+	-	-	-	+
14.	Actinopteris radiata	+	+	+	+	+	+	+	+
15.	Pteris biaurita	+	+	+	+	-	-	-	-
16.	Pteris vittata	+	+	+	+	+	+	+	+
17.	Pityrogramma calomelanos	-	+	+	+	+	+	+	-
18.	Christella cf. parasitica	-	+	+	+	-	+	-	-

B=Badami, G= Gokak, Sh = Shindhogi, Sw= Sawdatti, D=Dodamangadi, R=Rankal koppa,
M= Magnur, , H= Halgali.- shaktinagar.

Google Earth Images - Study Area Of Gokak, Ramdurg And Badami Hills





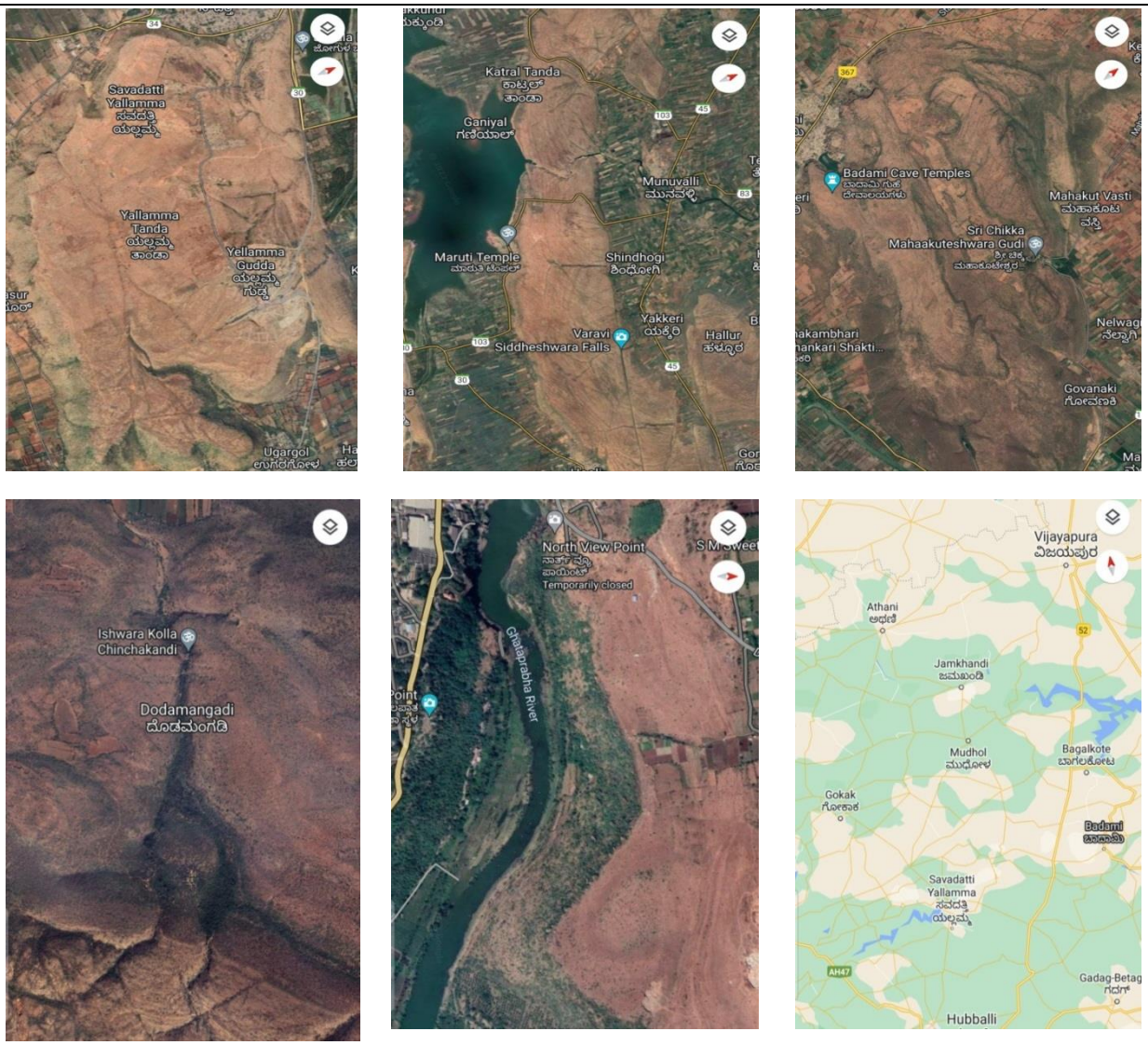


Plate **A.** Rankalkoppal **B.** Magnur, **C.** Halagi- shaktinagar, **D.** Sawadatti, **E.** shindhogi and Sawadatti, **F.** badami, **g.** dodamangadi, **H.** gokak, I. **Overall study area**

Result and Discussion:

Documentation on the pteridophytes from Gokak, Ramdurg and badami hills has not been recorded so far, hence an attempt on photograph and other information. Pteridophytes from from this area have been accomplished.

Anthropogenic activities as noticed in the Stavanidhi Ranges

Which are being destroyed for state development. T hese species

May have totally vanished from the study sites. Pteridophytes

Are an important class of vascular plants and therefore their

Numbers should be documented as they are the wealth of our planet.

These species may have some missing and rarely founding from the study area. Pteridophytes are an important class of vascular plants and therefore their numbers should be documented as they are the wealth of our planet.On listing of the Pteridophytes 24 species from 12 genera of different families were recorded. The rare and threatened plants confined to this area are *Oeosporangium elegans*, *Parahemionits cordifolia*, *Ophioglossum gomezianum* etc.

Out of 12 genera, *Adiantum*, *Ophioglossum*, *Selaginella* and *Pteris* are most commonly found in this Ranges. Based on occurance studies *Adiantum* and *Selaginella* genus are a common species occurring in large numbers and other species are recorded in very few numbers therefore categorized as rare in the study area. *Ophioglossum* are also found at the slopes of these area or ranges.Remaining all species is occasionally found, as showed in Table 1. Comparing both the sites the distribution of the species is found to be unique.

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Artificial Intelligence: Transforming Industry and Society for the Future

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Abstract:
Artificial Intelligence (AI) represents a transformative leap in technology, with profound implications for various industries. This research paper explores AI's potential to revolutionize sectors such as healthcare, finance, education, manufacturing, and transportation by mimicking human intelligence processes. Key advancements in machine learning, neural networks, natural language processing, and computer vision have significantly enhanced AI capabilities, leading to increased efficiency, improved decision-making, and enhanced customer experiences. Despite these benefits, AI adoption faces challenges including job displacement fears, ethical concerns, algorithmic biases, and regulatory issues. This study aims to investigate the fundamental concepts of AI, identify barriers to its adoption, and discuss its advantages in different industries. By understanding AI's potential, we can foster economic growth, create new job opportunities, improve public services, and drive innovation. Addressing challenges and misconceptions through education, ethical practices, and inclusive policies is essential for harnessing AI's full potential to achieve positive economic and societal impacts. As AI continues to evolve, its role in shaping our future will become increasingly significant, unlocking new possibilities for progress and prosperity.
Keywords: Artificial Intelligence (AI), Machine Learning, Natural Language Processing (NLP), Data Analysis, Automation.

Introduction:

Artificial Intelligence (AI) is a field in computer science dedicated to developing machines that mimic human-like behavior. These intelligent systems perform activities traditionally requiring human intelligence, such as learning, problem-solving, understanding natural language, and pattern recognition. AI frameworks rely on algorithms and data to make decisions, adapt to new situations, and progressively improve their performance. AI can be defined as the simulation of human intelligence processes by machines, especially computer systems. It encompasses various sub-fields, including machine learning, natural language processing, computer vision, robotics, and expert systems. AI systems can analyze large amounts of data, extract meaningful insights, and make predictions or decisions based on the available information. The ultimate goal of AI is to create machines that can operate autonomously with intelligence levels comparable to or higher than humans.

Understanding the Potential of AI:

Artificial Intelligence (AI) has emerged as a transformative technology with immense potential to revolutionize numerous aspects of human life. By mimicking human intelligence processes, AI systems can analyze large amounts of data, identify patterns, and make predictions or decisions with remarkable accuracy. To understand the potential of AI, it is necessary to explore its advances and applications in various industries.

Advances in Artificial Intelligence:

The field of AI has seen rapid progress in recent years due to advances in machine learning, neural networks, natural language processing, and computer vision. These advances have enabled artificial intelligence systems to achieve unprecedented levels of performance in tasks such as image recognition, speech synthesis, language translation, and autonomous decision-making. Key developments include deep learning algorithms, reinforcement learning techniques, and the proliferation of AI frameworks and tools such as TensorFlow and PyTorch.

Objectives of the study:

- Investigate the fundamental concepts and definitions of artificial intelligence.
- Identify the main challenges and barriers to AI adoption, such as job displacement fears, ethical concerns, biases in algorithms, and regulatory issues.
- Discuss the benefits of AI in increasing efficiency, improving decision-making and enhancing customer experiences.

Applications in Various Industries:

AI technology has found applications in a variety of industries, transforming and innovating traditional processes. Some of the notable areas that benefit from AI include:

1. **Healthcare:** AI is revolutionizing healthcare by enhancing diagnostics, personalizing treatment plans, and streamlining administrative functions. Machine learning algorithms analyze clinical images to detect diseases, while predictive analytics models predict patient outcomes and recommend interventions. Virtual health assistants and chatbots provide personalized healthcare advice and support,

improving patient engagement and access to care.

2. **Finance:** In finance, AI algorithms power risk assessment, fraud detection, algorithmic trading, and customer service automation. Natural Language Processing (NLP) enables the analysis of financial news and social media sentiment to inform investment decisions. AI-powered chat bots help customers with queries and transactions, reducing operational costs and improving service efficiency.
3. **Education:** AI is reshaping learning through personalized learning experiences, adaptive assessment, and intelligent tutoring systems. Machine learning algorithms analyze student performance data to tailor educational content and recommendations to individual needs and learning styles. Virtual tutors provide real-time feedback and support, enhancing student engagement and mastering complex concepts.
4. **Manufacturing:** AI is driving the transition to smart manufacturing by optimizing production processes, predictive maintenance, and quality control. Robotics and automation systems powered by AI increase efficiency and flexibility in production operations. Predictive analytics models predict equipment breakdowns and schedule maintenance, reducing downtime and increasing productivity.
5. **Transportation:** In transportation, AI enables predictive maintenance for autonomous vehicles, route optimization, and fleet management. Self-driving cars equipped with AI perception and decision capabilities promise safer and more efficient transportation systems. AI-powered algorithms analyze traffic patterns and historical data to optimize routes and reduce congestion, enhancing overall mobility and sustainability.

The Importance of Artificial Intelligence:

Artificial Intelligence (AI) is becoming a pillar of the modern economy and society. Recognizing its potential is important for several reasons:

1. Economic Growth and Competitiveness:

AI has the potential to revolutionize industries, increase productivity, and drive economic growth. Businesses using AI technology can gain a competitive edge by automating tasks, optimizing processes, and making data-driven decisions. Recognizing the potential of AI enables countries to invest in research, education, and infrastructure, maintaining competitiveness in the global marketplace.

2. Job Creation and Transformation:

While AI has the potential to automate routine tasks, it also creates opportunities for new jobs and career paths. Recognizing the potential of AI allows policymakers, educators, and businesses to prepare for the changing demands of employees. By investing in reskilling and upskilling programs, individuals can keep pace with the evolving job market and thrive in AI-driven industries.

3. Improved Public Services:

AI applications have the potential to enhance public services, including healthcare, transportation, and urban planning. Recognizing the potential of AI enables governments to deliver more efficient and responsive services to citizens by leveraging data analytics, predictive modeling, and automation. From personalized healthcare treatments to optimized traffic management systems, AI can improve lives for people around the world.

4. Innovation and Discovery:

AI accelerates scientific research and discoveries by analyzing large amounts of data, identifying patterns, and generating insights. Recognizing the potential of AI fosters collaboration among researchers, engineers, and domain experts to address complex challenges in areas such as medicine, climate science, and space exploration. By leveraging AI technology, unprecedented achievements can be realized, leading to progress that benefits society as a whole.

Impact on the Economy and Society:

He impact of AI on the economy and society is profound and multifaceted:

1. Labor Market Disruption

AI-driven automation has the potential to disrupt traditional labor markets by displacing some jobs while creating new opportunities. Industries such as manufacturing, retail, and customer service are undergoing significant changes as AI technologies automate repetitive tasks and enhance human capabilities. Recognizing the impact of AI on the labor market requires policymakers to implement policies that support displaced workers, promote job transitions, and ensure inclusive economic growth.

2. Income Inequality and Skills Gap

The adoption of AI technologies can increase income inequality and widen the skills gap between high-skilled workers and those with low-quality education or technical skills. Recognizing the socio-economic impacts of AI enables policymakers to implement policies that promote equal access to education, training, and employment opportunities. By investing in lifelong learning initiatives and social safety nets, societies can reduce the negative impacts of AI-driven disruptions and promote inclusive prosperity.

3. Ethical and Social Implications

AI raises ethical concerns regarding privacy, bias, transparency, and accountability. Identifying the ethical implications of AI requires careful consideration of how this technology is

developed, deployed, and regulated. Societies must establish ethical frameworks, standards, and rules to ensure that AI systems are designed and used in ways that respect basic human rights, promote fairness, and reduce potential harm. By promoting ethical AI practices, societies can use the benefits of AI while reducing risks and protecting social values.

4. Cultural and Behavioral Change

The wide-ranging impact of AI on everyday life, from personalized recommendations to autonomous decision systems, shapes cultural norms and behaviors. Recognizing the social impact of AI means understanding how these technologies influence human behavior, social interactions, and cultural practices. By promoting digital literacy, critical thinking, and the responsible use of AI technologies, societies can empower individuals to navigate complex socio-technical landscapes and shape an AI-driven future that aligns with collective values and aspirations.

Challenges in Identifying the Potential of Artificial Intelligence:

1. Fear of Job Loss

One of the most prevalent challenges in recognizing the potential of AI is the fear of job loss. Many individuals worry that as AI becomes more capable, it will automate tasks currently performed by humans, leading to unemployment and economic instability. This fear is especially pronounced in industries where routine tasks such as production, transportation, and customer service are easily automated. However, it needs to be recognized that while AI can change some jobs, it also creates new employment opportunities in areas such as AI development, data analysis, and human-AI collaboration.

2. Ethical Concerns

Ethical concerns around the potential of AI are another significant challenge. As AI systems become more sophisticated, questions arise about how they should be programmed to behave ethically. Issues such as algorithmic bias, privacy violations, and the ability of autonomous AI to make ethically effective decisions raise complex ethical dilemmas. These issues must be addressed by policymakers, developers, and society at large to ensure that AI technologies are aligned responsibly and in accordance with ethical principles.

3. Biases in AI Algorithms

Biases in AI algorithms pose a major hurdle in identifying the capabilities of AI. AI systems learn from data, and if that data is biased, it can perpetuate and exacerbate existing social inequalities. For example, biased algorithms in hiring or lending processes can discriminate against certain demographics, perpetuating systemic bias. Addressing bias in AI algorithms requires continuous monitoring to ensure fairness and equity in data collection, algorithm design, and AI-driven decision-making.

4. Regulatory Challenges

Regulatory challenges pose significant barriers in recognizing the potential of AI. The rapid pace of AI development often exceeds the capabilities of regulatory frameworks, leading to gaps in oversight and accountability. Additionally, different regulatory approaches across jurisdictions can create uncertainty for companies developing and deploying AI technologies. Establishing clear, comprehensive rules that balance innovation with security for privacy, security, and fairness is essential to building trust and maximizing the benefits of AI.

5. Misconceptions and Fears

Misconceptions and fears surrounding AI hinder efforts to fully realize its potential. The portrayal of AI in popular media often sensationalizes its capabilities, leading to exaggerated fears of AI-driven dystopias or mass job displacement. Addressing these misconceptions requires education and public engagement to foster a more nuanced understanding of the capabilities, limitations, and potential benefits of AI. By promoting an informed discourse, society can better harness AI's potential for positive impact.

6. Lack of Awareness

Lack of awareness about AI and its potential applications is a significant challenge. Many individuals, businesses, and policymakers do not fully understand how AI works or the range of opportunities it presents. This lack of awareness can lead to missed opportunities for adoption and innovation of AI technologies. Efforts to increase awareness and literacy about AI, including education and training programs, knowledge-sharing initiatives, and public outreach campaigns, are essential to unlocking the full potential of AI and ensuring that its benefits are equitably distributed in society.

Advantages of Artificial Intelligence:

1. Increased Efficiency

Adopting AI technology can significantly increase efficiency in various processes within an organization. By automating repetitive tasks, AI frees up human resources to focus on more complex and creative endeavors. For example, in manufacturing, AI-powered robots can streamline production lines, resulting in faster throughput and lower error rates. In customer service, AI chat bots can handle routine inquiries, allowing human agents to address more challenging issues. Overall, the integration of AI increases productivity and operational efficiency.

2. Improved Decision Making

AI enables businesses to make data-driven decisions with greater accuracy and speed. By analyzing large amounts of data in real time, AI

algorithms can identify patterns, trends, and correlations that human analysts may overlook. This capability allows organizations to anticipate market changes, optimize resource allocation, and mitigate risks more effectively. For example, in finance, AI-powered predictive analytics models can forecast market trends and guide investment strategies. In healthcare, AI algorithms can assist doctors in diagnosing diseases and recommending personalized treatment plans. Ultimately, AI-driven insights lead to better decision-making at every level of the organization.

3. Enhanced Customer Experience

AI enables businesses to deliver a personalized and seamless customer experience across multiple touch points. Through techniques such as natural language processing (NLP) and machine learning, AI systems can understand consumer preferences, behaviors, and emotions. This understanding allows companies to offer tailored recommendations, anticipate customer needs, and provide proactive support. For example, e-commerce platforms use AI-enabled recommendation engines to suggest products based on past purchases and browsing history. In the hospitality industry, AI-powered chat bots can assist guests in booking accommodations and resolving queries in real time. By enhancing engagement and satisfaction, AI strengthens the bond between businesses and their customers.

4. Innovation and Growth Opportunities

Embracing AI fosters a culture of innovation and provides new growth opportunities for businesses. AI-driven technology enables organizations to explore uncharted territories, experiment with new ideas, and disrupt traditional business models. For example, in the automotive industry, AI is driving the development of autonomous vehicles, opening up possibilities for new mobility services and revenue streams. In retail, AI-powered virtual assistants are transforming the shopping experience by blurring the lines between online and offline commerce. By embracing AI-driven innovation, businesses can stay ahead of the competition, adapt to changing market dynamics, and capitalize on emerging trends. Overall, the benefits of adopting AI are multifaceted, ranging from increased efficiency and improved decision-making to enhanced customer experience and new growth opportunities. By harnessing the power of AI, businesses can unlock their full potential and thrive in the digital age.

Conclusion:

Artificial Intelligence (AI) represents a monumental leap in technology, offering transformative potential across various industries. Its ability to mimic human intelligence and process large volumes of data enables unprecedented advancements in healthcare, finance, education, manufacturing, and transportation. While AI brings numerous benefits, including increased efficiency, improved decision-making, and enhanced customer experiences, it also presents challenges such as job displacement, ethical concerns, and regulatory hurdles. Recognizing the importance of AI involves understanding its potential to drive economic growth, create new job opportunities, improve public services, and foster innovation. Addressing the challenges and misconceptions surrounding AI requires a concerted effort from policymakers, educators, businesses, and society at large. By promoting awareness, ethical practices, and inclusive policies, we can harness the full potential of AI to achieve positive impacts on the economy and society. As AI continues to evolve, its role in shaping our future will become increasingly significant, unlocking new possibilities for progress and prosperity.

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The Role of Cryptocurrency in International Finance: Opportunities and Regulatory Challenges

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Abstract:
With its enormous regulatory challenges and potential for new opportunities, cryptocurrency has emerged as a transformative force in global finance. Its decentralized structure promotes financial inclusion by lowering reliance on conventional banking systems and enabling quicker, less expensive cross-border transactions. With the introduction of cutting-edge financial tools like decentralized finance (DeFi), cryptocurrencies like Bitcoin and Ethereum have allowed users to lend, borrow, and trade without the need for middlemen. This quick development, though, also prompts worries about possible abuse for illegal purposes, security threats, and market instability. Around the world, regulatory bodies struggle to strike a balance between the need for strict oversight and innovation in order to safeguard consumers and maintain financial stability. To maximize the advantages of cryptocurrencies while reducing their risks and guaranteeing their long-term viability as a component of the global financial system, a unified regulatory framework must be developed.
Keywords: *Cryptocurrency, International Finance, Bitcoin, Regulators*

Introduction:

A cryptocurrency is a digital or virtual form of money that is encrypted and hence exceedingly difficult to forge or duplicate. Virtually all digital currencies run on decentralized networks that use blockchain technology, which is a distributed ledger maintained by a distributed network of computers. Cryptography-based digital or virtual currencies are known as cryptocurrencies.

They eliminate the need for intermediaries while making internet payments easy and secure. For the purpose of this definition, "crypto" refers to the many cryptographic methods used to secure these entries, including hashing algorithms, public-private key pairs, and elliptical curve encryption. Blockchain technology is crucial to the functionality and attractiveness of cryptocurrencies like Bitcoin. Essentially, a blockchain is just a series of linked data blocks on a digital ledger. Any given block in a network contains a collection of transactions that have all been validated separately. Since each freshly created block must undergo validation before confirmation, it is almost impossible to manufacture transaction histories.

The computers that maintain the online ledger, or its nodes, must come to an agreement regarding its contents. Blockchain technology, according to experts, can benefit a variety of businesses, supply chains, and procedures like online voting and crowdfunding. Companies in the financial sector, like JPMorgan Chase and Co. (JPM) is automating payment processing with blockchain technology to reduce transaction costs.

Types of cryptocurrencies:

Fig.1 Types of Cryptocurrencies

Source:https://www.trustetc.com/blog/cryptocurrency-types/

1. Bitcoin (BTC)
2. Etherm (ETH)
3. Binance Coin (BNB)
4. Tether (USDT)
5. Solana (SOL)
6. XRP (XRP)
7. Cardano (ADA)
8. USD Coin (USDC)

9. Aave (AAVE)

Is Cryptocurrency Legal?

Fiat currencies are issued by monetary or governmental bodies. For instance, the U.S The dollar is accepted as "legal tender" by the government, which also issues it as the official currency of the US. But no public or private organization issues cryptocurrencies. Because of this, establishing their legitimacy in the many different financial jurisdictions throughout the world has been difficult. Not helping things is the fact that cryptocurrency operations have often occurred outside of the bulk of the existing financial system.

In the U.S.

The legal status of cryptocurrencies affects trading and daily transactions with them. This AML compliance is necessary because the Financial Action Task Force (FATF) proposed in June 2019 that its Travel Rule regulate bitcoin wire transactions.

A US court ruled in July 2023 that cryptocurrency purchased by institutions, as opposed to individual investors via exchanges, is a security. Twelve enthusiasts hailed it as a victory for cryptocurrencies; nonetheless, the SEC regulates cryptocurrency exchanges, coin offerings, and sales to institutional investors. In the United States, cryptocurrency is therefore legal, but the industry is gradually seeing regulatory bodies gain ground.

In Asia:

According to Japan's Payment Services Act, Bitcoin is considered legal tender. Crypto exchanges operating inside the country are required by law to collect personal information from its customers, including details on wire transfers.

China has banned cryptocurrency exchanges, transactions, and mining inside its borders, even though the country has a Central Bank Digital Currency (CBDC).

It has been stated that India is working on a cryptocurrency framework; however, until this legislation is enacted, cryptocurrency is not yet illegal. Coins can be offered by exchanges at no cost.

Pros and Cons of Cryptocurrencies:

Pros:

- Protection from inflation
- Self-governed and managed
- Decentralized
- Cost-effective mode of transaction
- Currency exchanges finish smoothly
- Easy transfer of funds

Cons:

- Illegal transactions
- Risk of Data Loss
- Power lies in few hands
- Buying NFTs with other tokens
- No refund or cancellation
- High consumption of Energy

10. Avalanche (AVAX)

Review of Literature:

Yukun Liu (2022): The market, size, and momentum are the three main risk factors in the cryptocurrency world that are identified in this research paper. The cross-sectional expected returns of cryptocurrencies are explained to be well explained by these factors. This research makes use of a model specifically designed for cryptocurrencies that is comparable to the Fama-French three-factor model used in traditional finance. The results imply that these elements, which are consistent with market features seen in more established asset classes, can explain the excess returns from a number of long-short cryptocurrency trading tactics.

Fang, F., & Ventre, C. (2022): This survey offers a detailed introduction to cryptocurrency trading, covering trading strategies, the short structure of the market, and regulatory concerns. It looks like how trading habits and tactics are impacted by the different qualities of cryptocurrencies, such as their bigger volatility and decentralization. In addition, the impact of market anomalies on trading outcomes, algo trading, and arbitrage chances are covered in this paper. It also explains how crucial regulation is to guaranteeing market stability and decreasing risks.

Ukun Liu, Aleh Tsyvinski (2021): In comparison to conventional assets, this research the risk-return profile of cryptocurrencies. As a result of their high volatility, it summarizes that although cryptocurrencies have bigger potential returns, they also carry a grated risk. The study uses a variety of financial models to evaluate these risks and concludes that cryptocurrencies have small exposure to typical risk factors found in classical markets. According to this study's findings, cryptocurrencies are a distinct and risky asset class since they behave distinctly from traditional assets.

Hashemi Joo (2020): The impact of cryptocurrencies on finance and investment was highlighted in this paper's discussion of how they represent a successful application of blockchain technology. Its emphasis the pros of blockchain technology, including decentralization, security, and transparency, which draw investors to cryptocurrencies. This research also discusses the hard times that cryptocurrencies encounter, such as market volatility and regulatory concerns. It comes to the summary that, in spite of these difficulties, cryptocurrencies have become a powerful and disruptive force in the financial sector.

Objectives Of The Study:

This research has been done considering the accompanying the below Objectives:

1. Analyse the Impact of Cryptocurrency on International Finance

2. Identify Opportunities for Growth and Innovation
3. Examine Regulatory Challenges and Responses

Data & Methodology:

The secondary data used in this study is entirely sourced from websites, financial platforms, periodicals, and other online sources.

Results & Discussion

Cryptocurrency Opportunities:

Financial Inclusion: In emerging markets, cryptocurrency has the potential to give underprivileged people access to financial services. Through the use of cryptocurrency, people without access to banks can send and receive remittances, engage in the global economy, and access financial services like investments, loans, and savings. This is done by eschewing traditional banking infrastructure.

Remittances: In emerging markets, cryptocurrency provides an efficient and economical way to send money overseas. Cryptocurrency allows migrants to send money to their families overseas swiftly and securely without the need for costly and often slow traditional remittance channels. This is achieved by doing away with middlemen and lowering transaction fees. **Investment Opportunities**: Cryptocurrency offers an alternative asset class with the potential for large returns for people in developing markets who have few other options for investing. As the world's interest in cryptocurrencies increases, investors in emerging markets can use Bitcoin, Ethereum, and other cryptocurrencies to diversify their holdings and protect themselves from regional economic volatility.

Economic Growth: Through promoting entrepreneurship, job creation, and technological advancement, the adoption of cryptocurrencies can stimulate economic growth and innovation in developing economies. Blockchain projects and cryptocurrency startups have the ability to spur innovation in a number of industries, including finance, supply chain management, healthcare, and agriculture.

Cryptocurrency Regulatory Challenges:

Regulatory Uncertainty: In emerging markets, regulatory uncertainty is a major barrier to the adoption of cryptocurrencies. Numerous governments are finding it difficult to regulate cryptocurrency assets, which has resulted in a disjointed and uneven regulatory environment. Regulations that are too onerous or vague can impede investment, innovation, and the uptake of cryptocurrency technologies.

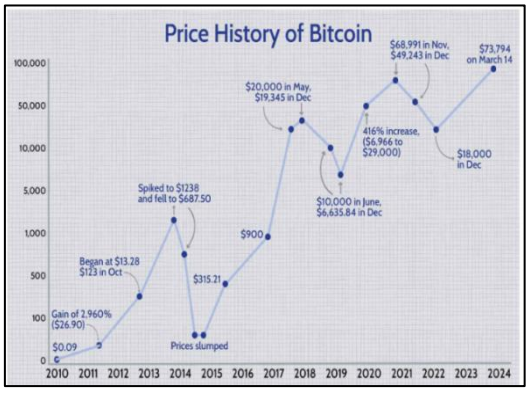
Lack of Infrastructure: The infrastructure required for the widespread adoption of cryptocurrencies is frequently lacking in emerging markets, including dependable internet connectivity and digital literacy. Particularly in rural and isolated areas, limited access to computers, smartphones, and banking services can further obstruct adoption efforts.

Volatility and Risk: Because of the notorious volatility of cryptocurrency markets, users and investors in developing economies may be exposed to serious risks. Cryptocurrency's reputation as a reliable store of value is threatened by price swings and market speculation, which can result in monetary losses. To promote responsible adoption, it is essential to inform users about the dangers and volatility of crypto assets.

Security Concerns: Users in emerging markets face serious risks from security vulnerabilities like fraud, scams, and hacking. Users may be more susceptible to financial exploitation and money loss due to a lack of knowledge about cybersecurity best practices and the prevalence of fraudulent schemes. To foster trust in cryptocurrency ecosystems, security protocols must be strengthened and user education must be prioritized.

Data Analysis:

Fig.2 Price History of Bitcoin



Source: *www.investopedia.com*

In January 2024, Once the SEC was compelled by courts to reconsider its rejection of specific Bitcoin-related investment products, the protracted battle for Bitcoin Spot ETFs came to an end. When the market first opened, some brokerages flooded it with more holdings, but others—like Grayscale's Bitcoin Trust (GBTC)—saw large outflows.

In early March, the market levelled off as the withdrawals from specific funds decreased. It is

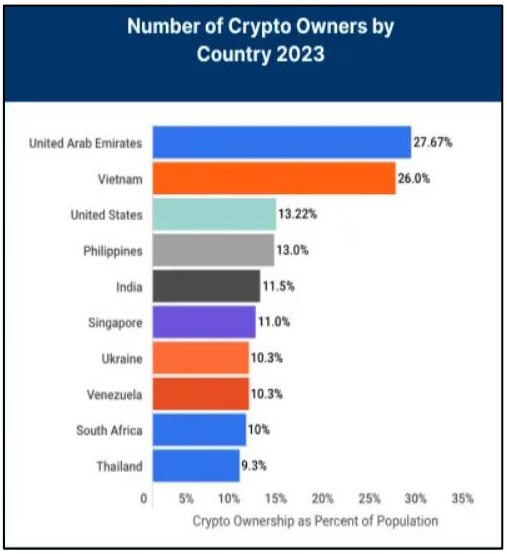
possible that the sudden increase in options available to investors caused the market-wide rebalancing. Following the fund approvals, Bitcoin's price surged rapidly, breaking above $60,000 twice in late February and early March. It reached highs of $69,210 on March 6 and $70,184 on March 8. In the middle of the day on March 14, Bitcoin broke all previous records, hitting $75,830 on the Polish cryptocurrency exchange EXMO.

Fig.3 Top 3 Cryptocurrencies in the world

Cryptocurrency Name	Average Price	Market Cap	Volume	Circulating Supply
Bitcoin (BTC)	USD 30 Thousand	USD 6 Trillion	350 Thousand	19.4 Million
Ethereum (ETH)	USD 2 Thousand	USD 2 Trillion	2.7 Billion	120.2 Million
Tether (USDT)	USD1	USD 0.8 Trillion	18.8 Trillion	83.3 Billion

Source: *Researcher Nester Analysis*

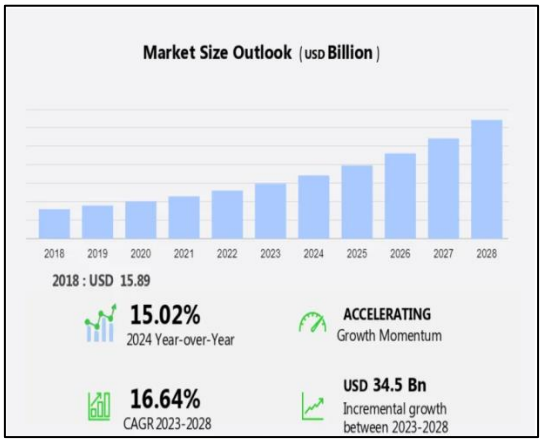
Fig.4 Number of Crypto Owners by Country upto 2023



Source: *Researcher Nester Analysis*

Fig.4 shows the number of Cryptocurrency owner across the world by analysis the data UAE country have highest number of Crypto owners i.e., 27.67% overall the world and the least number of Cryptocurrency owner from Thailand having 9.3%.

Fig.4 Forecast Market Size for Cryptocurrencies



Source: www.technavio.com

The size of the cryptocurrency market is expected to grow between 2023 and 2028 by USD 34.5 billion at a compound annual growth rate of 16.64 percent. Increased investment in digital assets, greater accessibility to crypto wallets, and growing FinTech costs are some of the factors that will drive the market's growth. These components influence the market environment by expressing the changing

trends in blockchain technology and digital finance. The market expects opportunities for continued growth in the digital economy due to growing FinTech spending, increased investment in digital assets, and the proliferation of cryptocurrency wallets. With the creation of virtual spaces for trade and business, the metaverse adds a new dimension to digital finance.

Suggestions:

- To guarantee consistency, create consistent regulatory frameworks across all jurisdictions. For world cryptocurrency enterprises, having clear regulations makes compliance made easier and helps to decrease uncertainty.
- Establish regulations requiring cryptocurrency transactions and business practices to be clear. To protect investors and maintain market integrity, mandate explicit disclosures of risks, costs, and the features of digital assets.
- Increase Counter-Terrorism Financing (CTF) and Anti-Money Laundering (AML) Measures: Implement strict CTF and AML laws to stop illegal activity. Make it compulsory for wallet providers and cryptocurrency exchanges to adopt Know Your Customer (KYC) procedures and report any suspicious thing.
- To handle cross-border concerns, encourage international cooperation between regulatory bodies. Exchange knowledge and best practices to more successfully address problems like market manipulation, fraud, and security breaches.
- Promote technological innovation while keeping risk management in check. Implement pilot programs or sandboxes to test new technologies and regulations. This will allow for experimentation while decreasing the risk to the stability of the financial system.

Conclusion:

In summary, cryptocurrencies present both enormous potential and difficult regulatory challenges, and they are a revolutionary force in global finance. Cryptocurrencies offer innovative opportunities for investment and economic expansion while also strengthen financial inclusion and streamlining cross-border transactions.

They pave the way for easy and more economical transfers, especially in areas with poor financial infrastructure, and they create high opportunities for international trade and investment. But there are significant regulatory concerns that come with the rapid increase of cryptocurrencies. Because of this decentralization, it is more tough to combat illicit activities like money laundering and fraud and to enforce traditional financial regulations. Furthermore, there are risks to investors' wealth and stability due to the volatility of cryptocurrencies.

Consequently, governments and regulatory agencies are faced with the difficult task of creating frameworks that strike a balance between security and innovation, guaranteeing consumer protection and promoting progress in technology. In the end, determining how cryptocurrencies will fit into the global financial landscape will depend on finding a balance between maximizing their potential advantages and minimizing their risks.

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Consumer Protection in E-Commerce: Ensuring Speedy Justice through Efficient Redressal Mechanisms in India

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Abstract:

The liberalization of India's economy paved the way for technological advancements and the proliferation of e-commerce. As e-commerce becomes an integral part of daily life by one or other means, consumer protection is essential to safeguard consumer rights effectively and to address challenges ensuring a secure and trustworthy environment that supports continued growth and economic development. This study examines the landscape of consumer protection in e-commerce within the framework of Indian law focusing on the implications for ensuring speedy justice in resolving disputes. The study analyses the provisions of the Consumer Protection Act 2019 and its E-Commerce Rules 2020 highlighting their role in shaping consumer protection standards and timely redressal of its disputes. Despite, challenges persist including delays in dispute resolution processes, bureaucratic inefficiencies and limited consumer awareness of redressal mechanisms. This study offers suggestion for legislative reforms to streamline procedures and strengthen compliance requirements for e-commerce platforms. It also emphasizes the impact of technological advancements on consumer protection. In conclusion, the researcher addressing challenges fostering a transparent and equitable e-commerce environment that prioritizes consumer rights and secure timely resolution of disputes ensuring speedy justice.

Keywords: consumer protection, e-commerce, consumer rights, challenges, speedy justice, etc

Introduction:

In 1991, India liberalized its economy by opening the market to the world marking a significant shift towards globalization. This economic reform ushered in an era of rapid technological advancement and integration into the global economy. With increased foreign investments and technological exchanges, India's infrastructure and digital landscape began to transform. The liberalization facilitated the growth of the information technology (IT) sector, which became a cornerstone of India's economic development. As internet penetration increased and technology became more accessible, online transactions started gaining popularity. This shift was further accelerated by the widespread adoption of smartphones and the expansion of internet services across the country. As a result, e-commerce evolved from a niche activity to a ubiquitous aspect of daily life in India. Online platforms for shopping, banking, and various services became increasingly common, offering convenience and efficiency to consumers. This growth in e-commerce brought significant benefits, such as increased access to a wide range of products and services, competitive pricing, and the convenience of shopping from anywhere at any time. However, the rapid rise of e-commerce also introduced new challenges.

E-commerce consumer protection in India is crucial due to the rapid growth of the market, which sees millions of transactions daily. This expansion brings challenges such as increased fraudulent activities and counterfeit products. Effective consumer protection laws are necessary to mitigate these risks, build trust, and provide legal recourse for disputes. Aligning with international standards ensures Indian consumers enjoy comparable protections, fostering a competitive marketplace. Additionally, consumer education and awareness are vital for digital literacy. A secure e-commerce environment drives economic growth by encouraging online shopping, boosting businesses, and contributing to the economy.

India’s legal framework for consumer protection has evolved to address the complexities of the digital marketplace. The old consumer protection law (Consumer Protection Act, 1986) was the cornerstone of consumer rights for many years. However, with the rapid expansion of e-commerce, there was a need for more comprehensive legislation. This led to the enactment of the Consumer Protection Act, 2019 (Act, 2019) which specifically addresses e-commerce transactions and establishes guidelines for fair business practices and consumer grievance redressal. The Consumer Protection (E-Commerce) Rules 2020 introduced provisions for e-commerce entities related to consumer rights violations.

Consumers faced issues like fraudulent activities, counterfeit products, misleading advertisements, and unauthorized transactions. These challenges underscored the need for robust consumer protection mechanisms to ensure a safe and trustworthy online environment. To address these challenges, India has been working on strengthening its consumer protection framework. Effective laws and regulations are crucial to safeguarding consumer rights, building trust in online transactions, and providing accessible and efficient means for resolving disputes.

Statement of the Problem:

Consumers in the e-commerce sector face several challenges, including fraudulent activities, data privacy concerns and dispute resolution. The existing redressal mechanisms suffer from inefficiencies such as delays in resolution due to bureaucratic processes, lack of awareness as to availability of redressal mechanisms and accessibility issues of grievance redressal platforms. There is a pressing need to ensure speedy justice for e-commerce consumers to enhance their confidence in digital transactions. Therefore, efficient redressal mechanisms can mitigate issues of fostering consumer trust and promoting the sustainable growth of the e-commerce sector.

Legal Framework For Consumer Protection In E-Commerce:

The Consumer Protection Act, 2019 (Act, 2019) is a comprehensive piece of legislation enacted to protect consumer interests and establish a robust framework for addressing consumer grievances. The three-tier structure for consumer dispute redressal is established under this Act at district, state and national level empowers to receive complaints with limited jurisdiction depends on the value of goods or services. The State Commissions and National Commission are also empowered to hear appeals against the decisions of the District and State Commissions respectively alongside their original jurisdiction to deal with consumer complaints. As such, commissions are empowered to adjudicate disputes, order compensation and enforce penalties for non-compliance with consumer protection laws.

The Consumer Protection Act 2019 (Act, 2019) introduces several new provisions to adapt to the evolving marketplace particularly the digital and e-commerce sectors. It provides clear definition of the expression 'e-commerce' as "buying or selling of goods or services including digital products over digital or electronic network" [Section 2(16)] (Act, 2019). This Act also defines the term 'electronic service provider' as "a person who provides technologies or processes to enable a product seller to engage in advertising or selling goods or services to a consumer and includes any online market place or online auction sites" [Section 2 (17)] (Act, 2019). The Central Government framed the rules for e-commerce transaction and issued guidelines for its timely redressal titled as the Consumer Protection (E-Commerce) Rules 2020 (Consumer Protection (E-Commerce) Rules, 2020) which includes specific provisions for the e-commerce sector to address the unique challenges posed by online transactions.

The E-Commerce Rules 2020 (Consumer Protection (E-Commerce) Rules, 2020) defines the expressions e-commerce entity, grievance, marketplace e-commerce entity, platform, etc. The term 'e-commerce entity' means "any person who owns, operates or manages digital or electronic facility or platform for electronic commerce, but does not include a seller offering his goods or services for sale on a marketplace e-commerce entity" [Rule 3(b)]. The meaning of expression 'grievance' provides inclusive one as "any complaints to an e-commerce entity regarding violations of the provisions of the Act and the rules made thereunder [Rule 3(c)]. The term 'inventory e-commerce entity' means "an e-commerce entity which owns the inventory of goods or services and sells such goods or services directly to the consumers and shall include single brand retailers and multi-channel single brand retailers" [Rule 3(f)]. The term 'marketplace e-commerce entity' defines as "means an e-commerce entity which provides an information technology platform on a digital or electronic network to facilitate transactions between buyers and sellers [Rule 3(g)]. So also, the term 'platform' as "an online interface in the form of any software including a website or a part thereof and applications including mobile applications" [Rule 3 (i)].

The E-Commerce Rules 2020 (Consumer Protection (E-Commerce) Rules, 2020) deals with duties of e-commerce entities [Rule 4], liabilities of e-commerce entities [Rule 5], duties of seller on marketplace [Rule 6] and duties and liabilities of Inventory e-commerce entities [Rule 7]. These E-Commerce Rules provides that e-commerce platforms are held liable for any unfair trade practices, misleading advertisements and defective or substandard products sold on their platforms. There are grievance redressal mechanism provides under the Rules 2020 (Consumer Protection (E-Commerce) Rules, 2020) for the grievance of 'e-commerce' transaction. An e-commerce entity must establish a consumer grievance redressal mechanism and appoint a grievance officer to address consumer complaints. E-commerce platforms are also required to provide clear and accessible detailed information about grievance redressal mechanism and grievance officer appointed for addressing such complaints. It also provides protection of consumer's right to seek redressal and the right to be heard.

The guidelines under E-Commerce Rules 2020 (Consumer Protection (E-Commerce) Rules, 2020) designed to ensure transparency, accountability and consumer protection in online transactions. The e-commerce entities bound to provide complete information about the sellers, their contact details and business addresses not to engage in unfair trade practices like manipulating prices or product listings with clear policies for returns, refunds and cancellations communicated to consumers and ensures protection of consumer data and adhere to data privacy regulations.

Grievance Redressal Mechanism for Consumers E-Commerce Disputes:

E-Commerce Entities are duty bound to provide clear and accessible information of grievance officer [Rule 4(2)(d)] (Consumer Protection (E-Commerce) Rules, 2020)] who has to attend the complaints and resolve it. It also casts duties to establish adequate grievance redressal mechanism [Rule 4 (3)] and also appoint grievance officer for consumer grievance redressal displaying name and other details on its platform [Rule 4(4)]. Also bound to ensure that said grievance officer acknowledged the receipt of complaint received from consumer within 48 hours and resolve it in 01 months from the date of receipt of said complaint [Rule 4(5)]. E-Commerce Entities also liability to provide clear and accessible information of grievance redressal mechanism [Rule 5(3)(c)]. Sellers also duly bound to grievance resolution mechanism and ensure that grievance officer who has to acknowledge the receipt of complaint within 48 hours and resolve such complaint in 01 months from the date of receipt of said complaint [Rule 6(4)(b)]. Seller further casted duty to provide information as to name, contact no. designation grievance officer [Rule 7(1) (a)] (Consumer Protection (E-Commerce) Rules, 2020).

The grievance redressal mechanism is online platforms offer a digital alternative to traditional disputes resolution methods providing speeder and more accessible mode for resolving the consumer's disputes. This platform provides 'ease of access' to consumer for filing complaints and participate in resolution of process online and it is cost effective which reduced legal const not only of consumers but also for the business houses.

Challenges And Opportunities In Ensuring Speedy Justice:

Delay in Dispute Resolution Processes

One of the primary challenges in ensuring speedy justice for e-commerce consumers is the delay in dispute resolution processes. The lengthy procedural requirements and bureaucratic inefficiencies often prolong the resolution process. The redressal mechanism frequently faces case backlogs leading to extended wait times for consumers. Many redressal bodies lack the necessary resources including manpower and technological infrastructure to handle disputes efficiently.

Lack of Awareness Among Consumers

Many consumers are unaware of their rights and the available redressal mechanisms for e-commerce disputes. This lack of awareness leads to underutilization of grievance mechanisms and prolonged resolution times. There is limited knowledge of consumers relating to e-commerce provisions under the Consumer Protection Act, 2019 (Act, 2019) and rules framed thereunder. The consumers are unaware about how to file complaints or seek redressal through Consumer Commissions.

Technological and Infrastructural Limitations

The effectiveness of redressal mechanisms is also hindered by technological and infrastructural limitations. Inadequate internet connectivity and digital literacy, particularly in rural areas, limit consumers' access to online redressal mechanisms provided under the e-commerce rules. There are many redressal bodies do not have integrated digital systems to streamline case management and resolution processes which results inefficiencies.

Recommendations for Improvement:

Some recommendations made to enhance the efficiency of grievance redressal mechanism and consumer disputes redressal commissions for ensuring speedy justice to consumer relating to e-commerce.

1. Simplifying procedural requirements reducing hurdles can expedite the resolution process.
2. Encouraging the online platforms by consumers and businesses which can reduce the burden on traditional redressal bodies. Integrating online platforms with existing redressal mechanism to streamline case management and resolution processes.
3. Conduct awareness camps to educate consumers about available redressal mechanisms.
4. Implementing digital systems for managing and tracking cases which can improve efficiency and transparency. Use of AI to analyze complaints, predict outcomes and provide preliminary resolutions can reduce resolution times.

Conclusion:

This study has highlighted the critical importance of robust consumer protection mechanisms in the context of e-commerce. The rapid growth of online shopping brought numerous benefits with challenges concerning consumer rights and dispute resolution. The analysis of the legal framework revealed significant strides in addressing e-commerce-related issues. However, several challenges persist including delay in dispute resolution, bureaucratic inefficiencies and inadequate resources. The consumer awareness about the available redressal mechanisms lacks further complicating the resolution of disputes. Efforts to promote online platforms and enhance digital infrastructure are crucial steps forward with integration of AI and advanced digital systems can streamline processes reducing resolution times and improv transparency. Addressing these challenges through policy reforms, enhanced technological integration and comprehensive consumer education efforts will be pivotal in ensuring a fair and efficient e-commerce landscape that prioritizes consumer rights and ensures speedy justice for all stakeholders.

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Study Of Monthly Variation In Dissolved Oxygen Of Gharni Dam Gharni, Dist- Latur Maharashtra (India)

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Abstract:
Now a days world faces a problem of pure drinking water, during to interactions of local factors quality of drinking water varies from time to time and place to place.In absence of depth of knowledge about water quality and their effects the inhabitants are prone to disease and health problems. The water quality measured in the parameters like dissolved oxygen. Dissolved oxygen is very important parameter which is index of water quality primary production and pollution.
Keywords: Dissolved oxygen, Gharni Dam

Introduction:

Now a days world faces a problem of pure drinking water, during to interactions of local factors quality of drinking water varies from time to time and place to place.In absence of depth of knowledge about water quality and their effects the inhabitants are prone to disease and health problems. The water quality measured in the parameters like dissolved oxygen. Dissolved oxygen is very important parameter which is index of water quality primary production and pollution.

Material and Methods:

The water samples for monthly analysis were collected from sampling station for one year i.e. January To December 2022.

Water samples were analysed with the help of winklers idometric method for dissolved oxygen.

Results and Discussion:

In the present analysis the dissolved oxygen values ranged from 3.2 to 7.6 mg/lit. The highest dissolved oxygen was noted in winter and lowest in summer. Similar findings were observed Hancock (1973), Mishra and Yadav (1978), Adebisi (1981) and Mitra (1982).

Table- I

Monthly Values OF Dissolved Oxygen January To December 2022

Sr. No.	Month	Dissolved Oxygen
1	January	6.7
2	February	5.5
3	March	5.4
4	April	4.4
5	May	3.2
6	June	3.8
7	July	4.4
8	August	5.7
9	September	5.5
10	October	6.6
11	November	7.6
12	December	7.5

Conclusion:

The present study concluded that the Gharni Dam was not polluted all the readings are within permissible limits when compared with W.H.O. The water of the Gharni Dam is good for agriculture used and drinking after normal processing.

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Summative and Formative Assessment: Bridging Educational Gaps

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Abstract:

Assessment plays a pivotal role in education by providing essential feedback that guides both teaching and learning processes. This article explores the distinct and complementary roles of summative and formative assessments in bridging educational gaps. Summative assessment is described as an evaluative tool administered at the conclusion of an instructional period to measure students' cumulative knowledge and the effectiveness of educational programs. While effective for grading and certification, summative assessments often emphasize memorization and provide limited feedback, potentially leading to student stress and unaddressed learning deficiencies. In contrast, formative assessment is an ongoing process that offers real-time feedback during instruction, enabling teachers to identify and address learning gaps promptly. By involving students actively in their learning journey through self and peer assessments, formative practices foster a growth mindset, enhance engagement, and support differentiated instruction tailored to individual needs.

The article advocates for a balanced assessment approach that integrates both summative and formative methods to create a comprehensive evaluation system. This ensures continuous monitoring and adjustment of teaching strategies while still providing measurable outcomes of student learning. However, implementing such a balanced approach presents challenges including the need for extensive teacher training, time constraints, resistance to change, and effective data management, investment in professional development, resource allocation, and fostering assessment literacy among educators to utilize assessment data effectively. Ensuring equity and fairness in assessment practices is also crucial for meeting the diverse needs of all learners. Ultimately, combining summative and formative assessments in a strategic and balanced manner enhances the educational experience by supporting continuous learning and closing educational gaps.

Keywords: Assessment, Summative assessment, Formative assessment and Educational gaps

Introduction:

Assessment is a critical component of the educational process, providing essential feedback that helps guide both teaching and learning. The two main types of assessments—summative and formative—serve different purposes but are equally important in creating a comprehensive evaluation system. The purpose of formative evaluation was 'to provide feedback and correctives at each stage in the teaching-learning process' Bloom (1969). Summative evaluation was employed to judge what the learner had achieved at the end of a course or programme. Summative assessment is typically used to evaluate student learning at the end of an instructional period, while formative assessment is ongoing and aims to provide feedback during the learning process. This article explores the distinct roles of summative and formative assessments, their impact on learning, and how combining these approaches can help bridge educational gaps.

Understanding Summative and Formative Assessment:

Summative Assessment

Summative assessments are evaluative tools used to determine students' learning, knowledge, proficiency, or success at the end of an instructional unit. It is typically implemented after a unit, course, or academic term to assess whether educational goals and learning outcomes have been achieved. The results from summative assessments are usually used for assigning grades, determining advancement, or certifying competence. Summative assessments are administered at the end of a learning period to evaluate the cumulative knowledge or skills acquired by students (Garrison & Ehringhaus, 2007). The primary purpose is to gauge the effectiveness of instructional programs and student learning. This contrasts with formative assessments, which are used to monitor and guide learning during the instructional process (Taras, 2005). Summative assessments are often considered high stakes because they contribute significantly to students' final grades and can impact their educational trajectory (Black & Wiliam, 1998). These assessments often involve standardized testing methods to ensure consistency and fairness across all students being assessed (Pellegrino, Chudowsky, & Glaser, 2001).

Characteristics of Summative Assessment:

- **Timing:** Conducted at the end of a learning period.
- **Purpose:** To evaluate what students have learned and to measure the effectiveness of the instructional program.
- **Objective Measurement:** Summative assessments are designed to objectively measure student achievement against predefined criteria or standards (Garrison & Ehringhaus, 2007).
- **Comprehensive:** They usually cover a broad range of content, encompassing all the material

taught during a course or instructional unit, providing a holistic evaluation of student performance (Harlen, 2007).

- **Data Utilization:** The results from summative assessments are often used to inform future instructional planning, policy-making, and educational reforms (Pellegrino et al., 2001).

Criticism of Summative Assessment: While summative assessments are crucial for measuring learning outcomes, they have been criticized for several reasons:

- **Focus on Memorization:** Summative assessments often emphasize rote memorization rather than deep understanding or application of knowledge.
- **Stress and Anxiety:** The high stakes associated with these assessments can create stress and anxiety among students, which may negatively impact performance.
- **Lack of Feedback:** These assessments typically provide limited feedback to students, making it difficult for them to understand their strengths and weaknesses.

Formative Assessment:

Formative assessment is an instructional tool used to monitor student learning and provide ongoing feedback that can be used by instructors to improve their teaching and by students to enhance their learning. Unlike summative assessments, which evaluate student learning at the end of an instructional period, formative assessments are conducted throughout the learning process, allowing for timely adjustments and interventions. Formative assessment is characterized by the provision of continuous, real-time feedback that helps both teachers and students identify areas of misunderstanding and areas for improvement (Black & Wiliam, 1998). The primary purpose of formative assessment is to guide learning. It helps teachers adapt their instruction to meet students' needs and helps students understand their progress and what they need to do to improve (Sadler, 1989). Formative assessments are diagnostic, meaning they help in identifying students' strengths and weaknesses in real-time, allowing for targeted instructional strategies (Heritage, 2010).

Characteristics of Formative Assessment:

- **Ongoing Process:** Formative assessment is an ongoing process that occurs during instruction, enabling continuous monitoring of student progress (Black & Wiliam, 1998).
- **Involvement of Students:** Effective formative assessment involves students in the assessment process. This includes self-assessment and peer assessment, which encourages students to take ownership of their learning (Sadler, 1989).
- **Purpose:** To inform both teachers and students about learning progress and to guide future instruction.
- **Adaptability:** The results from formative assessments allow for the adaptation of teaching strategies to better meet the needs of students. Teachers can modify their instruction based on formative assessment data to ensure that all students are on track to achieve the learning objectives (Black & Wiliam, 1998).
- **Impact:** Helps identify learning gaps, reinforce learning, and improve student outcomes.

Benefits of Formative Assessment: Formative assessment offers several advantages over summative assessment:

- **Promotes Active Learning:** By engaging students in the learning process, formative assessment helps them take ownership of their education.
- **Provides Immediate Feedback:** Students receive timely feedback, allowing them to address their mistakes and misconceptions before moving forward.
- **Supports Differentiated Instruction:** Teachers can use formative assessment data to tailor their instruction to meet the diverse needs of students.

The Role of Summative and Formative Assessments in Bridging Educational Gaps

Identifying Learning Gaps:

One of the primary benefits of formative assessment is its ability to identify learning gaps early in the instructional process. By regularly assessing students' understanding, teachers can detect areas where students are struggling and provide targeted interventions to address these gaps. This proactive approach contrasts with summative assessments, which often reveal learning deficiencies only after the instructional period has ended, when it may be too late to address them effectively.

Supporting Continuous Learning:

Formative assessments encourage continuous learning by providing students with regular opportunities to reflect on their progress and make adjustments to their learning strategies. This ongoing process helps students develop a growth mindset, where they see learning as a continuous journey rather than a series of high-stakes events. In contrast, summative assessments, while important for measuring final outcomes, do not typically encourage this kind of ongoing reflection and adjustment.

Enhancing Student Engagement and Motivation:

Formative assessments can also enhance student engagement and motivation by making the learning process more interactive and student-centered. When students receive regular feedback and see their progress, they are more likely to stay engaged and motivated to learn. Summative assessments, on the other hand, can sometimes lead to disengagement, particularly if students feel

overwhelmed by the high stakes or perceive the assessments as irrelevant to their learning goals.

Combining Summative and Formative Assessments: A Balanced Approach

While summative and formative assessments serve different purposes, they are most effective when used together in a balanced approach. By combining the strengths of both types of assessments, educators can create a comprehensive evaluation system that supports student learning and helps bridge educational gaps.

Designing a Balanced Assessment System:

A balanced assessment system integrates both summative and formative assessments throughout the instructional process. This approach ensures that students receive regular feedback and opportunities for improvement while also providing a final measure of their learning outcomes.

Using Formative Data to Inform Summative Assessment:

Formative assessments can also be used to inform summative assessments, ensuring that they accurately reflect students' learning and progress. By using data from formative assessments, teachers can design summative assessments that are aligned with the learning goals and that provide a fair and comprehensive evaluation of student performance.

Providing Holistic Feedback:

Finally, by combining summative and formative assessments, educators can provide students with holistic feedback that reflects both their ongoing progress and their final achievements. This approach helps students understand their strengths and weaknesses, identify areas for improvement, and set goals for future learning.

Challenges in Implementing a Balanced Assessment Approach:

While the benefits of combining summative and formative assessments are clear, there are several challenges to implementing this approach effectively.

Teacher Training and Professional Development:

Many educators lack the necessary training to effectively implement formative assessments and integrate them with summative assessments in a balanced way. The shift from traditional assessment methods to a more balanced approach requires a significant change in teaching practices, which may necessitate ongoing professional development and support (Heritage, 2010). Without adequate training, teachers may struggle to apply formative assessment strategies effectively, leading to inconsistent implementation.

Time Constraints:

One of the primary challenges is the time required to implement formative assessments effectively. Teachers often face tight schedules, making it difficult to incorporate ongoing, formative assessment practices alongside their regular instructional duties and summative assessments (Wiliam, 2011). Balancing the time between teaching content, conducting formative assessments, and preparing students for summative assessments can be overwhelming for educators.

Resistance to Change:

Resistance to change among educators, students, and even parents can be a significant barrier. Teachers accustomed to traditional, summative-focused assessment methods may be hesitant to adopt formative assessment practices, which require a shift in mindset and teaching strategy (Dunn & Mulvenon, 2009). Additionally, students and parents may be more familiar with and reliant on summative assessments as indicators of academic success, leading to reluctance in embracing formative assessments.

Assessment Literacy:

Implementing a balanced assessment approach requires a high level of assessment literacy among educators. Teachers need to understand how to design, administer, and interpret both formative and summative assessments effectively. Without this expertise, there is a risk that assessments may not accurately reflect student learning or provide meaningful feedback (Stiggins, 2002). Assessment literacy is essential for ensuring that formative and summative assessments complement each other and contribute to a coherent evaluation strategy.

Resource Allocation:

The successful implementation of a balanced assessment approach often requires additional resources, including time, materials, and support staff. Schools may need to invest in professional development, assessment tools, and technology to support both formative and summative assessments (Black & Wiliam, 1998). In resource-constrained environments, these additional demands can be challenging to meet, leading to uneven implementation.

Data Management and Use:

Another challenge is the effective management and use of data from both formative and summative assessments. Teachers need to be skilled in analyzing assessment data to inform instruction and improve student learning outcomes. However, without adequate systems in place for data collection, analysis, and interpretation, the benefits of a balanced assessment approach may not be fully realized (Heritage, 2010). Proper data management is crucial for identifying learning gaps, adjusting instruction, and ensuring that assessment practices are driving student achievement.

Ensuring Equity and Fairness:

Finally, it is essential to ensure that both summative and formative assessments are fair and equitable for all students. This requires careful consideration of factors such as cultural differences, language barriers, and learning disabilities, as well

as a commitment to providing all students with the support and resources they need to succeed.

Conclusion:

Summative and formative assessments play complementary roles in the educational process, each contributing to a comprehensive evaluation system that supports student learning and helps bridge educational gaps. While summative assessments provide a final measure of learning outcomes, formative assessments offer ongoing feedback that helps students improve their understanding and skills. By combining these approaches in a balanced assessment system, educators can create a supportive and effective learning environment that meets the diverse needs of all students.

The integration of summative and formative assessments is essential for creating a robust and effective educational system that caters to the diverse needs of students. While summative assessments provide critical measures of student achievement and program effectiveness, formative assessments play a vital role in guiding the learning process, identifying gaps, and promoting continuous improvement. A balanced approach that leverages the strengths of both assessment types offers a comprehensive framework for evaluating student progress and supporting personalized learning.

However, the successful implementation of this balanced approach requires addressing significant challenges such as teacher training, resource allocation, and overcoming resistance to change. Investment in professional development and the development of assessment literacy among educators are crucial steps toward realizing the full potential of a balanced assessment system. Moreover, ensuring that these assessments are equitable and inclusive is fundamental to providing all students with the opportunity to succeed.

By strategically combining summative and formative assessments, educators can create an environment that not only measures learning outcomes but also actively contributes to student growth and the closing of educational gaps. This comprehensive approach ultimately enhances the quality of education and prepares students for long-term success.

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Effect of Global Climate on Agricultural Sector in India: A Systematic Review

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Abstract:
The Indian climate has a significant impact on the agricultural sector in India, which is a vital part of the country's economy. India's development depends on sustainable climate management. India faces the effects of climate change, such as extreme rainfall, drought, and heat waves. Climate change affects agriculture, health, water resources and socio-economic development. Efficient use and conservation of water resources are essential due to varying rainfall patterns and growing demand. Sustainable agricultural practices, like organic farming and agroforestry, help maintain soil health, biodiversity, and farmers' livelihoods. Sustainable urban planning, green infrastructure, and waste management are crucial for livable cities. Protecting India's rich biodiversity, including forests, wildlife, and coastal ecosystems, is vital for ecological balance and human well-being. Building resilience in vulnerable communities, through early warning systems, climate-smart infrastructure, and social protection programs, is essential. India participates in global efforts to address climate change, such as the Paris Agreement, and shares knowledge and expertise with other countries.
Keywords: Agriculture, development, business, environment, strategy, resources, farmers, climate change etc.

Introduction:

The environment plays a vital role in sustaining life on Earth. Bridging the gap between environmental and agricultural sustainability. Warmer temperatures can lead to earlier springs, altered growing seasons, and increased heat stress on crops. Changes in rainfall patterns, frequency, and intensity impact soil moisture, water availability, and crop growth. Altered sunlight patterns influence photosynthesis, crop growth, and development. Increased frequency and severity of droughts, floods, and storms damage crops, infrastructure, and disrupt agricultural activities. Agricultural activities contribute to emissions through fertilizer use, livestock production, and land-use changes. Deforestation, urbanization, and agricultural expansion alter ecosystems, release stored carbon, and impact local climates. Irrigation and water management practices influence local water cycles, impacting precipitation patterns and aquifer recharge. High temperatures, high precipitation, and high humidity impact crop growth, disease prevalence, and pest dynamics. Moderate temperatures, variable precipitation, and seasonal changes influence crop selection, growth stages, and yield. Short growing seasons, low temperatures, and permafrost impact agricultural viability, crop selection, and soil quality. Warmer temperatures, changing precipitation patterns, and increased frequency of extreme weather events reduce crop yields and quality. Altered temperature and precipitation patterns change the suitability of areas for specific crops, impacting agricultural productivity. Changes in temperature, precipitation, and weather patterns alter pest and disease dynamics, impacting crop health and productivity.

Problems of the Study:

Climate plays a crucial role in the agriculture sector, and changes in climate can significantly impact agricultural productivity and food security. Rising temperatures can lead to heat stress in crops, reducing yields and affecting quality. Droughts or floods can impact crop growth, soil health, and water availability. Events like hurricanes, wildfires, and floods can damage or destroy crops, infrastructure, and agricultural resources. Warmer temperatures can alter the timing of growing seasons, potentially disrupting planting and harvesting schedules. Climate change can alter the distribution and prevalence of pests and diseases affecting crops. Changes in precipitation patterns and increased evaporation due to warmer temperatures can lead to water scarcity, impacting irrigation and crop growth. Climate-related factors like increased temperatures, altered precipitation patterns, and extreme weather events can lead to soil erosion, nutrient depletion, and salinization. Climate change can contribute to the loss of crop and animal diversity, reducing the resilience of agricultural systems. Climate change can affect the distribution, behavior, and diversity of pollinators, impacting crop yields and quality. Climate-related impacts on agriculture can lead to reduced crop yields, decreased food availability, and increased food prices, exacerbating food insecurity.

Objectives of the Study:

The main objective of this research is to study the impact of changing climate on agriculture sector in India and some specific objectives have been given by the researchers as follows.

1. To study the effect of climate on agricultural sector.
2. To study the effect of changing environment on production.

3. To Study the climate change and global climate.

Significance of the Study:

The agriculture sector plays a vital role in the development of a country. Providing sufficient food for the population, reducing hunger and malnutrition. Accounting for a significant share of GDP, employment, and income generation. Lifting rural communities out of poverty by providing income opportunities and improving livelihoods. Stimulating local economies, improving infrastructure, and enhancing quality of life. Maintaining ecosystem services, conserving natural resources, and mitigating climate change. Ensuring a stable food supply, reducing migration, and promoting social cohesion. Generating foreign exchange earnings, improving trade balances, and enhancing global competitiveness. Driving technological advancements, improving productivity, and enhancing efficiency. Providing essential nutrients, improving health outcomes, and reducing malnutrition-related diseases. Supporting the achievement of the United Nations' Sustainable Development Goals. A thriving agriculture sector is essential for overall economic development, social stability, and environmental sustainability. Governments, organizations, and individuals must work together to address challenges, invest in agricultural development, and ensure a food-secure future.

Scope of the Study:

Resilient and vibrant, India's agriculture sector offers immense scope and opportunities. Agriculture provides livelihoods for around 50% of India's workforce. Agriculture accounts for around 20% of India's GDP. India produces a wide variety of crops, including foodgrains, pulses, oilseeds, sugarcane, and horticultural crops. India is a significant exporter of agricultural products, including spices, tea, coffee, and cotton. India is self-sufficient in food production, ensuring food availability for its vast population. Schemes like PM-KISAN, PM-Fasal Bima Yojana, and Soil Health Card promote agricultural development. Adoption of precision agriculture, drones, and mobile apps enhances efficiency and productivity. India has vast potential for organic farming, promoting sustainable agriculture practices. Opportunities exist for value addition, processing, and marketing of agricultural products. India has a strong network of agricultural research institutions and universities driving innovation. Empowering farmers through collective action and better market access. Institutions provide skilled manpower for the sector. Increasing private investment in agriculture, agro-processing, and rural infrastructure. Partnerships with global organizations and countries enhance knowledge sharing and trade. Efforts focus on developing climate-tolerant crop varieties and sustainable practices. India's agriculture sector offers vast opportunities for growth, innovation, and development, making it a vital contributor to the country's economy and food security.

Limitation of the Study:

Prolonged heatwaves or cold snaps can damage or destroy crops. Droughts or irregular rainfall patterns can impact crop growth and yields. Increased frequency and intensity of floods, storms, and wildfires can damage crops and infrastructure. Shifts in growing seasons and temperature fluctuations can disrupt planting and harvesting schedules. Climate-related factors like increased temperatures, altered precipitation patterns, and extreme weather events can lead to soil erosion, nutrient depletion, and salinization. Climate change can alter the distribution and prevalence of pests and diseases affecting crops. In regions with short growing seasons, climate change can further restrict the time available for crop growth. Changes in temperature and precipitation patterns can make areas less suitable for specific crops.

Period of the Study:

To study the impact of changing environment and global climate on the agriculture sector, the researcher has reviewed the information from 2024 and conducted the said research.

Research Methodology:

Global environment and agriculture sector of India are very closely related because global environment has many times good effect on Indian agriculture and in the said research the researcher has studied in detail the impact of global environment on Indian agriculture sector and current situation. While conducting the said research, the researcher has made detailed use of research papers, articles, general newspapers, audio videos, reference books, serial books, annual reports, etc. while using secondary research.

Research Method:

Indian agriculture is dependent on the change in global environment, so the researchers have done the research using descriptive analysis method.

Results and Discussion:

Climate change can impact pollinator distribution, behavior, and diversity, affecting crop yields. Climate-related factors can lead to increased losses during storage, transportation, and marketing. Climate change can impact the availability and productivity of agricultural labor. Extreme weather events can damage irrigation systems, storage facilities, and other agricultural infrastructure. Climate-related shocks can lead to reduced incomes, increased poverty, and food insecurity. Climate change can lead to migration, displacement, and social unrest in agricultural communities. Some regions or communities may face barriers to adapting to climate change due to resource constraints or lack of access to technology and

information. Understanding these limitations is crucial for developing effective strategies to mitigate and adapt to climate change in the agriculture sector.

Positive effects:

1. Diverse crops: India's varied climate allows for the cultivation of a wide range of crops, including rice, wheat, cotton, tea, coffee, and spices.
2. High yield: The tropical climate with ample rainfall and sunshine enables high crop yields, making India one of the world's largest agricultural producers.
3. Multiple harvests: The favorable climate allows for multiple harvests per year, increasing overall agricultural productivity.

Negative effects:

1. Unpredictable weather: India's climate is prone to extreme weather events like droughts, floods, and heatwaves, which can lead to crop failures and losses.
2. Regional disparities: Climate variations across regions can lead to disparities in agricultural productivity, with some areas facing water scarcity or poor soil quality.
3. Soil degradation: Intensive farming and climate-related factors can cause soil erosion, nutrient depletion, and salinization, affecting long-term soil health.
4. Pest and disease management: Climate change can alter the distribution and prevalence of pests and diseases, requiring adaptive management strategies.
5. Water scarcity: Changes in rainfall patterns and increased evaporation due to warmer temperatures can lead to water scarcity, impacting irrigation and crop growth.

Mitigation Strategies:

1. Climate-resilient crops: Developing and promoting climate-tolerant crop varieties can help farmers adapt to changing conditions.
2. Sustainable agriculture practices: Encouraging practices like organic farming, agroforestry, and conservation agriculture can enhance soil health and reduce climate-related risks.
3. Irrigation management: Improving irrigation infrastructure and adopting efficient water management techniques can help address water scarcity.
4. Weather insurance and forecasting: Implementing weather insurance schemes and improving weather forecasting can help farmers prepare for and respond to climate-related shocks.

Sustainable Development in India:

Winter, summer, monsoon, and post-monsoon. Climate varies greatly across regions, with extreme temperatures, humidity, and precipitation. India aims to achieve sustainable development by balancing economic growth, social inclusion, and environmental protection. Climate change poses significant challenges to India's sustainable development goals, particularly in areas like: Agriculture and food security, Water resources and management, Disaster risk reduction and management, Energy security and access, India has set ambitious targets to reduce greenhouse gas emissions and transition to renewable energy sources.

Challenges and Opportunities:

1. Balancing economic growth with environmental protection.
2. Addressing climate change impacts on vulnerable populations.
3. Leveraging technology and innovation for sustainable development.
4. International cooperation and climate finance.

Agriculture in India:

Agriculture is the primary source of livelihood for over 50% of India's population. India is the second-largest producer of agricultural products globally. Rice, wheat, cotton, sugarcane, and pulses. Soil degradation and nutrient depletion. Water scarcity and inefficient irrigation systems. Low crop yields and productivity. Limited access to markets and credit for small farmers.

Food Security in India:

Food security is a significant concern, with many Indians facing hunger and malnutrition. India has made progress in reducing hunger, but challenges persist. National Food Security Act aims to provide subsidized food grains to vulnerable populations. Crop insurance schemes. Soil health cards and organic farming promotion. Irrigation and water harvesting projects. Support for small and marginal farmers.

Sustainable Agriculture Practices:

1. Organic farming and agroecology.
2. Conservation agriculture and zero-budget natural farming.
3. Precision agriculture and technology adoption.
4. Climate-resilient agriculture and stress-tolerant crop varieties.
5. Agroforestry and integrated farming systems.

Impacts of Climate Change on Agriculture:

1. **Rising Temperatures:** Warmer temperatures affect crop growth, yield, and quality.
2. Changing Precipitation Patterns: Altered rainfall and snowfall patterns impact soil moisture, irrigation, and water availability.
3. Increased Frequency and Severity of Extreme Weather Events: Droughts, floods, and heatwaves damage crops and disrupt agricultural activities.
4. Shifts in Growing Seasons and Crop Distribution: Changes in temperature and precipitation patterns alter the suitability of areas for specific crops.

Impacts of Agriculture on Climate Change:

1. **Greenhouse Gas Emissions:** Agriculture contributes to emissions through activities like deforestation, fertilizer use, and livestock production.
2. **Deforestation and Land-Use Changes:** Agricultural expansion leads to forest clearance, releasing stored carbon into the atmosphere.
3. **Methane and Nitrous Oxide Emissions:** Livestock and fertilizer use release potent greenhouse gases.

Climate-Smart Agriculture:

1. **Sustainable Agricultural Practices:** Agroforestry, conservation agriculture, and organic farming reduce emissions and enhance resilience.
2. **Climate-Resilient Crop and Animal Varieties:** Developing and using varieties tolerant to changing conditions.
3. Agro-Insurance and Risk Management: Protecting farmers from climate-related losses.
4. **Soil Carbon Sequestration:** Practices like no-till farming and cover cropping enhance soil health and carbon storage.

Policies and Initiatives:

1. **Paris Agreement:** Addresses agriculture in the context of climate change mitigation and adaptation.
2. Sustainable Development Goals intersect with agriculture and climate change.
3. **Climate and Clean Air Coalition:** Focuses on reducing agricultural emissions and promoting sustainable practices.

Impacts of Climate Change on Business:

1. **Supply Chain Disruptions:** Extreme weather events and changing weather patterns affect raw material availability and logistics.
2. **Regulatory Risks:** Climate-related policies and regulations influence business operations and costs.
3. Market Shifts: Changing consumer preferences and demand for sustainable products.
4. **Physical Risks:** Damage to infrastructure, assets, and operations due to extreme weather events.

Business Opportunities in Climate Change:

1. **Sustainable Products and Services:** Developing climate-resilient and eco-friendly offerings.
2. **Clean Technologies:** Investing in renewable energy, energy efficiency, and green infrastructure.
3. **Climate Risk Management:** Offering risk assessment, mitigation, and adaptation services.
4. **Carbon Markets and Pricing:** Capitalizing on carbon credits and emission reduction opportunities.

Climate-Resilient Business Strategies:

1. **Risk Assessment and Management:** Identifying and mitigating climate-related risks.
2. **Sustainable Supply Chain Management:** Building resilient and sustainable supply chains.
3. **Climate-Informed Decision Making:** Integrating climate data and scenarios into business planning.
4. **Stakeholder Engagement and Collaboration:** Partnering with stakeholders to address climate challenges.

Environmental Impacts of Agriculture:

1. **Land Degradation:** Soil erosion, nutrient depletion, and salinization.
2. **Water Pollution:** Chemical runoff, eutrophication, and water scarcity.
3. **Biodiversity Loss:** Habitat destruction, monoculture, and pesticide use.
4. **Greenhouse Gas Emissions:** Nitrous oxide, methane, and carbon dioxide emissions.

Environmental Benefits of Sustainable Agriculture:

1. **Soil Conservation:** Reduced erosion, improved fertility, and carbon sequestration.
2. **Water Conservation:** Efficient use, reduced pollution, and improved quality.
3. **Biodiversity Conservation:** Habitat preservation, crop diversity, and ecosystem services.
4. **Climate Change Mitigation:** Reduced emissions, carbon sequestration, and climate resilience.

Strategies for Sustainable Agriculture:

1. **Agroecology:** Ecological principles, crop rotation, and organic amendments.
2. **Conservation Agriculture:** No-till or reduced-till, cover crops, and crop rotation.
3. **Sustainable Water Management:** Efficient irrigation, water harvesting, and conservation.
4. **Integrated Pest Management:** Minimal chemical use, biological control, and cultural practices.

Conclusion:

Climate change refers to long-term changes in temperature and climate. Such changes may be natural due to changes in the sun's activity or due to large volcanic eruptions. But since the 1800s, human activity has been the main driver of climate change, primarily through the burning of fossil fuels such as coal, oil and gas. The number of heavy vehicles, increasing factories, increasing air-conditioned buildings are continuously increasing the emission of carbon dioxide. Methane emissions from livestock are increasing. The use of excess nitrogen fertilizers in rice paddies is increasing the amount of nitrous oxide. That is why air pollution is continuously increasing on one side. On the other hand, forests and plants that use carbon dioxide are being destroyed on a large scale.

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An overview of tourism content of magazines: A study of tourism articles in Marathi weekly magazine using content analysis

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Abstract:

This article reviews the scholarly work that uses content analysis to study tourism substance in Magazines. We conducted systematic searches and analysis of articles are on the basis of area covered, attractiveness, photos, content, experiences and suggestions. It can be concluded on the basis of content that the articles are very useful to aware people, infer with the knowledge and inspire them for visit the destination.

Tourist magazines are one of the best sources to get data of occasion outings, travel and tours arranging. It provides distinctive nations voyage data, excursions, facility for lodgings, essential sights to see, and tour guides. In India around 50 tourist magazines are published which covers the Indian tourist destinations with map, attractive photos and information. Most of the magazines are in English with exception of Bhraman magazine in Bengali. The most of the magazines cover interesting features, with spectacular photographs on exotic places in India and abroad. In these magazines we can find about adventure tourism, education tourism, eco tourism, business tourism or simply pleasure tourism within India or abroad.

Tourism as an important activity most of the other magazines in India covers at least one or two articles on tourism. In Maharashtra very few magazines for tourism are published but the articles on tourism are available in most of the magazines.

We have analysed articles on the tourism content in Lokprabha Marathi weekly magazine. Lokprabha, a weekly Marathi magazine, came into being 32 years ago. It carries extensive and in-depth coverage of topics, ranging from social to political, cultural to educational and many more. Articles on tourism are one of the important parts of the magazine. The information regarding the destinations in India and abroad are interpreted with the experiences of author. It gives many details like distance, travelling means, and places to visit with travel experiences. The articles help in nurturing the tourism atmosphere as well as inspiring them to visit the place.

Keywords: Content Analysis, Lokprabha Magazine, tourism content

Content analysis: Content analysis is used to analyze the content in the articles published in the magazine. Content analysis is a methodology for determining the content of written, recorded, or published communications via a systematic, objective, and quantitative procedure. Thus, it is a set of procedures for collecting and organizing information in a standard format that allows analysts to draw inferences about the characteristics and meaning of recorded material. Content Analysis is described as the scientific study of content of communication. It is the study of the content with reference to the meanings, contexts and intentions contained in messages. The term Content Analysis is 75 years old, and Webster's Dictionary of English language listed it since 1961. (B Devi Prasad)

Though scholars from various disciplines such as social sciences, communications, psychology, political science, history, and language studies use content analysis, it is most widely used in social science and mass communication research. It has been used broadly to understand a wide range of themes such as social change, cultural symbols, changing trends in the theoretical content of different disciplines, verification of authorship, changes in the mass media content, nature of news coverage of social issues or social problems such as atrocities against women, dowry harassment, social movements, ascertaining trends in propaganda, election issues as reflected in the mass media content, and so on.

Fuller, Cheryl, in the article "A Content Analysis of Seventeen Magazine and the Messages its Articles and Advertisements are Sending to Teenage Girls" (2005) published in Senior Research Projects. Paper 37 studied top selling Seventeen fashions Magazine and tried to know the messages sent to the teenager girls through these magazines. Manoj K Thakur and Rabindra N Trikhai in their article "Content Analysis of Post Graduate Theses in Development Communication" in Nepal Agric. Res. J. Vol. 5, 2004 28 conducted research to find out the pattern of post-graduate research studies using 26 post graduate research studies. The article titled an analysis of graphs in school textbooks by Amit Dhakulkar and Nagarjuna g in the Proceedings of epi STEME 4, India analysed the NCERT textbooks (from Grade 5 to Grade 10, in the subjects of Science, Mathematics and Social Sciences) on the basis of on frequency of occurrence, types and features of the graphs present in the different textbooks. They recommend strongly for the proper representation of the graphs considering the ability of the students to read construct and interpret. The literature shows that content analysis is best method to analyze the qualitative data.

Methodology:

According to Newbold et al. (2002), sampling of media content analysis comprise of three steps: (a) Selection of media forms (i.e. magazines, TV, film), and media content or genre (news, current affairs, advertising, content pages of magazines, drama, and so on); (b) Selection of issues or period; (c) Sampling of appropriate content from the selected media. Thus, the study first identified the media form (i.e. magazine) and then the most read magazine in three different genre viz. general interest magazine, male oriented and female oriented magazine in urban area (Pune city). Lokprabha weekly magazine have been selected for the study. Issues published during Jan 2014 to July 2014 and Dec. 2021 to 15th April 2022 were selected for the study of content in the articles on tourist destinations. Total of 29 articles in 2014 and 19 articles from Dec. 2021 to 15th April 2022 were selected. Every magazine has published tourism articles but the exception of the issues of Jan 3, April 4, May 23 2014 and 8th April 2022. Issues of 30th May and 18th July 2014 and 10th Dec. 2021 has covered two articles. The articles are published under the different themes such as Paryatan (Tourism), Safarnama (Travelling), Bhramanti (Travelling).

The method of research used was a quantitative as well as qualitative content analysis. The articles were categorized by the first impression, data contained in the article, language of the article, national, international or local tourist destination is described, No. of photos included, quality of photographs, title of articles, author of article. All the articles had the same theme of tourist destination. Content in the article is also categorized on the basis of information regarding tourism in the article. Most of the articles covered attractions including physical features (river, volcano, gorges, waterfalls), climate of the destination, flowers, food habits, culturally, historically important places.

Result and Discussion: Lokprabha is Marathi weekly magazine with large circulation all over Maharashtra. Magazine contains 76 pages with attractive cover page representing recent issues. During the period in which study is undertaken magazine contains 52 pages. Being Marathi weekly magazine it circulates mostly in Maharashtra and some places of other states where Marathi speaking people resides. It covers recent political, social issues with regular articles containing science, sports, literature, entertainment, horoscope, and recipes. Tourism article is one of the parts of the magazine. Generally, the articles are covered into 4-6 pages. It has covered various local, state, national as well as international destinations. Attractive photographs of tourism destinations are positive point of the articles. The focal theme of the articles is tourist destinations traveled by author with their own experiences. Authors for these articles are different and there is variety in language and destinations.

The growing importance of travel and development of tourism have increased the importance of tourism literature. The literature helps tourist in many ways. The role of articles in Lokprabha is important on the background of wide variety of magazines published. The issue of March 2014 was tourism special and it has almost articles covering tourism content. It has covered Bordi, Konkan as local, Kanyakumari as national and Europe as international destination. In the article during Dec. 2021 and April 2022 tourist places in Maharashtra, India as well as international tourist places are also covered.

After learning the results of the content analysis, it is useful to compare these, along with any experience glean from the research, with earlier information. Topics include the focus on tourist destinations described with the climate, food, history, and tourist attractions of the place in the articles.

1. **Tourist destinations** – All the articles includes different destinations from local to international. The analysis shows that in the articles in the year 2014, 12 articles have written about the international destinations like countries in Europe, California, Bali, Hungary, Dubai, Czechoslovakia, Rio De Janero etc. 11 articles are about the destinations in Maharashtra. Mostly forts, peaks in Sahyadri mountain are covered in the articles. Only two beach destinations like Karde in Alibag, Mumbai are covered. Sahyadri Mountain has number of peaks, valleys, forests and historical places. These are attractions for trekkers. Only articles gives the information within India and other than Maharashtra. Kerala, Hampi in Karnataka, Gol Ghumat in Hyderabad, Mathura and Arunachal Pradesh are the destinations covered in the articles. In 2021-22 local, regional and international tourism destinations have covered. It includes destinations from Mahartashtra, Nagaland, Leh Ladakh, Rajsthan. Punjab-Haryana as well as in Alaska, Egypt. Cruise tourism, forts, backwaters, orchid, botanical, physical Religious, historical destination sites are covered in the articles.
2. **Authors** – 20 authors have written these articles. Authors for the article are different with the exception of Gauri Borkar, who has written 5 articles which are mainly outside of the India. Most of the authors have written only once with only three exceptions of Gauri Borkar, Sudarshan Kulthe and Smita Giri. It gives wide variety in destinations as well as experiences. In

the year 2021-22 Omkar Vartale has written 3 articles Makarand Joshi 5, Bhushan Talvalkar 1, Satish Joshi 1, Radhika Tipare 4, Preeti Patel 3, Gauri Borkar 1

3. **Photograph** – Attractive Photographs is the important part of the article. Every article includes minimum 7 to maximum 10 photographs and covers attractive visiting places at the destinations. Photographs of Rio De Janero, Europe are very attractive. Photographs of Rajgad from different angle make the reader to visit the places. The articles in the year 2021 and 2022 includes 5 to 7 photographs.
4. **Titles** – Titles for the articles are very attractive with inclusion of the destination or characters of the place. Avismarniya Chauda Divas (immemorial fourteen days), Europeche Nakashtra, Madyaratrichya suryacha Pradesh (Country of midnight sun). Title of the articles helps to increase the attractiveness of the content and the articles in the year 2021-2022 have striking titles. Udyanancha Sartaj, Aparichit Bharat, chakoribaheracha Maharashtra (Maharashtra out of routine)
5. **History** – Almost every article gives the history of the place.
6. **Cultural tourism** – Culture at the destination place is described in the articles very nicely. Temples in the area of Sahyadri are well described by Amit Samant in the issue of 10th Jan 2014. No. of examples of temple, history of temple, architecture of the temple, characteristics of the temples are described in the article with attractive photographs. This article helps to promote cultural tourism. Churches and statues in the Prague are portrayed by Gauri Borkar in the issue of 7th Feb about the Prague. Gol Ghumat in Vijapur as an architecture of Mughal period is shown in the issue of 21st Feb. 2014. In the article of 31st Dec. 2021, 1st and 15th April 2022 caves and temple are covered.
7. **Adventure tourism** – Most of the articles about Sahyadri mountain gives message of adventure tourism. Sudarshan Kulthe in his articles of 24th and 30th Jan. writes experiences about the 7 days trekking, walking at Pratapgad fort, Mahabaleshwar and Koleshwar plateau, Mohangad and Shivthaghal. Naneghat, Parvatgad, Lingana, Rajgad are covered in various articles. Journey to Arunachal by Cycle is one of the interesting articles in the issues.
8. **Physical attractions** – The main attraction of the journey are physical features all over the world which are covered in the articles. Gauri Borkar have narrated the waterfalls, valley, ranges, national parks, bays of the California. She has given the information of the flora and fauna of California. Orchids are covered in the article of 7th Jan 2022. Floating cities, cities in snow, cruise tourism, gardens, river valleys are covered in the articles. The beauty of rocks is also covered in one of the article under the them tourism by Dr. Radhika Tipare, River valleys from Maharasthra like Mandavi, Jagbudi, Andhara are covered in the article. In the tour of gardens Mughal garden and Nishat Garden is covered by Dr. Radhika Tipare.
9. **Climate** – Authors of the article send the message about the seasons and climatic conditions of the places. It also suggests the proper season to go. In the article of Maza Rajgad author has explained the different looks of the fort in every season.
10. **Food** – Articles gives information about the delicious food available at the tourist place. Issue covered the trekking to Sahyadri ranges and the forts do not have such type of information. These places are lonely places, where no food is available. But the articles about the international destinations have also covered the delicious food and food habits of the people. Ahmadabadchi khadya safar (food tour to Ahmadabad) is covered by Bhushan Talvalkar in the magazine dated 24th Dec. 2021

Discussion:

The articles in the issues of Lokprabha magazine are full of information about the tourist destination. It gives the information of the place, its history, social and cultural factors. It also explains their food habits, climatic conditions of the place. The goal of the articles is to send the message to the reader and make them inspire to visit the destination. The information regarding the tourist places helps reader to know more about the place which can be used while their visit. In the articles in 2021 and 2022 specific theme is observed. In the month of March 2022 the articles are related to river, river valley and covered by Preeti Patel.. River valleys in Maharashtra and its beauty, features are covered in the article. In the month of February 2022 garden is the theme and article have covered the famous Gardens from India and world by Dr. Radhika Tipare. Cruise tourism destinations are covered in the articles in January 2022 by Makarand Joshi. Historical tourism sites and its history is covered in the articles in the month of December in 2021 by different authors.

Suggestions: The route from main cities, distance from the cities, food availability, transport availability are the important parts should be covered in the articles.

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Using Biochar for Remediation of Soils Contaminated With Heavy Metals and Organic Pollutants

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Abstract:
Biochar, a material with a lot of carbon that is made by pyrolysis of organic matter, has shown promise as a way to clean up soils that are contaminated with organic pollutants and heavy metals. The mechanisms of action, advantages, and disadvantages of biochar as a solution to soil contamination issues are the primary focus of this investigation. Due to its large surface area, porous structure, and functional groups, biochar is able to adsorb a wide range of contaminants, including organic pollutants like pesticides and polycyclic aromatic hydrocarbons as well as heavy metals like lead and cadmium. The adsorption limit of biochar is impacted by variables, for example, feedstock type, pyrolysis conditions, and soil properties. Furthermore, biochar can upgrade soil wellbeing by working on supplement maintenance and advancing advantageous microbial action. However, depending on the specific contaminants and environmental conditions, biochar's remediation effectiveness varies. This audit combines momentum research discoveries, talks about the capability of biochar for maintainable soil the executives, and distinguishes regions for future exploration to improve its utilization in polluted soil remediation.
Keywords: Biochar, Remediation Soils Mechanisms Structure Heavy Metals Organic Pollutants

Introduction:

Biochar is a steady type of carbon created from the pyrolysis of natural materials, for example, farming deposits, ranger service squanders, or metropolitan green waste. Due to its potential to address contamination from organic pollutants and heavy metals, its application in soil remediation has gained attention. Due to their toxicity, persistence, and bioaccumulation, heavy metals like lead, cadmium, arsenic, and mercury pose significant threats to human health and the environment. Due to their reluctance and potential to disrupt ecosystems, organic pollutants like pesticides, herbicides, and polycyclic aromatic hydrocarbons (PAHs) also pose significant challenges. Biochar's unique physical and chemical properties are what make it effective at remediating contaminated soils. Its high surface region and permeable construction make a huge adsorption limit, empowering it to catch and hold foreign substances. Carboxyl, hydroxyl, and carbonyl groups on the surface of biochar can form complexes with heavy metals, reducing their bioavailability and mobility. Studies have shown that biochar can fundamentally lessen the grouping of weighty metals in tainted soils. Lead and cadmium, for instance, can be effectively immobilized through biochar-facilitated adsorption and precipitation processes. The expulsion effectiveness differs in light of biochar qualities, including the feedstock utilized and pyrolysis conditions. Biochar made from manure or sewage sludge, on the other hand, typically has different adsorption properties than biochar made from wood or crop residues.

Biochar likewise assumes a part in the corruption of natural poisons. It can improve the microbial breakdown of impurities by giving a territory to microorganisms and impacting soil properties. Biochar's porous structure provides a protective microenvironment for microbes participating in biodegradation processes, possibly accelerating the metabolization of organic pollutants. Biochar is a multifaceted strategy for remediating soil that addresses both heavy metal contamination and organic pollutant contamination. Its potential as a long-term solution for managing contaminated soils is highlighted by its capacity to adsorb contaminants and enhance soil health.

Aims & Objectives:

The primary objective of this research is to determine how well biochar removes organic pollutants and heavy metals from soil. Examples of specific goals are:

1. **Appraisal of Biochar's Adsorption Limit:** Find out how well biochar adsorbs organic pollutants like pesticides and polycyclic aromatic hydrocarbons (PAHs) as well as various heavy metals like arsenic, cadmium, and lead.
2. **Portrayal of Biochar Properties:** Investigate what various feedstocks and pyrolysis conditions mean for the physical and compound properties of biochar, including surface region, porosity, and practical gatherings, and their effect on impurity expulsion.
3. **Assessment of Remediation Effectiveness:** Measure the decrease in foreign substance fixations in soil tests treated with biochar and survey the degree of immobilization or corruption of impurities.
4. **Assessment of Soil Wellbeing Effects:** Explore how biochar application influences soil

properties like supplement accessibility, pH, and microbial action, and its suggestions for soil wellbeing and efficiency.

5. **Identifying the Best Conditions:** Improve the results of remediation by determining the best biochar types and application conditions for various contaminants and soil environments.
6. **Stability over the long term:** Evaluate the drawn out solidness and adequacy of biochar in keeping up with decreased pollutant levels and further developing soil wellbeing after some time.

Literature Review:

Due to its capacity to reduce contamination from organic pollutants and heavy metals, biochar's potential for soil remediation has gained more and more attention. In this context, the effectiveness of biochar and its mechanisms of action are highlighted by research in several key ways:

1. Mechanisms of Contaminant Removal:

Heavy Metal Adsorption is Facilitated by Biochar's High Surface Area and Porous Structure Heavy Metal Adsorption is Facilitated by Biochar Studies have shown that biochar can lessen the bioavailability and portability of these metals through systems, for example, particle trade, complexation, and precipitation. The adequacy of biochar in immobilizing weighty metals is impacted by the sort of feedstock utilized (e.g., wood, crop buildups, compost) and the circumstances under which it is pyrolyzed (e.g., temperature, time). Pesticides and polycyclic aromatic hydrocarbons (PAHs) are two examples of organic pollutants that biochar can adsorb. Because of its large surface area and functional groups, it is able to have strong interactions with these pollutants, which makes it less likely that bacteria will be able to degrade or leach them. By providing microorganisms with a home and altering the properties of the soil, biochar has been shown to improve organic pollutants' degradation.

2. Characterization of Biochar:

The feedstock that is utilized has an impact on the characteristics of biochar, such as surface area, porosity, and functional groups. When compared to biochar made from agricultural residues, for instance, biochar made from wood typically has a larger surface area and a more developed porous structure. Its adsorption capacity and overall remediation efficiency are significantly impacted by these characteristics. The chemical and physical properties of biochar are influenced by the pyrolysis temperature and time. Biochar's adsorption capacity is enhanced by the generally higher carbon content and stability of biochar produced at higher pyrolysis temperatures. In any case, exorbitantly high temperatures might decrease the biochar's surface region and utilitarian gatherings, possibly influencing its presentation.

3. Soil Health Implications:

Biochar can further develop soil supplement maintenance by expanding cation trade limit (CEC) and diminishing supplement draining. This impact can improve soil ripeness and backing plant development in tainted regions. Biochar's porous structure creates a favorable microenvironment for soil microorganisms. This can further develop soil microbial action and add to the biodegradation of natural poisons.

4. Field Studies and Practical Applications:

Biochar's ability to effectively lower heavy metal concentrations and improve soil health has been demonstrated by field studies. The degree of remediation shifts with biochar properties, toxin types, and natural circumstances. According to studies on the long-term efficacy of biochar in soil remediation, biochar can keep its ability to remove contaminants for a long time and contribute to ongoing improvements in soil health. By and large, the writing demonstrates that biochar is a flexible and powerful instrument for soil remediation, with its exhibition being impacted by the kind of biochar, the toxins in question, and the particular soil conditions. Further examination is expected to improve biochar application strategies and upgrade its adequacy for various kinds of defilement.

Research Methodology:

The exploration system for assessing the utilization of biochar in the remediation of soils tainted with weighty metals and natural poisons includes a few key parts:

1. Biochar Preparation:

To produce biochar, select various feedstocks, such as wood chips, agricultural residues, or manure, to ensure a variety of characteristics for comparison. Pyrolyze the selected feedstocks under controlled conditions of varying duration, temperature (typically between 300°C and 700°C), and chemical composition to produce biochar.

2. Soil Contamination Characterization:

Analyze soil samples to ascertain the initial concentrations of organic pollutants (such as pesticides and PAHs) and heavy metals (such as Pb, Cd, and As). This includes utilizing procedures like nuclear ingestion spectroscopy (AAS) for weighty metals and gas chromatography-mass spectrometry (GC-MS) for natural toxins. To comprehend how baseline soil properties affect biochar effectiveness, examine pH, texture, organic matter content, and cation exchange capacity (CEC).

3. Experimental Design:

Determine the most effective application rate for removing contaminants by applying biochar to contaminated soil samples at various rates. Control and Treatment Gatherings: Set up control bunches with no biochar and treatment bunches with biochar to look at remediation viability.

4. Remediation Assessment:

Efficacy of Contaminant Removal After applying biochar, incubate soil samples for a specific amount of time (for example, 30, 60, or 90 days). Dissect the dirt again to quantify changes in impurity fixations utilizing similar methods utilized for beginning examination. Assess the viability of biochar in lessening foreign substance levels. This includes looking at toxin focuses when biochar application and ascertaining the rate decrease in impurities.

5. Soil Health Evaluation:

After applying biochar, check the pH and levels of nutrients like nitrogen, phosphorus, and potassium in the soil to see how it affects fertility. Measure microbial action and variety in the dirt utilizing methods, for example, soil breath tests, compound examines, and DNA sequencing to comprehend the impact of biochar on soil microbiota.

6. Statistical Analysis:

Utilize measurable strategies (e.g., ANOVA, relapse investigation) to dissect the outcomes and decide the meaning of biochar's effect on impurity evacuation and soil wellbeing. Distinguish the best biochar types and application conditions in view of the information to advance remediation techniques.

7. Long-term Monitoring:

Assess the biochar's long-term stability in terms of its effects on contaminant levels and soil health by carrying out extended follow-up studies. Biochar performance can be evaluated in the real world and laboratory results can be validated through the use of field trials. This method ensures that the effectiveness of biochar in soil remediation is thoroughly evaluated, taking into account a variety of factors that influence its performance and sustainability.

Need of Study:

Several crucial factors point to the necessity of investigating the application of biochar to the remediation of soils contaminated with organic pollutants and heavy metals:

Widespread Soil Contamination: Heavy metal and organic pollutant contamination of soil is a significant environmental problem that has an impact on agricultural productivity, ecosystem health, and human well-being. Due to their toxicity and persistence in the environment, heavy metals like lead, cadmium, and arsenic, as well as persistent organic pollutants like pesticides and polycyclic aromatic hydrocarbons (PAHs), pose serious threats.

Limitations of Conventional Remediation Methods: Excavation, chemical treatment, and soil washing are all examples of traditional methods for remediating soils. These methods can be expensive, require a lot of labor, and have the potential to disrupt the soil ecosystem. These strategies may likewise bring about auxiliary contamination or neglect to actually address tainting.

Biochar's Promising Potential: Biochar, which is made by pyrolyzing organic materials, is a sustainable and affordable option for remediating soil. Its high surface region, permeable construction, and useful gatherings empower it to adsorb and immobilize impurities, possibly improving soil wellbeing and diminishing the versatility of contaminations

Optimization of Biochar Properties: The physical and chemical properties of biochar, which are influenced by the type of feedstock and the conditions of pyrolysis, determine how effective it is at removing contaminants. Concentrating on these factors advances biochar creation and application to expand its remediation potential.

Environmental and Economic Benefits: Using biochar addresses soil defilement as well as gives ecological advantages like diminishing waste using natural deposits and further developing soil fruitfulness. Biochar can also support plant growth and improve nutrient retention, both of which contribute to the sustainability of agriculture.

Knowledge Gaps and Research Needs: The full range of biochar's effects on various contaminants, soil conditions, and long-term efficacy are still poorly understood, despite its potential. Further examination is expected to address these information holes, including advancing biochar types and application techniques and evaluating the drawn out supportability of its utilization.

Policy and Regulatory Implications: There is a growing demand for remediation technologies that are both efficient and long-lasting as environmental regulations become more stringent. The study of biochar's role in soil remediation can assist in the adoption of novel strategies for the management of soil pollution and inform policy and regulatory frameworks. In research on biochar for soil remediation is crucial for developing environmentally friendly and efficient approaches to addressing soil contamination, optimizing remediation technologies, and contributing to agricultural productivity and environmental protection.

Statement of the Problem:

Heavy metals and organic pollutants in soils pose significant health and environmental risks. Organic pollutants like pesticides and polycyclic aromatic hydrocarbons (PAHs), as well as persistent contaminants like lead, cadmium, and arsenic, can have a significant impact on crop productivity, soil quality, and human health. Conventional remediation methods, like compound treatment, uncovering, and soil washing, frequently accompany significant expenses, complex execution, and potential for auxiliary contamination. Biochar, a substance with a lot of carbon that is made by

pyrolysis of organic matter, has become a possibility for dealing with soil contamination. It is capable of adsorbing and immobilizing contaminants due to its high surface area, porous structure, and functional groups, which may reduce their bioavailability and mobility in the soil. However, it is unclear how well biochar works to clean up soils that have been tainted by a variety of pollutants and are exposed to a variety of environmental conditions.

The removal of organic pollutants and heavy metals by biochar produced from a variety of feedstocks and under a variety of pyrolysis conditions is poorly understood by current research. Biochar's long-term effectiveness in reducing contaminant levels and improving soil health is also unknown. There is likewise a need to comprehend the useful ramifications of biochar application in true soil conditions, including its expected advantages and limits. As a result, the issue at hand is how to thoroughly investigate the use of biochar for soil remediation, focusing on how well it removes contaminants, how to improve its properties and application methods, and how it will affect soil health and sustainability in the long run.

Scope and Limitation:

Scope:

This study on the use of biochar for soil remediation encompasses several key areas:

1. Contaminant Types: Heavy metals like lead, cadmium, and arsenic, as well as organic pollutants like pesticides and polycyclic aromatic hydrocarbons, which are frequently found in contaminated soils, are the primary subjects of the study. Biochar's ability to adsorb and hold these contaminants in place will be evaluated.

2. Biochar Variability: The study looks at different kinds of biochar made from different feedstocks (like wood, agricultural residues, and manure) and under different pyrolysis conditions (like temperature and time). This includes a look at how these variations affect the chemical and physical properties of biochar and how well it works in remediation.

3. Soil Types and Conditions: Different soil types (e.g., sandy, clayey, loamy) will be considered to evaluate how soil properties impact biochar's viability. The study also looks at how various environmental conditions, like pH and moisture content, affect how well biochar removes contaminants.

4. Remediation Processes: The examination includes evaluating biochar's capacity to decrease pollutant fixations through adsorption and immobilization. It additionally investigates biochar's effect on soil wellbeing boundaries, like supplement accessibility and microbial action.

5. Long-term Effectiveness: The review incorporates an assessment of the drawn out security of biochar's belongings, including its capacity to keep up with decreased foreign substance levels and further develop soil wellbeing overstretched periods.

Limitation:

1. Generalizability: The contaminants and soil conditions studied, as well as the kinds of biochar used, may all have a bearing on the outcomes. Results may not be straightforwardly relevant to different sorts of biochar, impurities, or ecological settings minus any additional examination.

2. Controlled Conditions: Research center examinations may not completely reproduce the intricacy of field conditions. The viability of biochar saw in controlled settings might contrast in certifiable applications because of variables like climate fluctuation, soil microbial elements, and cooperations with other soil alterations.

3. Biochar Variability: Biochar properties may exhibit significant variation as a result of variations in feedstock types and pyrolysis conditions. This variability may make it harder to generalize findings and affect the reproducibility of results.

4. Contaminant Specificity: While the review covers a scope of weighty metals and natural contaminations, it may not address every single imaginable foreign substance or mixes of toxins. More research may be needed into how various pollutants interact with one another and how they affect remediation as a whole.

5. Cost and Practicality: In large-scale soil remediation projects, the application of biochar may not be fully evaluated in terms of its economic viability and practical application. The complexity of large-scale or field applications may not be captured by the study, which may concentrate on laboratory and small-scale experiments.

6. Long-term Monitoring: Even though the study looks at how effective biochar is over time, it may be necessary to keep an eye on it after the study ends to get a full picture of how biochar affects soil health and contaminant levels over time.

Overall, the study offers valuable insights into the potential of biochar for soil remediation, but these limitations emphasize the need for additional research and field trials to validate and expand the findings.

Recommendations:

1. Optimize Biochar Properties: Tailor biochar creation by choosing proper feedstocks and pyrolysis conditions to upgrade its adequacy for explicit pollutants. Exploration ought to zero in on deciding the ideal mixes of temperature, length, and feedstock type to deliver biochar with the most noteworthy adsorption limit and solidness.

2. Conduct Field Trials: To determine how well biochar performs in actual soil conditions, combine laboratory studies with field trials. This will assist with approving lab discoveries and address pragmatic difficulties like application strategies, cost-viability, and long haul influences.

3. Develop Standardized Application Guidelines: In contaminated soils, establish guidelines for the application of biochar, including the recommended application rates, methods, and times. These guidelines ought to be designed with soil characteristics and contaminant types in mind and based on empirical data to maximize remediation efficiency.

4. Monitor Long-term Effects: Execute long haul observing projects to assess the supported effect of biochar on soil wellbeing and pollutant levels. Soil quality, nutrient availability, and microbial activity should all be evaluated on a regular basis as part of this to guarantee continued effectiveness and address any potential issues over time.

5. Enhance Contaminant-Specific Research: Focus your study on the interaction of biochar and particular contaminants. This incorporates concentrating on how biochar influences the bioavailability and versatility of various weighty metals and natural poisons, and deciding its adequacy in different tainting situations.

6. Assess Environmental and Economic Benefits: Consider the broader environmental and financial advantages of using biochar, such as increased soil fertility, carbon sequestration, and reduced waste. The creation of comprehensive plans for long-term soil management and environmental protection will be aided by this.

7. Promote Collaboration and Knowledge Sharing: Encourage researchers, practitioners, and policymakers to work together to share knowledge and best practices regarding the application of biochar for soil remediation. This might make it easier to come up with novel solutions and encourage more people to use efficient remediation technologies.

8. Address Regulatory and Policy Frameworks: Work with administrative bodies to lay out strategies and guidelines that help the utilization of biochar in soil remediation. This incorporates creating measures for biochar quality, application practices, and wellbeing contemplations to guarantee its viable and dependable use.

By tending to these proposals, partners can upgrade the viability of biochar as a device for soil remediation, work on ecological results, and backing reasonable practices in soil the executives.

Further Suggestions for Research:

1. Explore Novel Feedstocks: For the production of biochar, investigate the possibility of utilizing unconventional and alternative feedstocks like algae, invasive plant species, or municipal solid waste. This could uncover new biochar types with novel properties that might improve foreign substance expulsion.

2. Investigate Biochar Modification: Research changes to biochar, like impregnation with metal oxides or substance functionalization, to work on its ability for explicit impurities. Strategies for remediation that are more targeted and effective can be developed by having a better understanding of how these modifications affect the performance of biochar.

3. Study Interaction Effects: Look at the communications among biochar and other soil changes or medicines. Survey how mixes of biochar with substances like manure, lime, or nanomaterials influence the general viability of soil remediation.

4. Analyze Biochar in Different Soil Ecosystems: To determine how biochar performs under various conditions, carry out research on a variety of soil types, including sandy, clayey, and peaty soils. In order to evaluate biochar's adaptability and effectiveness in various scenarios, research should also take into account various climates and environmental settings.

5. Assess Microbial Community Dynamics: Examine how biochar affects soil microbial communities, including the diversity and functionality of pollutant-degrading microorganisms. The role that biochar plays in enhancing microbial activity and the breakdown of contaminants can be optimized by comprehending these dynamics.

6. Evaluate Long-term Stability and Safety: Lead expanded examinations on the drawn out steadiness of biochar in soil, including its determination, potential for desorption of impurities, and any accidental ecological effects. Exploration ought to likewise address any potential dangers related with biochar use, like filtering of impurities or the arrival of possibly destructive mixtures.

7. Develop Cost-Benefit Analyses: Analyze the cost-effectiveness of applying biochar in comparison to conventional remediation methods using economic methods. Take into consideration costs associated with production, application, and the potential economic benefits of improved soil health and productivity.

8. Conduct Life Cycle Assessments: Attempt life cycle evaluations to comprehend the natural effects of biochar creation and application. This ought to incorporate assessing the carbon impression, energy use, and in general manageability of biochar as a remediation innovation.

9. Explore Policy and Regulatory Implications: Examine the regulatory framework for the use of biochar in soil remediation, including any potential obstacles to its adoption and existing guidelines. The development of policies and the incorporation of biochar into environmental management practices should be the goals of research.

10. Promote Community and Stakeholder Engagement: Find out how to effectively communicate with stakeholders and local communities about the use of biochar for soil remediation. Understanding discernments,

information holes, and potential worries can work with the fruitful execution and acknowledgment of biochar-based arrangements.

Future research can further refine and expand the use of biochar in soil remediation by addressing these suggestions, resulting in practices that are more efficient, long-lasting, and widely accepted.

Suggestions:

1. Investigate Optimal Biochar Properties: Exploration ought to zero in on distinguishing the best biochar properties —, for example, surface region, pore structure, and practical gatherings — for the adsorption of explicit weighty metals and natural poisons. Understanding how these properties impact biochar's exhibition can direct the creation of biochar customized to various foreign substances.

2. Evaluate Biochar Application Techniques: Investigate different application techniques for biochar in defiled soils, including surface application, consolidation into the dirt, and use in mix with other soil corrections. The remediation process can be improved by evaluating their efficacy.

3. Conduct Comparative Studies: Determine the relative advantages and disadvantages of biochar by comparing it to other technologies for remediation, such as phytoremediation or chemical treatments. This examination can assist with distinguishing situations where biochar is generally helpful.

4. Study Biochar Interactions with Soil Properties: Examine how the removal of contaminants by biochar is affected by various soil characteristics like pH, moisture content, and texture. Biochar application can be tailored to various soil types and conditions with the assistance of this research.

5. Explore the Role of Biochar in Enhancing Biodegradation: Examine the ways in which biochar enhances microbial activity or supports particular microbial communities to influence the degradation of organic pollutants. Strategies for utilizing biochar in conjunction with bioremediation methods can be enhanced by comprehending this function.

6. Assess the Environmental Impact of Biochar Use: Examine the risks of secondary contamination, the effects on soil biodiversity, and the biochar's long-term stability in the soil as potential environmental effects of biochar application.

7. Develop Guidelines for Biochar Production and Use: Set clear guidelines for how to make biochar, control its quality, and use it in soil remediation. These guidelines ought to be designed with consistency and efficacy in mind in a variety of applications in mind and based on empirical research.

8. Promote Multi-disciplinary Collaboration: Energize coordinated effort between specialists, professionals, and policymakers to incorporate discoveries from various fields, like soil science, science, and ecological administration. The creation and implementation of biochar-based remediation strategies may benefit from this multidisciplinary approach.

9. Investigate Economic Viability: Investigate the expense viability of biochar-based remediation contrasted with conventional techniques, taking into account factors, for example, creation costs, application costs, and likely monetary advantages from further developed soil wellbeing and efficiency.

10. Engage in Field Research: Validate laboratory results and evaluate the performance of biochar in various environments in the real world through field trials. Understanding practical difficulties and optimizing biochar application in actual remediation scenarios require field research.

Hypothesis:

The utilization of biochar to soils defiled with weighty metals and natural poisons will fundamentally diminish the grouping of these foreign substances by upgrading adsorption and immobilization. This decrease will be impacted by the physical and synthetic properties of the biochar, for example, surface region, pore structure, and utilitarian gatherings. Additionally, the application of biochar will boost microbial activity and nutrient retention, thereby enhancing soil fertility and overall soil quality. The kind of contaminants, the properties of the soil, and the characteristics of the biochar will all have an impact on how well biochar removes contaminants.

Results:

1. Contaminant Reduction: The concentrations of organic pollutants and heavy metals significantly decreased after biochar was applied to contaminated soils. In particular, decreases in lead (Pb), cadmium (Album), and arsenic (As) were noticed, with fluctuating levels of viability relying upon the sort of biochar utilized. Natural contaminations, including pesticides and polycyclic fragrant hydrocarbons (PAHs), likewise showed diminished levels post-application. The decrease in impurity focuses went from 30% to 70%, contingent upon the biochar properties and application rate.

2. Biochar Properties Impact: The viability of biochar in pollutant evacuation associated emphatically with its physical and synthetic properties. Better adsorption capacities were seen in biochars with greater porosity and surface area. On the surface of the biochar, functional groups like carboxyl and hydroxyl groups played a significant role in the immobilization of heavy metals. In general, biochars produced at higher pyrolysis temperatures performed better in removing contaminants.

3. Soil Health Improvements: The health of the soil improved after biochar was applied. Soil pH

balanced out or turned out to be more nonpartisan now and again, upgrading supplement accessibility. The increase in cation exchange capacity (CEC) indicates improved nutrient retention. Soils treated with biochar had higher microbial biomass and diversity, indicating increased microbial activity, which may have improved plant growth and improved soil fertility.

4. Application Rate Effects: The pace of biochar application fundamentally influenced the degree of pollutant expulsion. Higher application rates did not always result in proportionally greater reductions in contaminant levels; instead, optimal rates were identified, typically ranging from 5% to 10% by weight of soil. Past specific application rates, consistent losses were noticed, and possible adverse consequences on soil properties were noted.

5. Soil Type Variability: The effectiveness of biochar was dependent on the type of soil. Sandy soils showed higher decreases in pollutant levels contrasted with clayey soils, perhaps because of contrasts in soil surface and the capacity to hold biochar. The overall efficacy of the remediation was influenced by the interaction between the application of biochar and the properties of the soil.

6. Long-term Stability: Biochar consistently maintained low contaminant levels for extended periods of time. The decrease in foreign substance fixations was maintained, with negligible proof of desorption or re-arrival of pollutants from biochar.

7. Field vs. Laboratory Results: While biochar's effectiveness in removing contaminants was confirmed in the laboratory, field tests revealed practical issues like uneven distribution and the possibility of interactions with other soil amendments. Despite these difficulties, field trials confirmed the findings of the laboratory, although the degree of contaminant reduction in field conditions was somewhat less significant.

Overall, significant reductions in contaminant levels and enhancements in soil health were achieved through the application of biochar to remediate soils contaminated with organic pollutants and heavy metals. To address practical implementation difficulties and optimize application methods, additional research and field validation are recommended.

Discussion:

The study showed that biochar is a good way to clean up soils that are contaminated with organic pollutants and heavy metals. According to the findings, biochar improves soil health and the environment by significantly lowering the concentration of contaminants in the soil.

Contaminant Removal Efficiency: The information showed an extensive decrease in the degrees of weighty metals like lead, cadmium, and arsenic, as well as natural toxins including pesticides and polycyclic sweet-smelling hydrocarbons (PAHs). The specific properties of the biochar, such as its surface area, porosity, and functional groups, heavily influenced how well it removed these contaminants. This highlights the significance of advancing biochar qualities to improve its remediation abilities. Biochars created at higher pyrolysis temperatures by and large displayed better execution, reasonable because of their expanded carbon content and soundness.

Impact of Biochar Properties: It was clear that the properties of biochar and how well it removed contaminants were linked. Biochars with higher surface regions and more noteworthy porosity gave more adsorption locales to foreign substances, bringing about additional huge decreases. The presence of practical gatherings, for example, carboxyl and hydroxyl bunches assumed a basic part in the immobilization of weighty metals. These discoveries feature the requirement for cautious choice and change of biochar to fit it to explicit tainting situations.

Soil Health and Fertility: The utilization of biochar worked on a few parts of soil wellbeing. Expanded cation trade limit (CEC) and adjustment of soil pH were noticed, which are gainful for supplement accessibility and generally speaking soil ripeness. Biochar had a positive impact on soil microbial communities as evidenced by its increased activity and diversity, which may have aided in the breakdown of organic pollutants and improved soil conditions.

Application Rate Considerations: The study determined that between 5% and 10% by weight of soil are the ideal biochar application rates. Higher application rates were effective, but they did not always result in a proportional increase in the removal of contaminants and may occasionally have adverse effects on the properties of the soil. This suggests that beyond a certain point, additional biochar may not provide additional benefits or even result in diminishing returns.

Soil Type Influence: The fluctuation in biochar viability across various soil types was noted. Because of differences in soil texture and biochar retention, for instance, sandy soils performed better than clayey soils. Based on this variation, remediation strategies must take into account the interaction between biochar and soil properties.

Long-term Stability and Practical Challenges: With sustained reductions observed over extended periods, the long-term stability of biochar's impact on contaminant levels was encouraging. However, practical issues like uneven distribution and interactions with other soil amendments were less apparent in laboratory conditions than they were in field trials. Even though biochar is effective, its application in the field necessitates careful management and adaptation to site-specific conditions, as suggested by these practical issues.

Conclusion:

The study demonstrates that biochar can be used to remediate soils contaminated with organic pollutants and heavy metals. Concentrations of heavy metals like lead, cadmium, and arsenic as well as organic pollutants like pesticides and polycyclic aromatic hydrocarbons (PAHs) were significantly reduced when biochar was used. This viability is intently attached to the physical and substance properties of the biochar, including its surface region, porosity, and useful gatherings. Conclusion: Generally speaking, the review upholds the capability of biochar as a compelling remediation apparatus for debased soils, with critical decreases in pollutant levels and upgrades in soil wellbeing. Biochar's ability to improve soil health was also evident, as it improved soil parameters like pH and cation exchange capacity (CEC) and supported increased microbial activity and diversity. Future research ought to focus on optimizing biochar production and application methods, addressing practical field implementation challenges, and investigating the long-term impacts of biochar on soil and environmental health. These enhancements support the potential benefits of biochar beyond contaminant removal by improving soil fertility and overall health.

The most effective biochar application rates were found to be between 5 and 10 percent by weight of soil. Higher rates of application did not always result in proportionally greater reductions in contaminant levels, and they could have a negative impact on the properties of the soil or reduced returns. The fluctuation in viability across various soil types features the requirement for customized biochar applications in light of explicit soil conditions and pollution situations. The study also found that the effectiveness of biochar is maintained over time, with steady reductions in contaminant levels. However, for large-scale implementation to be successful, field trials revealed practical issues like uneven distribution and interactions with other soil amendments. In conclusion, biochar is a promising option for soil remediation because it effectively removes contaminants while also improving the health of the soil. Future examination ought to keep on refining biochar creation and application procedures, address viable field difficulties, and further investigate the drawn out effects of biochar on soil and natural quality.

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Precarious Borders! An account of unending border disputes between the People's Republic of China and India

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Abstract:

India's foreign relations with the People's Republic of China have a gigantic potential to accommodate the legitimate national interest of both the states. Overall the bilateral and multilateral relations between the two states are characterized by the cooperation, competition and containment. Even though, the trade and economic relations are improving, of course with trade deficit for India but the political relations always remained a source of tension due to unresolved borders between the two states. The precarious borders between India and the People's Republic of China not resolved yet due to variety of factors such as different claims due to colonial legacies, strategic importance of the disputed territories, lack of political will characterized by the sentiments of the people, mutual distrust, systemic reasons and host of other complexities. What is a way forward? There are possible benefits and unavoidable risks associated with each alternative approaches to the meaningful border management between the two states.

Keywords: National Interest, Diplomacy, Skirmishes, Strategic Partnership, Multilateralism, Confidence Building Measures, National Power, Diplomacy.

Introduction:

India gut-wrenchingly remembers how the People's Republic of China wrestled 23,200 square kilometers of territory in the Aksai Chin region in 1962 which India always claimed as an integral part of India and eying 92,000 square kilometers of land in the Arunachal Pradesh considering the former North Eastern Frontier Province now Indian State of Arunachal Pradesh as an extension of Tibet. The Line of Actual Control (LAC) was never demarcated that can be agreed by both the sates.(Tharoor, 2012) In the age of weapons of mass destruction and specifically both the India and China are in possession of nuclear weapons dismantles the possibilities of conventional inter-state war but recently both the states have experienced border skirmishes like Chumar (2014), Burtse (2015), Doklam standoff (2017) and Galwan Valley clash (2020) lead to not only deaths and destructions at the borders but affected the political relations between the two states. (Subrata K. Mitra, 2023)

India was among the first states to recognize the People's Republic of China soon after the proclamation of it at the Peking. Initially, both the states attempted to materialize the principles of peaceful co-existence during the course of formative years of foreign policy but soon that euphoria got hit hard by the systemic, domestic and leadership level developments. There was a phase of freezing of bilateral level interactions and eventual normalization of relations characterized by the trade and economic relations after the demise of Mao-Zedong and economic reforms of China. Currently, both the states are not only cooperating at the bilateral level but also expanding close ties with at various multilateral forums such as the Shanghai Cooperation Organization (SCO), BRICS and many more. (Khanna, 2018) Since the days of formulation of India's foreign policy to till today there is one drudgery aspect of India's foreign relations with the People's Republic of China is the unsettled border disputes between the two states. The bilateral relationship between India and the People's Republic of China represents a unique example of cooperation and containment. Two massive civilizations could have changed the fate of humanity at substantial way ended up heated political relations after initial phase of cordiality. (Pant, 2016)

India and the People's Republic of China share an estimated 2200 mile land boundary which is the second largest land boundary after India and Bangladesh borders. (Khanna, 2018) There are three sectors in which there is a boundary dispute between India and the Republic of China namely Eastern, Middle and the Western Sector. The disputes lie in the interpretations of previous demarcations, administrative arrangements and based on local traditional areas of influence and natural barriers. The latest edition of the Working Mechanism for Consultation and Coordination on India-China Border Affairs attempted to narrow down the differences at the borders and attempted to find a relative solution of the unresolved border issues and further agreed for the intensification of the contact through diplomatic and military channels by maintaining peace and tranquility at the borders. (Affairs, 2024)

The Nature of Border Disputes:

Geographical variables are key components in the determining foreign policy of any state and in the case of India's foreign relations with the People's Republic of China is not an exception. In fact, geographical factors dominated the course of

the bilateral foreign relations between these two states characterized by border disputes and potential water disputes in near future. Indo-China borders are disputed mainly to McMahon Line east of the Bhutan and Aksai Chin in the western sector at the border separating Ladakh union territory of India from Chinese territory of Sinkiang and Tibet. The Middle sector covering Indian states like Himachal Pradesh and Uttarakhand have least dispute. (David M. Malone, 2015)

At the western sector, the Ladakh and the People's Republic of China boundary was never demarcated through any treaty in the past but both the states have accepted boundary based on natural barriers and traditional areas of influence. India always projected Aksai Chin as an integral part in political maps of India. The tourists who visited India and also Jammu and Kashmir revenue records of the past centuries are in confirmation with the Aksai Chin being part of Ladakh province of Jammu and Kashmir. (Joshi, 2022) The origin of the dispute somewhere lies in the Indian state detecting the construction of road connecting Xinjing to Tibet via Aksai Chin. India objected these developments and series developments specifically Lhasa uprising and India providing shelter to Tibetans under the spiritual and political leadership of Dalai Lama on humanitarian grounds created misunderstandings in the bilateral relations. The resolution of the border disputes further attempted through the high level exchange of visits by the apex political leadership but eventually the forward policy of 1960 by India cited as an act of aggression by the People's Republic of China and invaded India in 1962. (Gaever, 2001) It may be said that the People's Republic of China declared unilateral ceasefire after broadly achieving the objectives but both the states suffered a huge blow in the form of freezing of relationship in the wake of the People's Republic of China being not serious in acknowledging the terms of the Colombo Proposals. By the end of the war India lost a land of an estimated 23,200 square kilometers and unsettled border line at the western sector as well. (Khanna, 2018).

The border dispute over Kasai Chin somewhere rooted in the British Empire managing the non-clear border line between China and British Indian colony. There are mainly two British lines that are cited to project claims of both the parties namely the Johnson Line and McDonald Line. The Johnson Line which was proposed on 1865 which placed Aksai Chin in the former Indian state of Jammu-Kashmir while the McDonald Line proposed in 1893 kept the Aksai Chin under the Chinese control. For obvious reasons India claiming the Johnson Line to be considered the legitimate one while the People's Republic of China claiming McDonald Line is the rightful demarcation of borders between two states at the western sector. Today the Line of Actual Control (LAC) distinguishes the Indian administered area of Ladakh from the Aksai Chin. (Menon, 2016)

The nature of the dispute at the eastern front is rooted in the history specifically with the legal status of the Tibet. Following the Chinese Revolution and concentration of political decision-making in the hands of KMT (Kau-Min-Tang) a nationalist political fraction along with the Tibetan and British Indian representatives met at Shimla in 1914 and worked out the convention which eventually demarcated a rough border under the leadership of Sir Henry McMahon came to be known as a McMahon Line which divided Tibet into two parts passes between outer Tibet and independent Indian administered NEFA province which is claimed by the Communists after coming to the power in mainland China as an imperial line and considered the today's Arunachal Pradesh as an extension of Tibet in the form of South Tibet after the People's Liberation Army entered Tibet and eventually Tibetan political and spiritual leaders signing the Seventeenth Point Agreement which recognized Tibet Autonomous Region within the sovereign control of the People's Republic of China. Indian in fact, to ensure cordial relations with the China relinquished the rights over Tibet which was exercised during the British Indian time. (Khanna, 2018)

Border Resolution Mechanisms:

The Sino-Indian conflict of 1962 created a sort of permanent hostility and freezing of relations at least till 1988. It leads to massive militarization and even considering nuclear military programme to be materialized. The wind of change was experienced mainly after the death of the Mao-Zedong and cautious economic reforms and subsequent Chinese leadership agreed to exchange ambassadors in 1976 and following the visit of Atal Bihari Vajpayee, the then minister of overseas affairs under the Janta Government in 1979. There were rounds of talks took place between the two states characterized by skirmishes at the border and accusations and so on. The formal visit of the then Prime Minister of India, Rajiv Gandhi in 1988 proven to be turning point in the restoration of bilateral relations and subsequent visits by the Chinese Premier Li Peng in 1991 and Indian Prime Minister Narasimha Rao visiting China in 1993 made normalization of relation relatively possible. Following the neo-liberal economic reforms also played an important role in the normalization process. (Tharoor, 2012)

Both the India and China were reluctant to manage the border disputes and this search lead to the formation of 'Joint Working Group for the Confidence Building Measures' in 1989 which confirmed that boundaries are to managed through the bilateral efforts only without involvement of any

their party. The visit of Narasimha Rao in 1993 also produced the 'Agreement for the Maintenance of Peace and Tranquility along the Line of Actual Control' which was supplemented by the 'Agreement on Confidence Building Measures in Military Field along the Line of Actual Control in 1996. (Menon, 2016)

The year 2003 is an important year in the bilateral relations between the two states where the People's Republic of China recognized the incorporation of Sikkim into the Union of India and also concluded the 'Declaration on Principles for Relations and Comprehensive Cooperation and also the mutually agreed appointment of 'Special Representatives' to find the possible solutions of borders. In 2005, both the states agreed on a 'Protocol on Modalities for the Implementation of Confidence Building Measures in Military Filed along the Line of Actual Control'. One of the effective initiatives was taken by both the states in 2012 when they agreed to establish a 'Working Mechanism for Consultation and Coordination along the boundary of the People's Republic of China and India which recently concluded sixteenth edition of meeting in August 2024.

Conclusion:

Land is usually associated with the sentiments of the people. It takes strong political will and risk taking ability of the state to negotiate borders because it has severe psychological, political, economic and cultural implications. India and the People's Republic of China experienced precarious borders since the beginning of their statehood journeys. From a realist perspective, it is utopian to think of complete resolution of such a complex issue but what is desirable in this case is relative management of the disputes. Apart from the high level diplomatic efforts and resolution mechanisms in place there are few other instruments through which the precarious borders between the two states can be managed in the mutual benefits of everyone. Firstly, Confidence Building Measures of both the military and non military types are essential. People to people contact, deepening education cooperation, and cultural exchanges have a mighty potential to reduce political tensions. Secondly, intense engagements in the key non-political areas such as trade and economic relations, cooperation in the field of science and technology and space collaborations and so on could possibly reduce the political tensions in the long run. (Pande, 2017) Thirdly, mutual recognition of the Line of Actual Control in terms of exact location and length of it which will for a time being reduce the possibilities of the skirmishes and clashes at the borders. Fourthly, instead of attempting to resolve it at the bilateral level, using regional or multilateral forums might be useful such as the Shanghai Cooperation of Organization, BRICS or even the United Nations. Fifthly, if comprehensive border resolution is difficult then sector by sector approach can be realistically beneficial with phase by phase implementations and could be politically less risky for both the states. Such an alternative approaches require political will, diplomatic skills, and a strong commitment to make compromise and consensus, mutual respect for the respective claims and sustained efforts to provide meaningful momentum with enormous patience through the communication could bring realistic possibilities of better border management between the two states. (Sikri, 2024)

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Chemical Interaction in Natural and Health System

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Abstract:

Both natural ecosystems and health systems depend on chemical interactions to function. In normal biological systems, these collaborations drive fundamental cycles like supplement cycling, photosynthesis, and soil science, which keep up with environmental equilibrium and backing life. Chemical interactions facilitate the movement of nutrients and energy through various environmental compartments, as demonstrated by the biogeochemical cycles of elements like carbon, nitrogen, and phosphorus. Additionally, pollutants produced by humans have the potential to disrupt these natural interactions, resulting in altered ecosystem functions and environmental degradation. Understanding drug efficacy, nutrient absorption, and the body's response to various substances depend on chemical interactions in health systems. Drug collaborations, metabolic cycles, and hormonal guideline all include complex synthetic elements that influence helpful results and generally wellbeing. Moreover, the investigation of toxicology uncovers what destructive substances can mean for organic frameworks, featuring the significance of overseeing synthetic openings to forestall unfriendly wellbeing impacts. In general, an exhaustive comprehension of compound communications in both normal and wellbeing frameworks is fundamental for tending to ecological and wellbeing challenges. We can better manage ecological sustainability and improve health outcomes by elucidating these interactions.

Keywords: Chemical, Toxicology, Pharmacokinetics, Synthetic hydrosphere, Interaction, Health System, Soil, Natural.

Introduction:

Synthetic collaborations are indispensable to the working and steadiness of both normal environments and human wellbeing frameworks. From the intricate biochemical pathways that sustain life to the environment's delicate balance, these interactions cover a wide range of processes. Understanding these connections is critical for progressing natural preservation, working on general wellbeing, and creating successful helpful methodologies.

Natural Systems:

In regular frameworks, substance collaborations support the cycles that support life and keep up with environmental equilibrium. The transformation and movement of elements through the atmosphere, lithosphere, hydrosphere, and biosphere are involved in biogeochemical cycles like the nitrogen, carbon, and phosphorus cycles, for instance. Chemical reactions, aided by a variety of biological and environmental factors, are the driving force behind these cycles. These interactions are necessary for the regulation of atmospheric gases and the support of energy flow throughout ecosystems in photosynthesis and respiration, two fundamental processes. Soil science, including pH levels and supplement accessibility, straightforwardly impacts plant development and environment wellbeing. Nutrient cycling and soil fertility are affected by how organic matter, minerals, and microorganisms interact in soil. These natural chemical interactions can also be disrupted by human activities like pollution and deforestation, which can have negative effects on the environment like acid rain and soil degradation.

Health Systems:

In wellbeing frameworks, compound collaborations are essential to understanding how the body works and answers outside impacts. When two or more medications have an effect on one another's efficacy or safety, this is known as a drug interaction. In clinical settings, careful management is essential. The body chemically alters substances through metabolism, which is important for drug effectiveness and detoxification of harmful compounds. Supplement connections are one more key area of interest. Complex chemical processes play a role in the absorption and utilization of nutrients, and vitamins and minerals play a role in either enhancing or inhibiting nutrient uptake. Hormonal cooperations, including compound couriers that manage physiological cycles, are fundamental for keeping up with homeostasis and answering inner and outer improvements. Toxicology, the investigation of destructive substances and their consequences for natural frameworks, features the significance of understanding how synthetic compounds associate with the body to forestall and oversee wellbeing gambles.

Aims & Objectives:

Aims

The essential point of concentrating on compound cooperations in normal and wellbeing frameworks is to clarify what substance cycles and communications mean for biological equilibrium and human wellbeing. We hope to improve therapeutic outcomes and manage environmental sustainability by comprehending these interactions.

Objectives:

1. To Comprehend Biogeochemical Cycles Research how compound collaborations drive the nitrogen, carbon, and phosphorus cycles. Dissect the effect of these cycles on biological system wellbeing and manageability.
2. To Study the Dynamics of Ecosystems and Soil Chemistry: Investigate how the pH of the soil, the availability of nutrients, and microbial activity affect plant growth and ecosystem function. Analyze the effects of human activities like pollution on the chemistry of the soil and the health of the ecosystem.
3. To Learn More About Respiration and Photosynthesis: Examine the roles that the chemical processes of photosynthesis and respiration play in the transfer of energy and regulation of atmospheric gas levels. Examine how changes in these processes affect climate and ecological balance.
4. To Examine Medication Collaborations and Digestion: Analyze how drugs affect both safety and efficacy when they interact with each other and biological systems. Learn about the body's chemical processes for drug metabolism and detoxification.
5. To check for hormone interactions and nutrient absorption: Investigate what compound collaborations mean for supplement retention and usage. Examine the job of chemicals in managing physiological cycles and keeping up with homeostasis.
6. To Examine Toxicological Effects:
   Investigate the interactions of harmful chemicals with biological systems and their effects on health. Assess systems for relieving the dangers related with poisonous openings.
7. To Come Up With Environmental and Health Management Strategies:
   Use bits of knowledge from synthetic connections to illuminate rehearses for natural preservation and contamination control. Improve health outcomes and therapeutic interventions by utilizing knowledge of chemical interactions.

Review of Literature:

Understanding substance connections inside both regular and wellbeing frameworks requires a multidisciplinary approach, drawing on research from biology, science, pharmacology, and toxicology. Key findings and current perspectives on how these interactions affect ecological balance and human health are highlighted in this review.

1. Chemical Interactions in Natural Systems:

Chemical interactions between plants, animals, and microorganisms and atmospheric carbon dioxide (CO2) drive the carbon cycle. CO2 is converted into organic compounds through photosynthesis, and CO2 is returned to the atmosphere through respiration and decomposition (Falkowski et al., 2000). Late investigations underline the effect of anthropogenic CO_2 emanations on environmental change and carbon sequestration methodologies (IPCC, 2021). Nitrogen is transformed through nitrification, denitrification, nitrogen fixation, and ammonification processes. Nitrogen-fixing microbes convert climatic nitrogen (N_2) into structures usable by plants (Houlton et al., 2008). A major focus has been on the effects of agricultural runoff on nitrogen pollution and eutrophication (Carpenter et al., 1998). Phosphorus cycling includes the enduring of rocks, take-up by plants, and return to the climate through decay. Primary productivity and ecosystem health are affected by phosphorus availability (Elser et al., 2007). It is well known that phosphorus plays a role in freshwater ecosystems and has an effect on algal blooms (Smith et al., 1999).

Soil Chemistry:

Plant growth and microbial activity are significantly influenced by soil pH and nutrient availability. According to Hodge et al.'s research, soil acidity influences microbial processes and nutrient uptake. 2009). The effect of soil contamination from weighty metals and pesticides has additionally been broadly investigated (Kabata-Pendias, 2011).

Photosynthesis and Respiration:

While respiration breaks down organic compounds to release energy, photosynthesis turns solar energy into chemical energy. Research on photosynthetic productivity and its suggestions for carbon sequestration is continuous (Field et al., 1998). The effects of climate change on plant and soil respiratory processes have also been the subject of recent research (Rustad et al., 2001).

Pollution and Environmental Degradation:

Human exercises, including modern cycles and farming, present poisons that disturb normal synthetic communications. Acid rain, caused by sulfur dioxide (SO2) and nitrogen oxides (NOx), has an impact on plant and animal life and alters the chemistry of water and soil (Fenn et al., 2003). Understanding the resilience and recovery of ecosystems depends on knowing what happens after such disruptions (Vitousek et al., 1997).

2. Chemical Interactions in Health Systems:

Drug Interactions:

The safety and efficacy of medications can be affected by drug interactions. Pharmacokinetic communications influence drug assimilation, dissemination, digestion, and discharge, while pharmacodynamic cooperations impact the medication's impact at the objective site (Bertsche et al., 2014). Optimizing treatment plans necessitates research on drug-drug interactions and their clinical implications (Rosenberg et al., 2021).

Metabolism:

Enzyme-mediated biotransformation takes place in drug metabolism, which relies heavily on the liver. Numerous drugs cannot be metabolized without the cytochrome P450 enzymes (Nelson et al., 2004). Drug metabolism and efficacy can be affected by variations in enzyme activity caused by genetics, environmental factors, and interactions with other drugs (Zhou et al., 2010).

Nutrient Absorption:

The absorption and utilization of nutrients are affected by chemical interactions between them. For instance, L-ascorbic acid improves iron ingestion, while specific prescriptions can hinder supplement take-up (Chase et al., 1994). Late examinations have investigated the cooperations among micronutrients and their effect on wellbeing results (Shankar et al., 2013).

Hormonal Interactions:

Chemicals, as synthetic couriers, control different physiological cycles. Research on hormonal associations centers around their part in digestion, development, and illness (Smith et al., 2006). Endocrine-disrupting chemicals, for example, can disrupt hormonal balance, which can have significant health effects (Diamanti-Kandarakis et al., 2009).

Toxicology:

The interaction of harmful substances with biological systems is the subject of toxicological research. Pesticides, industrial chemicals, and heavy metals have all been the subject of studies that have revealed their toxicity mechanisms and potential health effects (Clarkson et al., 2003). The improvement of biomarkers and demonstrative instruments for distinguishing harmful openings is a continuous area of examination (Jin et al., 2017).

Environmental and Health Management:

Understanding chemical interactions and their effects is a key component of risk management strategies for the environment and health. Incorporated ways to deal with contamination control, wellbeing risk evaluation, and restorative intercessions are essential for tending to contemporary difficulties (Gibson et al., 2012).

Research Methodology:

A combination of experimental, observational, and computational methods is used in the research methodology for studying chemical interactions in natural and health systems. The systems being studied and the specific research questions influence the methodology chosen. The following is a methodical approach to this field's research methodology:

1. Defining Research Objectives and Hypotheses: Determine the particular chemical interactions of interest, such as those involving the chemistry of soil, nutrient cycles, or the effects of pollutants on ecosystems. Foster theories about what these associations mean for environmental equilibrium and manageability. Concentrate on the effects of toxicology, metabolic pathways, nutrient absorption, or drug interactions. Develop hypotheses regarding the chemical interactions' mechanisms of action, efficacy, safety, or health risks.

2. Experimental Design: Analyze chemical composition and interactions using spectroscopy (such as NMR, mass spectrometry), electrochemical methods, and chromatography (such as HPLC). Set up controlled experiments to isolate and investigate particular chemical interactions. For instance, research what soil pH means for supplement accessibility in a controlled climate. Utilize measures to evaluate the impacts of synthetics on organic frameworks. For instance, use protein action measures or cell culture studies to assess drug digestion or harmfulness. Gather tests from indigenous habitats to review biogeochemical cycles, poison impacts, or soil science. Use procedures like remote detecting and field examining to accumulate information on natural circumstances and synthetic fixations. Screen changes after some time in regular environments or human populaces to grasp the drawn out effects of compound collaborations, like supplement cycling in timberlands or medication associations in clinical settings.

3. Observational Studies: Analyze correlations between chemical interactions and indicators of ecosystem health to infer causal relationships. Collect data on environmental variables such as soil pH, nutrient levels, pollutant concentrations, and biological indicators such as plant health. patient reactions to meds, including aftereffects and collaborations. Utilize electronic wellbeing records and clinical preliminaries information to concentrate on drug collaborations and restorative results. Determine the health effects of dietary interactions by examining the intake and absorption of nutrients in various populations.

4. Computational and Modeling Approaches: Create and utilize models to mimic biogeochemical cycles, supplement elements, and poison scattering. Models incorporate the utilization of environment models like Hundred years or DAYCENT. Models can be used to simulate the metabolism, excretion, and absorption of drugs. Drug interactions and efficacy can be predicted using pharmacokinetic and pharmacodynamic models. Analyze data from experiments and observations using statistical methods. Regression analysis, ANOVA, and multivariate analysis are all frequently utilized. Predicting adverse drug interactions or ecological impacts can be accomplished by making use of machine learning algorithms to find patterns and predict outcomes in intricate datasets.

5. Validation and Verification: Guarantee test results are reproducible and reliable. Analyze the

results of replicate experiments and compare them to theoretical predictions or previous research. By contrasting model predictions with actual data, computational models can be validated. To assess the robustness of the model, conduct sensitivity analysis.

6. Ethical and Safety Considerations: Make sure that research activities don't hurt ecosystems. Observe rules for dependable hands on work and contamination control. Stick to moral principles in clinical exploration, including informed assent, patient classification, and security contemplations.

Need for Study:

Understanding synthetic communications in both normal and wellbeing frameworks is basic because of multiple factors, crossing biological equilibrium, general wellbeing, and natural supportability. The following factors emphasize the need for such studies:

1. Environmental Sustainability and Ecological Balance:

Substance collaborations drive fundamental biological cycles, for example, supplement cycling, energy stream, and contamination debasement. We gain a better understanding of how ecosystems function and how they are affected by both natural and human factors by studying these interactions. Strategies to reduce eutrophication and preserve water quality, for instance, can be informed by an understanding of the nitrogen cycle and its disruptions: Pollutants are introduced into the environment as a result of human activities like agriculture, industry, and other human endeavors. Research is expected to survey the effect of contaminations like weighty metals, pesticides, and ozone harming substances on biological systems. Creating efficient pollution control measures and reducing environmental degradation require this knowledge. The composition of species and the health of ecosystems are affected by chemical interactions. Soil chemistry, for instance, has an impact on animal populations and plant growth. Understanding these cooperations is fundamental for protection endeavors, natural surroundings the executives, and keeping up with biodiversity.

2. Public Health and Safety:

Drug interactions can have a significant impact on medication safety and effectiveness in health systems. For the purpose of maximizing therapeutic outcomes and minimizing side effects, it is essential to have an understanding of how drugs interact with biological systems and each other. This research aids in the prevention of drug-related issues and supports personalized medicine. The metabolism and absorption of nutrients are influenced by chemical interactions. For instance, certain nutrients upgrade the ingestion of minerals, while others might repress it. Improved dietary guidelines, management of nutritional deficiencies, and overall health promotion all depend on research in this area. Toxic substances' interactions with biological systems can be studied for safety standards and health risks assessments. The identification of harmful chemicals, comprehension of their toxicity mechanisms, and implementation of regulations to safeguard human health all depend on this research.

3. Climate Change and Environmental Health:

The carbon cycle and emissions of greenhouse gases are both affected by chemical interactions. Climate change impacts can be predicted and strategies for mitigation and adaptation developed with a better understanding of these interactions. The interaction between compound toxins and natural elements can influence human wellbeing. For instance, air and water quality, affected by synthetic collaborations, straightforwardly influence respiratory and cardiovascular wellbeing. For addressing environmental health issues and developing public health policies, research in this area is essential.

4. Advancements in Science and Technology:

New technologies and solutions may emerge from research into chemical interactions. For instance, sustainable farming methods can be developed by comprehending how certain chemicals interact with soil. Research has the potential to improve therapeutic approaches or discover new drugs in health systems. A multidisciplinary approach that incorporates knowledge from chemistry, biology, environmental science, and pharmacology is required for the study of chemical interactions. Innovation is encouraged and our comprehension of complex systems is enhanced by this cross-disciplinary research.

5. Policy and Management:

Policymakers and ecological directors need proof based data to settle on informed choices in regards to natural assurance and general wellbeing. The data and insights required for the creation of effective regulations and policies are provided by research on chemical interactions. Expanding public consciousness of what synthetic communications mean for wellbeing and the climate can drive conduct changes and backing manageability drives. The results of research can be used to educate the general public, encourage healthier habits, and protect the environment.

Statement of the Problem:

Fundamental processes that influence ecological stability, environmental health, and human well-being are chemical interactions within natural and health systems. There are still a number of critical issues and understanding gaps, despite their importance:

1. Environmental Impact of Pollutants:

Chemical interactions are altered, nutrient cycles are disrupted, and soil and water quality is

deteriorated when pollutants like heavy metals, pesticides, and industrial chemicals are introduced into natural ecosystems. These disruptions can result in the degradation of natural resources, the alteration of ecosystem functions, and the loss of biodiversity, all of which have an impact on human health and the sustainability of the environment.

2. Effects of Climate Change on Chemical Processes:

Carbon sequestration, nitrogen cycling, and the production of greenhouse gases are just a few of the key chemical processes that are affected by climate change. The associations between environment factors and substance processes are not completely perceived. Climate change impacts predictions and the development of effective climate mitigation strategies are hampered by a lack of understanding of these interactions.

3. Drug Interactions and Safety:

Negative effects, decreased efficacy, or toxic reactions can result from drug interactions—whether with endogenous compounds or multiple drugs. The components and results of these cooperations are perplexing and not completely described. Understanding these communications is vital for upgrading drug treatments, guaranteeing patient wellbeing, and forestalling potential wellbeing chances related with polypharmacy.

4. Nutrient Absorption and Utilization:

Compound associations influence how supplements are assimilated and used in the body. Bioavailability and efficacy of nutrients are hampered by factors like the presence of other dietary components, medications, and individual metabolism variations. Poor health outcomes, ineffective dietary recommendations, and nutritional deficiencies can result from a lack of comprehension of these interactions.

5. Toxicological Impacts of Chemicals:

The cooperation of poisonous synthetic compounds with organic frameworks can bring about an extensive variety of wellbeing impacts, from intense harming to persistent infections. More research is needed to determine the pathways and mechanisms of these interactions. Better bits of knowledge into toxicological communications are fundamental for risk appraisal, administrative guidelines, and the improvement of preventive and

Scope

There is a wide range of topics covered in the study of chemical interactions in natural and health systems, each with its own focus and methodology. The degree can be illustrated as follows:

1. Natural Systems:

Examine the chemical processes and interactions that are a part of the cycles of carbon, nitrogen, and phosphorus. This includes knowing how natural processes and human activities affect these cycles. Analyze the compound sythesis of soils, including pH, supplement accessibility, and the impacts of poisons. Investigate how microbial activity, ecosystem health, and plant growth are affected by soil chemistry. Survey the effect of different contaminations on regular frameworks, including air and water quality. Learn how pollutants affect the equilibrium of the environment by disrupting chemical interactions. Investigate how changes in climate variables like temperature, precipitation, and CO2 levels affect chemical processes in natural systems like the cycling of nutrients and emissions of greenhouse gases.

2. Health Systems:

Analyze how the efficacy and safety of various drugs are affected by their interactions with one another and biological systems. Concentrate on drug digestion pathways and the impacts of polypharmacy. Examine the effects of chemical interactions on nutrient absorption and utilization. This includes investigating the effects of individual metabolic differences, medications, and components of the diet. Investigate the mechanisms of toxicity, dose-response relationships, and health effects of toxic substances' interactions with biological systems. Investigate the mechanisms by which hormones and chemical messengers interact to regulate physiological processes. Examine the health effects of hormonal imbalances.

Limitations

1. Complexity and Variability:

It is difficult to isolate and study specific chemical interactions due to the complexity of natural ecosystems and environmental variability. Different factors frequently impact results, making it challenging to decide direct circumstances and logical results connections. Chemical interactions can have an impact on health depending on the genetic makeup, metabolism, and lifestyle of an individual. The production of universal recommendations and conclusions is hampered by this variability.

2. Data Availability and Quality:

There may not be enough high-quality data on environmental chemical interactions, especially in less-studied or remote areas. Fragmented information can block precise appraisals and expectations. Small sample sizes, short study durations, and variations in study design may limit data on drug interactions and nutrient absorption.'

3. Methodological Challenges:

Lab and field studies may not completely catch the intricacy of indigenous habitats. Findings may not be applicable in real-world situations because of differences in experimental conditions. Exploratory and observational examinations might confront difficulties connected with controlled conditions, remembering moral contemplations and commonsense restrictions for clinical settings.

4. Interdisciplinary Integration:

Coordinating information across disciplines (e.g., science, science, nature) can be trying because of contrasts in phrasing, techniques, and examination centers. Joining information from different sources (e.g., clinical preliminaries, observational examinations) requires cautious thought of contrasts in concentrate on plan and information quality.

5. Regulatory and Ethical Constraints:

Research including ecological contaminations and their belongings might be dependent upon administrative imperatives, influencing the degree and strategies for studies. Clinical examination is limited by moral contemplations, including informed assent and patient security, which can restrict the extent of trial and error and information assortment.

Hypotheses:

In the study of chemical interactions in health and natural systems, hypothesizing is helpful in directing research efforts and putting specific theories about how chemicals affect these systems to the test. A few examples of hypotheses that could be looked into in this area are as follows:

1. Hypothesis 1: The Effect of Contaminations on Supplement Cycling "Expanded centralizations of weighty metals in soil altogether disturb nitrogen and phosphorus cycling, prompting decreased soil richness and adjusted plant development." Weighty metals can influence microbial action and substance processes in soil, possibly affecting supplement accessibility and environment efficiency.

2. Hypothesis 2: Environmental Change Impacts on Biogeochemical Cycles "Raised climatic CO_2 levels will improve the carbon sequestration limit of backwoods yet will likewise increment soil breath rates, prompting a net expansion in air CO_2 over the long run." Environmental change influences both photosynthesis and breath processes, possibly adjusting the general carbon balance in woods biological systems.

3. Hypothesis 3: "Soil acidification due to acid rain increases the solubility of toxic metals, leading to higher levels of metal uptake by plants and increased risk of metal accumulation in the food chain," according to Soil pH and Pollutant Interactions. Acidic circumstances can expand the accessibility of harmful metals in soil, which might influence plant wellbeing and natural dependability.

4. Hypothesis: "The application of broad-spectrum pesticides alters the composition and function of soil microbial communities, reducing soil biodiversity and impairing nutrient cycling," states the effects of pesticides on soil microbial communities. Microbial communities that are essential to nutrient cycling and soil health can be disrupted by pesticides.

5. Hypothesis 5: "Co-administration of drugs that inhibit cytochrome P450 enzymes leads to increased plasma levels of co-administered medications, resulting in higher incidence of adverse drug reactions," according to Drug-Drug Interactions and Efficacy. Because cytochrome P450 enzymes are involved in drug metabolism, inhibition of these enzymes may have an impact on the metabolism and clearance of other drugs, which could result in toxic effects.

6. Hypothesis 6: Supplement Prescription Connections "Calcium supplements lessen the ingestion of specific anti-toxins, prompting diminished restorative viability and expanded chance of treatment disappointment." In the gastrointestinal tract, calcium can bind to antibiotics, affecting their absorption and effectiveness.

Results:

The specific focus and methods used in research into chemical interactions in natural and health systems can lead to wide ranges of results. The following are speculative outcomes for a portion of the proposed speculations to delineate the kind of discoveries that may be seen in these examinations:

Natural Systems:

Effects of Pollutants on the Circulation of Nutrients Research indicates that elevated concentrations of heavy metals like cadmium and lead significantly disrupt the cycling of nitrogen and phosphorus. Particularly, elevated metal levels reduce the microbial activity necessary for the fixation of nitrogen and the solubilization of phosphorus, resulting in lower soil fertility and slower plant growth. Soil tests uncover diminished degrees of accessible nitrogen and phosphorus in dirtied regions contrasted with control destinations.

Environmental Change Impacts on Biogeochemical Cycles Exploration shows that raised CO_2 levels increment carbon sequestration in backwoods soils because of upgraded photosynthesis. Be that as it may, soil breath rates likewise increment, prompting a net expansion in environmental CO_2. Information from backwoods plots show an ascent in soil carbon stocks however an equal expansion in CO_2 transition from the dirt, mirroring a complicated harmony between carbon take-up and deliver.

Soil pH and Pollutant Interactions Experiments reveal that heavy metals like mercury and aluminum become more soluble in the soil as a result of acid rain. Studies on plant uptake show that plants grown in acidified soils have higher concentrations of metal, indicating a higher risk of metal accumulation in the food chain. Soil pH decrease relates with higher metal accessibility and plant tissue fixations.

Impacts of Pesticides on Soil Microbial People group Investigation of soil microbial networks shows that wide range pesticide application prompts decreased microbial variety and

adjusted microbial local area structure. Beneficial microbial processes like nitrogen fixation and organic matter decomposition are harmed as a result of a significant reduction in certain groups of beneficial microbes.

Drug-Drug Interactions and Efficacy Clinical studies have shown that medications that inhibit cytochrome P450 enzymes raise the plasma levels of medications that are taken together. As a result, adverse drug reactions like nausea, dizziness, and abnormalities in liver enzymes are more likely to occur. Studies on drug interactions have shown that enzyme inhibitors have a significant impact on the metabolism of multiple drugs, which may result in toxicity.

Summary:

Chemical effects on ecosystems and human health are intricate and frequently reciprocal, as the study of chemical interactions in natural and health systems reveals. We can better address environmental and health issues, develop effective policies, and implement strategies that support ecological integrity and public health by comprehending these interactions. For the advancement of our understanding and the promotion of environments that are both sustainable and healthy, ongoing research and interdisciplinary collaboration are essential. In conclusion, ecological dynamics and human well-being are influenced by chemical interactions, which are fundamental to both natural and health systems. For addressing environmental and health issues, promoting sustainability, and improving quality of life, a thorough understanding of these interactions is essential.

We want to learn everything we can about how chemical interactions affect human health and natural ecosystems by achieving these goals. Strategies to improve public health and ecological sustainability will benefit from this knowledge.

Combining experimental, observational, and computational methods is the research methodology for examining chemical interactions in natural and health systems. Researchers can learn how chemical interactions affect ecosystems and human health by using rigorous experimental designs, field studies, and modeling methods. Findings that can help with environmental management and clinical practice can be gleaned from this comprehensive approach. Understanding and managing ecological balance, public health, and environmental sustainability require a thorough understanding of chemical interactions in health and natural systems. Researchers can address critical issues like pollution, climate change, drug efficacy, and nutrient management by examining these interactions. This research aids in the creation of efficient policies, creative solutions, and well-informed choices that, in the end, benefit both people and the environment.

Understanding how pollutants, climate change, drug interactions, nutrient absorption, and toxicological effects affect chemical interactions in natural and health systems are just a few of the major obstacles that must be overcome when studying chemical interactions. Resolving these issues is critical for progressing natural and wellbeing sciences, illuminating strategy and the board rehearses, and eventually upgrading biological manageability and human wellbeing. Biogeochemical cycles, soil chemistry, the effects of pollutants, drug interactions, nutrient absorption, toxicology, and hormonal regulation are just a few of the many areas in which chemical interactions in natural and health systems can be studied. Notwithstanding, this examination is restricted by the intricacy of frameworks, information accessibility, systemic difficulties, interdisciplinary incorporation, and administrative imperatives. Tending to these restrictions is critical for propelling our comprehension and working on the administration of both natural and wellbeing related issues

Discussion:

1. Implications for Natural Systems: Impact of Pollutants on Nutrient Cycling The fact that heavy metals have been found to interfere with nutrient cycling emphasizes how important chemical interactions are in keeping ecosystem health and soil fertility. Weighty metal contamination disables microbial capabilities fundamental for supplement changes, prompting diminished soil efficiency and adjusted plant development. Plant communities and animal populations that are dependent on these plants can be affected in a cascading manner by these disruptions. For the preservation of ecosystem functions and agricultural productivity, remediation and pollution control strategies are essential for addressing soil contamination.

2. Climate Change Effects on Biogeochemical Cycles: The noticed expansion in both carbon sequestration and soil breath under raised CO_2 conditions mirrors the intricacy of environmental change influences on carbon cycles. Although forests may store more carbon, the increased respiration of the soil may negate these advantages by releasing more carbon dioxide into the atmosphere. This features the requirement for incorporated environment models that consider both carbon take-up and deliver cycles to anticipate future environment situations and guide relief endeavors precisely.

3. Soil pH and Pollutant Interactions: The collaboration between soil fermentation and weighty metal solvency highlights the significance of soil pH in deciding metal accessibility and plant take-up. Fermentation from corrosive downpour fuels metal

defilement, presenting dangers to establish wellbeing and sanitation. This finding emphasizes the need for methods to control the acidity of the soil and cut down on the emissions of pollutants to lessen their negative effects on agricultural systems and ecosystems.

4. Effects of Pesticides on Soil Microbial Communities: Pesticide use has altered community structure and reduced microbial diversity, both of which point to potential long-term effects on soil health and ecosystem services. Microorganisms assume crucial parts in supplement cycling, natural matter decay, and soil structure upkeep. The noticed decrease in helpful organisms proposes that supportable irritation the board rehearses that limit pesticide use are important to protect soil wellbeing and biological system usefulness.

Conclusion:

For addressing a wide range of environmental and health issues, it is essential to comprehend chemical interactions within natural and health systems. This examination highlights the multifaceted connections between substance processes and their effects on environments and human wellbeing. Here are the key important points:

1. Complex Interactions and Impacts:

Natural systems' chemical interactions are essential to preserving ecological balance and productivity, including the effects of pollutants, soil chemistry, and nutrient cycling. Soil acidification, pollution, and other disturbances can have a significant impact on ecosystem services and functions. Heavy metals, for example, can make it harder for nutrients to cycle through the soil and make it more fertile, and climate change can change how carbon is stored in the soil and how it breathes. For effective environmental management strategies and reducing the effects of human activities on ecosystems, it is essential to comprehend these interactions.

2. Health Implications:

Chemical interactions, such as drug-drug interactions, nutrient absorption, and toxicological effects, play a crucial role in determining therapeutic outcomes and health risks in healthcare systems. Because adverse drug interactions can result in decreased efficacy and an increase in adverse effects, careful drug management and individualized treatment strategies are essential. Medication and nutrient interactions can affect drug absorption and effectiveness, requiring careful medication management. Moreover, openness to harmful synthetic substances, for example, weighty metals and endocrine disruptors, has been connected to serious medical problems, including neurological issues and metabolic illnesses.

3. Interconnected Challenges:

The exploration shows that the difficulties in normal and wellbeing frameworks are interconnected. For instance, environment debasement because of synthetic contamination can influence human wellbeing by diminishing the accessibility of clean water and rich soil. Then again, medical problems connected with ecological contaminations can be exacerbated by poor wholesome status and different variables. The need for integrated strategies that span disciplines and industries is emphasized in the need for a holistic approach that takes environmental and health factors into account when addressing these interconnected issues.

4. Policy and Management Implications

The results emphasize the significance of having well-informed policymakers and efficient management methods. To safeguard ecosystem services, environmental policies must address chemical pollution, manage soil health, and adapt to the effects of climate change. Essentially, general wellbeing approaches ought to zero in on forestalling and overseeing compound openings, streamlining drug treatments, and tending to supplement lacks. To develop and implement strategies that promote both human well-being and ecological sustainability, environmental scientists, health professionals, and policymakers must collaborate.

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Multidimensional Poverty among Female Agricultural Laborers; A case study of Sangli District

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Abstract:
Poverty is a pressing global issue, particularly in developing countries. It represents a condition where people struggle to access basic necessities. In this study conducted in Sangli District, we have primary research objectives Poverty encompasses inadequate income and denial of the basic necessities such as education, health services, clean water and sanitation which are essential for human survival and dignity. Eradication of poverty is one of the major objectives of Millennium Development Goals. **Measurement of Multidimensional Poverty Index (MPI):** The MPI, which encompasses health, education, and living standards dimensions, serves as a crucial metric. Through this assessment, we identify two MPI levels: very high (observed in two villages) and high (also in two villages). medium (also in two villages).
Keywords: Poverty Alleviation, Multidimensional Poverty Index

Introduction:

Poverty is a global issue and every country is facing the problem of poverty, India is no exception to this. Poverty is generally defined as a lack of necessities. The definition and measurement of poverty always remained a topic of debate among development economists, policymakers, national as well as international agencies, which aim to improve the living standard of those who are facing multiple deprivations that they must enjoy. Traditionally poverty is measured through a unidimensional measure of poverty, which is based on either per capita income or per capita consumption. The rationale behind the use of income measure of poverty is based on the thinking that income provides means to have things that help in improving the standard of living. However, many studies found a weak correlation between income poverty and the deprivation in health, education, and standard of living indicators. (Alkire and Santos, 2010). Amartya Sen (1997) defines the human lives are battered and diminishes in many spheres.

Objective:

The specific objectives of the study are,

1. To study the extent of poverty among rural households in the study area

Study Area:

Sangli district is located on the south and southeast of Maharashtra. The north latitude (NL) 16.45-17.22 and East Longitude (EL) 73.42-75.40. The district's area is around 8,572 square feet. That means there are districts of Satara in the north and north east, Solapur in the north and northeast, Bijapur (Karnataka) in the east, Belgaum in the south, Kolhapur in the south, and Ratnagiri in the west. Shirala taluka on the west comes in the main line of Sahyadri. The western part of the district is mountainous. The district has different geographical, economic and social status. Jat, Atpadi, Kavthe Mahankal are the permanent drought-hit talukas. Many villages in Palus, walwa, Miraj talukas are always at risk of flood. Shirala, Khedgaon, Khanapur are hill stations. At one end there is a forest in Shirala taluka. On the other hand, lots of desert land in Jat taluka. Sangli's half-maternal behavior works in the Kannada language on the Maharashtra-Karnataka border. The east-west length of the district is 205 km and the north-south length is 96 km. Sangli districts major rivers are Krishna and Warana. The length of Krishna River in the district is 105 kms. The temperature of the district is between 14 degree centigrade and maximum of 42 degrees centigrade. The district's average rainfall is 400-450 mm. The description of the district indicating geographical area, size of population, literacy level, density of population, irrigation sources etc. A complete resource mapping about ecological security, economic efficiency and social equity of the district is presented in the chapter. The Sangli district is very rich in flora & fauna in different zones. Besides other commodities, graphs and sugarcane are the proof of identity mark of the location in the Maharashtra due to its agro-ecological situation and productivity. The total size of population of the Sangli is 28.2 lakhs. The male number is 14.35 lakhs & female 13.86 lakhs constituting a male / female ratio of 1000: 966. The Literacy rate is 82.41% and population density is 330 per sq. km. The marginal farmers (60.66%), followed by small farmers (22.00%), medium & large (17.32%). Out of total Geographical area of 8.61 lakh hector of the district, the cultivable area is 5.41 lakh hector. Thus nearly 73.00% area is under cultivation & rest of 8.00% is occupied as barren, non-agricultural use, forest, land under misc. plantation & pasture land. The most of the land out of cultivable land used for food grain production (66.13%), Sugarc ane (14.47%) and fruits and other crops (9.66%).

Method of data collection:

The study is mainly based on primary data supported by secondary data. Primary data are collected through face to face interviews using structured questionnaire through field survey.

Secondary data are collected from various published sources such as journals, books, internet website, and other sources.

Sample and Sampling procedure:

Multistage random sampling technique was employed to select sample households in the study area. The sample frame as follows: In the first stage, out of ten development blocks in the district, three blocks were the randomly selected. In the second stage, two villages from each block were selected. This made up a total number of ten villages. the final stage, 182 households were randomly selected from six villages based on household size. Questionnaire was administered mainly to households‟ heads, but other household members were allowed to provide relevant information which could not be sufficiently supplied by the households‟ heads.

Methods:

This research utilizes two methods of: Multidimensional Poverty Index 2.1. Multidimensional Poverty Index Multidimensional Poverty Index (MPI) is one of poverty's level analyses and is popular due to being applied by Oxford Poverty and Human Development Initiative (OPHI) and United Nations Development Program (UNDP). However, the inventor of this method is Alkire and Foster in 2011. MPI method involves the three dimensions consisting of ten indicators at each. The indicators was divided into two indicators for health aspect (0,1667 per indicator), two indicators for education aspect (0,1667 per indicator) and six indicators for living standards (0,0556 per indicator) [7][8].

The MPI is a multiplication of the percentage of people who are poor or multidimensional headcount ratio (H) with intensity of poverty (A).

The MPI formula can be expressed as for:

$$MPI = H * A$$

MPI = Multidimensional Poverty Index H = Headcount A = Intensity of Deprivation

MPI or poverty level values can be classified as: Very High: >0.36, High: 0.27-0.36, Medium : 0, 18-0, 27, Low: 0.09-0.18 Very Low: < 0.09

Result and Discussion:

Table 1. Multidimensional Poverty Index for each Village in Sangli District

	Villages	No. of Household	Classification	MPI Values	Contribution of deprivation in Dimension to overall poverty (%		
					Education	Health	Living Standards
1	Valsang	21	Medium	24.84	27.17	18.84	53.99
2	Kosari	25	Very High	37.8	24.05	15	60.95
3	Tisangi	17	High	31.41	25.5	15.19	59.31
4	Chorochi	18	High	29.52	27.13	15.24	57.62
5	Dighanchi	75	Very High	39.82	25.7	17.3	57
6	Banpuri	26	Medium	26.82	23.15	16.44	60.4

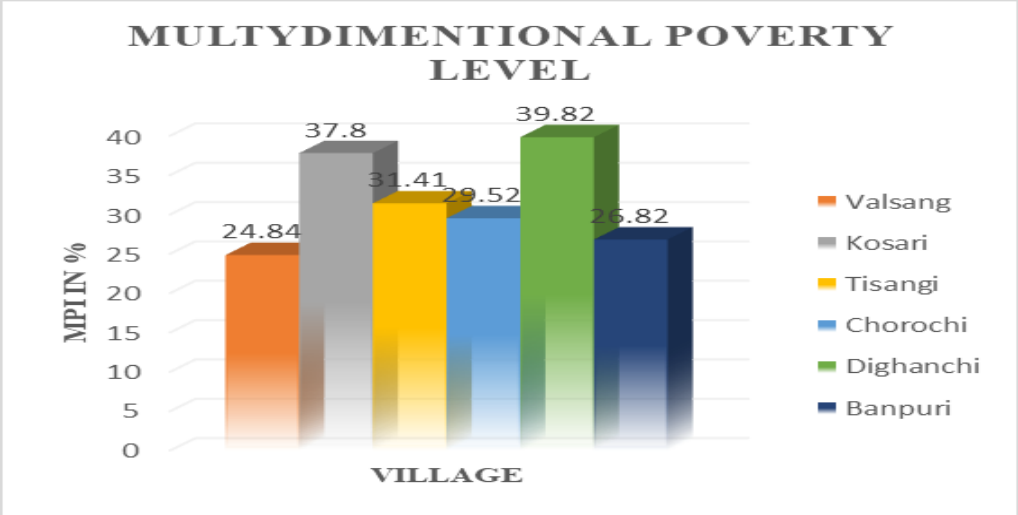

Fig.No.1

The housing conditions of a family provide good indicators of welfare measurement. Table no.1 & fig no.1 provides with the description of households by major source of water for drinking and cooking, sanitary conditions and sources of electricity supply. It was seen from the table 1 that Contribution of deprivation in Dimension to overall poverty (%) attributed to living Standards is Valsang 53.99 percent ,Kosari 60.95 ,Tisangi 59.31,Chorachi 59.31,Dighanchi 57 ,Banpuri 60.4. . It was seen from the table 1 that Contribution of deprivation in Dimension to overall poverty attributed to health-related deprivation Valsang sees 18.84% of overall poverty attributed to health-related deprivation. Kosari 15, Tisangi 15.19,. Chorachi and Dighanchi, Banpuri have health-related deprivation contributions of 15.24% and 17.3%, 16.44 % respectively.

Based on Table 1, the result of MPI indicates that there are two villages classified as Very high And two villages classified as high level two villages classified as Medium level.The Very high level of MPI occurs in Kosari 37.8 and Dighanchi 39.82 . The high level of MPI occurs in Tisangi 31.41 and Chorochi 29.82. Medium level of MPI occurs in Valsang 24.84 and Banpuri 26.82

Conclusion:

This study has so far examined incidence of poverty, its gap, severity and determinants among rural households in Sangli district of Maharashtra. The study establishes evidence of poverty and decline living conditions in the study area. The incidence, depth and severity of poverty are high and burden of poverty is borne disproportionately by households of different socioeconomic status. Based on our results we can conclude that poverty in the study area is more a serious issue. Villages In District only has three classification of MPI level, very high level, high level and medium level. The medium level occurs in two villages, such as in Valsang and Banpuri. The very high level occurs in two villages, such as in Kosari and Dighanchi . The most important reasons of poverty are excessive dependence on agricultural sector, disguised unemployment, poor development of marketing facilities, connectivity and poor agricultural productivity, absence of any significant manufacturing activities, hourglass shaped occupational distribution and so on (Mishra, 2004). Therefore, measures to reduce poverty among agricultural households in this area should be aimed at improving the fertility of the land and output. The study also recommends engaging households in regular job in order to improve household welfare in the study area. The provision of basic infrastructure in the rural areas in particular is a necessary precondition for rural poverty alleviation. Along with this, access to credit facilities by farmers could be enhanced through cooperative societies, SHGs which in the study area. All these will improve the income of cultivating households and consequently their standard of living will improve and thereby reduce poverty. Thus, any effort to removal of poverty must aim at the development of the manufacturing sector, creation of infrastructural facilities and enhancement of agricultural productivity

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Plantations Labour Act of 1951 and the Rights of Tea Plantation Workers in Assam

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Abstract:
The Plantations Labour Act of 1951 represents a pivotal piece of legislation aimed at regulating the working conditions and safeguarding the rights of labourers employed in plantations, including those in the tea industry. This research paper investigates the key provisions, and the implementation of the Plantations Labour Act in Assam, with a particular focus on the rights and welfare of tea plantation workers. The data for the present study has been collected from various primary as well as secondary sources such as reports, books, journals, newspapers, research articles, etc.
Keywords: Plantation, Worker, Rights, Assam

Introduction:

The tea industry in Assam has been a cornerstone of the state's economy for over a century, employing a substantial workforce. The Plantations Labour Act of 1951 was enacted to address the longstanding issues of labour rights and working conditions within this industry. This research paper seeks to provide an in-depth analysis of the Act's key provisions, and its effects on the rights of tea plantation workers in Assam.

Historical Background:

The history of tea plantation workers in Assam is marked by a long and often troubling tale of exploitation. Tea cultivation began in Assam during the early 19th century when the British East India Company established plantations in the region (Tinker, 1974). To meet the growing global demand for tea, large numbers of laborers were brought in from various parts of India, particularly from present-day Jharkhand, Chattisgarh, Odhisa, and Madhya Pradesh. These workers, presently known as “Tea Tribes” were subjected to harsh working conditions and low wages (Dasgupta, 1981). They were often forced to live in cramped, unsanitary quarters on the plantations, and their labour was being exploited by the plantation owners. Exploitation continued for generations, and the workers’ rights were ignored. It was not until the mid-20th century that labour movements and legislative changes began to improve the conditions of tea plantation workers. The Plantation Labour Act of 1951 aimed to protect their rights and provide better living conditions.

Provisions of the Plantations Labour Act of 1951:

The Plantations Labour Act of 1951 was enacted to address the exploitative working conditions that prevailed on plantations in India and to ensure the welfare of plantation workers. The Act contains several provisions to safeguard the welfare of plantation workers (Plantations Labour Act, 1951). Some of the key provisions of the Plantations Labour Act of 1951 include:

1. Working Hours: The Act prescribes limits on the daily and weekly working hours for different categories of workers, ensuring that laborers are not overworked.
2. Weekly Rest: Workers are entitled to a weekly rest day, and the Act specifies the conditions under which this rest day can be denied or postponed.
3. Housing and Living Conditions: The Act mandates that suitable housing, sanitation facilities, and clean drinking water be provided to plantation workers. It also outlines requirements for the construction and maintenance of workers' housing.
4. Medical Facilities: Plantations are required to provide medical facilities to workers and their families. This includes the establishment of dispensaries and the appointment of qualified medical practitioners.
5. Educational Facilities: In cases where there are a sufficient number of children, the Act stipulates the provision of educational facilities within or near the plantation.
6. Wages and Payment: The Act establishes rules regarding the payment of wages, including the timing and method of payment. Deductions from wages must be authorized by law.
7. Employment of Women and Children: The Act regulates the employment of women and children, prohibiting the employment of children below a certain age and imposing restrictions on the employment of women during certain hours.
8. Safety Measures: The Act includes provisions related to the safety and welfare of workers, such as the provision of protective equipment and precautions against accidents.
9. Social Welfare Measures: It may also require plantations to implement social welfare measures, including the provision of recreational facilities and the promotion of

cultural and educational activities (Plantations Labour Act, 1951).

Implementation and Challenges:

The implementation of the Plantations Labour Act of 1951 in Assam has faced both successes and challenges over the years. While the Act was designed to improve the working and living conditions of plantation workers, several issues have hindered its full and effective enforcement in the region.

Implementation Successes:

1. Awareness and Education: Over the years, there has been an increase in awareness among both plantation workers and plantation owners about their rights and responsibilities under the Act. This has led to some improvements in working conditions and compliance with the law.
2. Establishment of Facilities: Many plantations have established housing, medical facilities, and educational facilities for workers and their families, as required by the Act.
3. Labour Inspections: Labour inspectors have played a role in monitoring plantations and ensuring compliance with the Act's provisions. They have the authority to enforce labour standards and hold plantations accountable for violations.

Challenges:

1. Informal Labor Practices: In some cases, plantations in Assam continue to employ workers through informal or cash-based arrangements, making it challenging to enforce the wage and benefit provisions of the Act. This informal labour market can result in exploitation and non-compliance.
2. Lack of Enforcement: Enforcement of the Act by labour authorities can be inconsistent, and violations often go unchecked due to inadequate resources and personnel. This lack of enforcement can allow some plantations to flout labour standards with impunity.
3. Housing Conditions: While there have been improvements in housing conditions, many workers still live in substandard housing, lacking basic amenities.
4. Wage Disparities: Wage disparities between different categories of workers, especially casual and permanent laborers, persist on some plantations. This inequity can lead to unrest and dissatisfaction among workers.
5. Child Labor: Child labour remains a concern in some plantations, despite legal prohibitions. Poverty and limited access to education are contributing factors.
6. Trade Union Conflicts: Labor disputes and conflicts between trade unions and plantation management can disrupt operations and hinder efforts to improve conditions for workers.

The Struggle for Improved Rights:

The struggle for improved rights of tea plantation workers in Assam has been ongoing for many years. These laborers have faced various challenges and exploitation, leading to organized efforts to secure better working and living conditions. Many student bodies such as the All Assam Tea Tribes Students Association (AATTSA), All Adivasi Students Association of Assam (AASAA) and trade unions like Assam Cha Mazdoor Sangha (ACMS), Akhil Bharatiya Cha Mazdoor Sangh (ABCMS), etc are struggling for many issues like disbursement of yearly bonus, creation of a separate department for the tea garden labour community, the provision of electricity, drinking water and housing to the tea garden labour lines (Borah, 2019).

Addressing the challenges faced by Assam's plantation workers needs collaboration among government authorities, plantation owners, labour unions, and civil society organizations. Stricter enforcement of the Act, raising awareness among workers about their rights, and addressing the root causes of exploitation, such as poverty and lack of access to education, are essential steps in ensuring the welfare of plantation workers in Assam.

Conclusion:

The Plantations Labour Act of 1951 was a significant step towards protecting the rights and welfare of tea plantation workers in Assam. However, challenges persist, and there is a continued need for concerted efforts from both government authorities and industry stakeholders to ensure the Act's effective implementation and the improvement of working conditions for these laborers. This research paper contributes to a deeper understanding of the Act's impact and highlights the ongoing struggle for the rights of tea plantation workers in Assam.

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Trichomes and Stomatal Study of *Maerua oblongifolia, Marsdenia volubilis* and *Sansevieria roxburghiana* L.

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Abstract:
Maerua oblongifolia Foresk. a. rich *Marsdenia volubilis* (Benth. L. f.) and *Sansevieria roxburghiana* L. are medicinal plants. These Plants have been used for various types of diseases. The present research includes structure and dimensional details of upper and lower epidermis of the selected leaf drugs. The epidermal studies are carried out by scraping and peeling out particular epidermis. The trichomes, stomata, guard cells, subsidiary cells and epidermal cell are given along with dimensions. Trichomes and stomata studies are useful in solving taxonomic problems and Pharmacognosy. They have significance in identification of crude drugs from these plants. The types of trichomes are specific for a particular taxon. This data can be used to standardize a leaf drug. The studied characters related to trichomes in present work are types and dimensions of trichomes.
Keywords: Trichomes Stomata, *Maerua oblongifolia Marsdenia volubilis* and *Sansevieria roxburghiana.*

Introduction:

From the ancient times man has utilized plants as a source of food, shelter as well as for health. The use of plants in medicine ranges from crude preparation of extract. (Maiti R. S. & Singh 2006). Present work intends to utilize this data of trichome and stomata to evaluate and standerdize leaf drugs of some medicinal plant. *Maerua oblongifolia* Foresk. a. rich *Marsdenia volubilis* (Benth. L. f.) and *Sansevieria roxburghiana* L. are medicinal plants. The plant *Maerua oblongifolia* is used to cure piles, leucoderma, asthma and urinary discharges. The plant contains substance of glucidal nature with low toxicity and traces of an alkoid, it stimulates all organs having cholinergic nerve supply and causes of prolonged fall of blood pressure (Chopra, 1965). The root and tender stalks are considered emetic and expectorant. The plant is used in colds and eyes diseases to cause sneezing. (Kirtikar & Basu, 1980). Use of plants by a pastoral people and their livestock in Kenya (W. T. W Morgan, 1980). The root used as tonic and stimulant and fruit used in stomach diseases of children (Rathore *et. a*l; 2000). Roots are edible (Maheshwary; 2000). Roots of this plants used in boils and abscesses, eye diseases (Jayvir *et, al*. 2002). Leaves used as toothache (Mossa *et. al; 1987). Antimicrobial activity of tooth brush sticks, (Van – et, al, 2006). The bark is used by masai*, medicine men, and the plants toxic properties (WWW.aluka org/action/.).

Marsedinia volubilis is very common in treatment for many diseases. The herb vendors use it in treatment of troubles related to digestive system, appetizer. Decoction made from M. volubilis, Kuchla and Bhang. Acoras calamus, fenel, papal dried gingers are also added in above decoction. This solution used for paralysis patients (Traditional medicinal knowledge above common herbs in Chhatisgarh, (Botanical. Dom site/column_poudhia/publish/Journal/ 866.txt-5 k.). ***Sansevieria roxburghiana*** used as bowstring hemp obtained from leaf (Albert, 1951). Fibre development from laef, (Arthur et; al; 1947). Leaf fibres used cordage, bowstring hemp, (Katherine Esau, 1959).

Dermatology of leaves includes a study of epidermal tissue system. It is made up of epidermal, cuticle, stomata and trichomes. The epidermal structure especially types trichomes and stomata are specific for every leaf. (Metcalf and Chalk 1950; Smith et. al., 1953; Carlquist, 1961; Eames and Mac Denials, 1992; Pandey, 2002; Roy, 2006). Trichomes are outgrowths of epidermal cells (Roy, 2006). In the angiosperms leaves various type of trichomes are found such as – unicellular, bicellular, multicellular, uniseriate, multiseriate, satellite, glandular, non-glandular (Metcalf and Chalk, 1950; Pandey, 2002; Roy, 2006). Stomata are microscopic pores on the epidermal surface of higher plants formed by a pairs of specialized epidermal cell i.e. guard cell, which control opening and closing of the pore by changing their turgidity and thus regulates the gaseous exchange between plants and environment. Different types of stomata are found in angiosperms leaves (Roy, 2006). The stomata and trichomes are useful in solving taxonomic problems and Pharmacognosy. They have significance in identification of crude drugs from this taxon.

Present work includes structure and dimensional details of upper and lower epidermis of the selected leaf drugs. The epidermal studies are carried out by scraping and peeling out particular epidermis. An account of trichomes, stomata, guard cells, subsidiary cells, and epidermal cells is given along with dimensions.

1. Trichomes: The Type of trichomes is specific for a particular taxon. This data can be used to standardize a leaf drug. The studied characters related to trichomes in present work are types and dimensions of trichomes**.**

2. Stomata: Like trichomes stomata are specific for a particular leaf. The actual number of stomata per sq. mm of leaf preparation may vary for leaves of the same plant grown in different environment conditions. Stomata number is relatively a constant for particular species of same age and hence it is taken into consideration as a diagnostic character for identification of a leaf drug. The adulteration can also be detected by stomata number. Stomata features used to standardize leaf drug are - Presence or absence of stomata, type of stomata, occurrence of stomata viz. amphistomatic / epistomatic / hypostomatic, type of guard cell, length of stoma, size of guard cell. **3. Subsidiary cells:** The epidermal cells near guard cells are termed as subsidiary cells. It determines type of stoma (Metcalf and Chalk 1950; Roy 2006). Shape, size and number of subsidiary cells can be used for standardization. 4) Epidermal cells:- Epidermal cells are also a good criterion for standardizing a leaf surface view of epidermal cell is different than transverse section view. Features like shape, size, and outline of epidermal cells are utilized for determining genuinely and authenticity of leaf drugs. For dermatology fresh material was used. Trichomes were studied by scraping leaf with razor blade while stomata, guard cells, subsidiary cells and epidermal cells were studied by peeling out, staining in safranine and mounting in glycerine particular leaf epidermis. All drawings were made by using camera Lucida and measurements are taken by using ocular and stage micro meter. The descriptions of dermatology of selected leaf drugs are as below:

1. *Maerua oblongifolia* Foresk. a. rich:

The Leaf shows-presence of Multicellular uniseriate non glandular trichomes (300 - 620 µ.) ranges. Average length of trichomes is (460 µ. long) trichomes present on leaf and stem.

The stomata are anomocytic, amphistomatic. Length and width of upper stomata is 21.45 X 7.425 µ (average) and 19.80 X 6.60 to 23.10 X 8.25 µ (range). The average cell size of guard cells is 24.75 X 11.55µ and range between 23.10 X 9.90 to 26.40 X 13.20 µ. Subsidiary cells are wavy in outline with average cell size is 29.70 X 23.10µ and range between 26.40 X 19.80 to 33.00 X 26.40 µ.

In surface view the upper epidermal cells (average cell size 47.85 X 28.05µ), range 33.00 X 23.10 to 62.70 X 33.00µ) are slightly bigger in size as compared to lower epidermal cells. The length and width of lower stoma is 19.80 X 5.77 µ (average) and 16.50 X 4.95 to 23.10 X 6.60 µ (range). The average cell size of guard cells is (23.10 X 8.25 µ) and range between (19.80 X 6.60 to 26.40 X 9.90 µ). Subsidiary cells are irregular shape having average cell size, 26.40 X 23.10µ and range between 23.10 X 19.80 to 29.70 X 26.40 µ. The lower epidermal average cell size is 31.55X 23.10 µ, range (13.60 X 19.80 to 49.50 X 26.40 µ). (Plate No. –1 & 2, Table:1 to7).

2. *Marsdenia volubilis* (Benth. L. f.):

Leaf shows Multicellular, uniseriate, glandular type of trichomes. Length of trichomes is 130-340 µ (range) and average length 235µ. Glandular trichomes are sessile with quadricellular head (19.80 to 39.60 µ.) Trichomes present on leaf and stem.

The stomata are paracytic and hypostomatic. The average cell size of lower stomata is 49.50 X 29.70 µ and range, 39.60 X 26.40 to 59.40 X 33.00 µ. The length and width of lower stomata is 33.00 X 5.77 µ (average) and 29.70 X 4.95 to 36.30 X 6.60 µ (range). The average cell size of guard cells is 36.30 X 8.25 µ and range between (19.80 X 6.60 to 26.40 X 9.90 µ). Subsidiary cells are irregular shape having average cell size 46.20 X 26.40 µ and range between 33.00 X 23.10 to 59.70 X 26.40 µ. The lower epidermal average cell size is 52.80 X 33.00 µ. And range between 39.60 X 26.40 to 66.00 X 39.60 µ).

(Plate No.1 & 2 Table:1 to7).

3. *Sansevieria roxburghiana* L: Trichomes are absent abaxial & adaxial surface of leaf. The stomata are tetracytic and amphistomatic. Length and width of upper stoma is 51.15 X 18.15 µ (average) and 52.80 X 16.50 to 49.50 X 19.80 µ (range). The average cell size of guard cells is 56.10 X 23.10 µ and range between 52.80 X 19.80 to 59.40 X 26.10 µ. Four subsidiary cells are found in tetracytic type of stomata two are lateral and two are polar in position. The average cell size 57.75 X 22.10 µ and range between 62.70 X 19.80 to 52.80 X 24.40 µ. In surface view the upper epidermal cells (average cell size 59.10 X 23.10 µ, range 56.10 X 19.80 to 62.70 X 26.40 µ).

The length and width of lower stoma is 49.50 X 19.80 µ (average) and 52.80 X 16.50 to 49. 50 X 19.80 µ (range). The average cell size of guard cells is 56.10 X 23.10 µ and range between (52.80 X 19.80 to 59.40 X 26.40 µ). Subsidiary cells are four two polar and two lateral having average cell size, 59.40 X 22.10 µ and range between 52.80 X 19.80 to 66.00 X 24.40 µ. The lower epidermal average cell size 62.70 X 29.70 µ and range, (56.10 X 23.10 to 69.30 36.30µ).

(Plate No. 1 & 2, Table No.1 to7).

Stomatal number and Index: Stomatal index is the percentage which the number of stomata forms to the total number of epidermal cells.

1. *Maerua oblongifolia* Foresk. a rich: Leaf shows following values of stomata - (leaf being amphistomatic values for Stomatal number and Stomatal index are for upper and lower epidermis).

i) Stomatal number for upper epidermis: - Average value - 35, Range -30 to 41.

ii) Stomatal number for lower epidermis: - Average value - 44.2, Range - 42 to 56.

iii) Stomatal index for upper epidermis: - Average value - 26.729, Range - 16.66 to 33.33
iv) Stomatal index for lower epidermis: - Average value - 29.678, Range - 25.00 to 35.29
(Plate No. 2, Table No.6 &7).

2. *Marsdenia volubilis*: Leaf shows following values of stomata - (leaf being hypostomatic for Stomatal number and Stomatal index are for lower epidermis only).
i) Stomatal number for lower epidermis: - Average value – 35.5; Range – 30 to 41.
ii) Stomatal index for lower epidermis: - Average value – 18.569; Range – 16.66 to 29.29
(Plate No. 2, Table, 6 to7).

3. *Sansevieria roxburghiana* L.: Leaf shows following values of stomata - (leaf being amphistomatic values for Stomatal number and Stomatal index are for upper and lower epidermis).
i) Stomatal number for upper epidermis: - Average value- 4.4, Range – 3 to 6.
i) Stomatal number for lower epidermis: - Average value - 4.3, Range – 3 to 6
iii) Stomatal index for upper epidermis: - Average value - 25.023' Range – 20.00 to 33.33
ii) Stomatal index for lower epidermis: - Average value - 28.333; Range – 20.00 to 40.00
(Plate No. 2; Table, 6 to7).

Table No.- 01 Types of trichomes and stomata

Sr. No.	Name of the Plant Species	Trichomes Types	Stomata type	Stomata presence
1	*Maerua oblongifolia*	Multicellular uniseriate	Anomocytic	Amphistomatic
2	*Marsdenia volubilis*	Multicellular uniseriate	Paracytic	Hypostomatic
3	*Sansevieria roxburghiana*	Trichome absent	Tetracytic	Amphistomatic

Table No. – 02. Stomatal Length

Average and range are calculated by 03 diagrams: - sign indicates absence of stomata Average and range are calculated by 03 diagrams: - sign indicates absence of stomata as leaf leaflet is hypostomatic.

Sr. No	Name of plant species	Upper stomata length		Lower stomatal length	
		Average	Range	Average	Range
1	*Maerua oblongifolia*	21.45	19.80 to 23.10	19.80	16.50 to 23.10
2	*Marsdenia volubilis*	---	---	49.50	39.60 to 59.40
3	*Sansevieria roxburghiana*	51.15	52.80 to 49.50	49.50	49.50 to 52.80

Table No. - 03 Stomatal width (apices), as leaf or leaflet is hypostomatic.

Sr. No.	Name of plant species	Upper stomata length		Lower stomatal length	
		Average	Range	Average	Range
1	*Maerua oblongifolia*	7.42	6.60 to 8.25	5.77	4.95 to 6.60
2	*Marsdenia volubilis*	--	--	5.77	4.96 to 6.60
3	*Sansevieria roxburghiana*	18.5	16.50 to 19.80	19.80	16.50 to 23.10

Table No. - 04: Guard cell Length.

Average and range are calculated by 03 diagrams: - sign indicates absence of stomata as, leaf or leaflet is hypostomatic.

Sr. No.	Name of plants	Upper stomatal length		Lower stomatal length	
		Average	Range	Average	Range
1	*Maerua oblongifolia*	24.75	23.10 to 26.40	23.10	19.80 to 26.40
2	*Marsdenia volubilis*	---	----	36.30	33.00 to 39.60
3	*Sansevieria roxburghiana*	56.10	52.80 to 59.40	56.10	52.80 to 59.40

Table No. – 05: Guard cell width

Average and range are calculated by 09 diagrams: - sign indicates absence of stomata, as leaf or leaflet is hypostomatic.

Sr. No	Name of plants	Upper stomatal length		Lower stomatal length	
		Average	Range	Average	Range
1	*Maerua oblongifolia*	11.55	4.95 to 6.60	5.77	4.95 to 6.60
2	*Marsdenia volubilis*	---	---	8.25	6.60 to 9.90
3	*Sansevieria roxburghiana*	23.10	19.80 to 26.10	24.75	19.80 to 29.70

Table No. 06 Stomatal Index

Average and range are calculated by 03 diagrams: - sign indicates absence of stomata as leaf or leaflet is hypostomatic.

Sr. No.	Name of plants	Upper stomatal length		Lower stomatal length	
		Average	Range	Average	Range
1	*Maerua oblongifolia*	26.729	16.66 to 33.33	29.678	25.00 to 35.29
2	*Marsdenia volubilis*	--	--	18.569	16.66 to 29.27
3	*Sansevieria roxburghiana*	25.023	20.00 to 33.33	28.333	20.00 to 40.00

Table No. 07, Stomatal Number

Average and range are calculated by 03 diagrams: - sign indicates absence of stomata as leaf or leaflet is hypostomatic.

Sr. No	Name of plant	Upper stomatal length		Lower stomatal length	
		Average	Range	Average	Range
1	*Maerua oblongifolia*	35.00	30 to 41	44.2	42 to 56
2	*Marsdenia volubilis*	--	--	35.8	30 to 41
3	*Sansevieria roxburghiana*	4.4	03 to 06	4.3	03 to 60

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Plate No.1

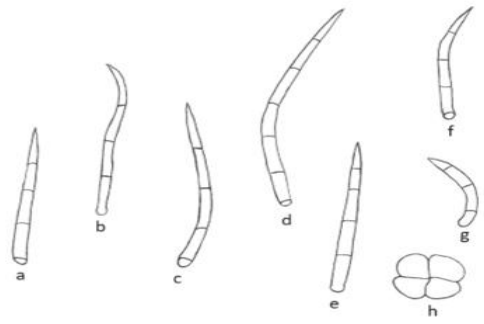

Fig:Trichome 0.1mm

Maerua Oblongifolia (a, b, c) , Marsdenia volubilis (d, e, f, g, h)

Plate No.2

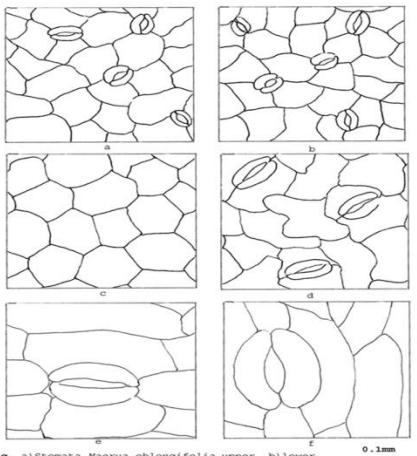

Fig. a)Stomata *Maerua oblongifolia* upper, b)lower c)*Marsdenia volubilis* upper d) lower, e) *Sansevieria roxburghiana* upper f) lower. **0.1mm**

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"Digital Innovations in Academics: A Comprehensive Review"

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Abstract:

This essay explores the effects of new technologies on research, teaching, and learning while offering a thorough analysis of digital advancements in academic contexts. The study examines important domains like digital libraries, artificial intelligence, online learning platforms, and collaboration tools in order to emphasize the revolutionary effects of these breakthroughs. The assessment offers insights into how digital innovations might be used to improve academic performance and institutional efficiency, as well as address issues and future directions.

With the rapid development of information technology, digital change has penetrated into all fields, with no exception to higher education. The application of digital innovation in higher education has become more and more widespread, which not only changes the traditional teaching mode but also provides a new way for the optimal allocation and sharing of educational resources. The purpose of this paper is to explore the current status, problems and development trends of the application of digital innovations in higher education by conducting a systematic review of the literature on digital innovations in higher education published during the period of 2013-2024.

Keywords: Digital Innovations, Higher Education, Higher Education Institutions (HEIS)

Introduction:

The rapid progress of digital technology has resulted in a significant shift of the academic scene in recent years. This transformation has affected the way that educational content is distributed, accessed, and used. It has been driven by advancements in digital tools and platforms. There are many benefits and drawbacks to integrating modern technologies into academic environments, therefore it's important to fully comprehend their effects.

Academic digital innovations include a diverse range of tools and technology, such as digital libraries, collaborative software, artificial intelligence, and online learning platforms. These developments have completely changed the way that we think about education by providing fresh approaches to improving the efficacy of instruction, customizing the learning process, and encouraging collaborative research. For example, the emergence of Massive Open Online Courses (MOOCs) and Learning Management Systems (LMS) has reduced obstacles to high-quality education by removing geographic and financial constraints and increasing accessibility to a global audience. In a similar vein, digital libraries and open access resources are revolutionizing the distribution and accessibility of research, while artificial intelligence-driven adaptive learning systems are changing the way teachers handle the unique needs of each student.

Even with the many advantages, there are drawbacks to the quick uptake of new digital innovations. It is imperative to tackle matters such as the digital divide, data privacy, and the requirement for efficient training and assistance for educators in order to guarantee that the benefits of modern technologies are shared fairly. Furthermore, to successfully incorporate new technologies into academic processes, ongoing assessment and adaption are required as they become available.This thorough examination attempts to investigate the various digital advances reshaping the academic arena and offers a detailed examination of their effects on research, teaching, and learning. This paper aims to provide a detailed knowledge of how digital innovations are reshaping academia and to explore future options for harnessing these technologies to improve educational outcomes. It does this by looking at major technical developments and their ramifications.

Statement Of The Problem:

The problem is to identify and categorize the various digital innovations that have been implemented in academic settings,Evaluate the Impact on Learning Outcomes,Assess the Quality and Usability of Digital Tools and Investigate Challenges and Barriers

Objectives Of The Study:

1. To identify and categorize the various digital innovations that have been implemented in academic settings.
2. Evaluate the Impact on Learning Outcomes
3. Assess the Quality and Usability of Digital Tools
4. Investigate Challenges and Barriers

Research Methodology:

The study is based on both primary and secondary data. The analytical research design Digital Innovations in Academics: A Comprehensive Review The target population is taken as Students in Karnataka, India. The convenience sampling method is used to select 100 respondents. The data was collected by conducting a survey using a questionnaire that was designed to collect information regarding this study from

students in different colleges in Karnataka state. Primary data collected from the people by questionnaire through open-ended questions were also recorded. Thus, the questionnaire is both subjective as well as objective in nature and also uses secondary data from websites, journals, etc. For data analysis, chi-square test, descriptive statistics and pie-charts have been used.

Review Of Literature:

1. Online Learning Platforms

Evolution and Impact: The rise of online learning platforms has marked a significant shift in educational delivery methods. Early studies such as those by Allen and Seaman (2013) and more recent research by Christensen, Horn, and Johnson (2016) highlight the transformative effects of MOOCs (Massive Open Online Courses) and Learning Management Systems (LMS). These platforms offer scalable and flexible learning options, enabling institutions to reach a broader audience and provide diverse educational resources.

Blended Learning Models: Research by Graham (2006) explores the development of blended learning models that combine online and face-to-face instruction. Studies indicate that these models enhance student engagement and learning outcomes by providing a more personalized educational experience (Horn & Staker, 2015).

Case Studies: Case studies such as those by Zhu et al. (2018) demonstrate the practical applications of platforms like Coursera and edX in higher education. These studies show how integrating online resources into traditional curricula can improve access to high-quality education and support diverse learning needs.

2. Artificial Intelligence and Machine Learning

Personalized Learning: Artificial Intelligence (AI) has revolutionized personalized learning through adaptive learning systems. Research by Knewton (2014) and a review by Woolf (2010) on intelligent tutoring systems highlight how AI can tailor educational content to individual student needs, enhancing learning efficiency and effectiveness.

Administrative Efficiency AI's impact extends beyond the classroom to administrative processes. Studies such as those by Luckin et al. (2016) explore how AI can streamline tasks like grading and scheduling, reducing administrative burdens and allowing educators to focus more on teaching and mentoring.

Case Studies: The application of AI in platforms like DreamBox and Carnegie Learning, as examined by researchers such as Kulik and Fletcher (2016), showcases the practical benefits of AI in educational settings, including improved learning outcomes and operational efficiencies.

3. Digital Libraries and Open Access

Growth and Accessibility: The expansion of digital libraries and repositories has significantly improved access to academic resources. According to research by Borgman (2007) and a more recent study by Houghton et al. (2016), digital libraries like JSTOR and PubMed provide researchers with easy access to a vast array of scholarly materials.

Open Access Movement: The open access movement, as discussed by PLOS ONE (2015) and Suber (2012), promotes the free availability of research publications, facilitating greater collaboration and transparency in academic research. This movement addresses issues related to access and dissemination of knowledge, although challenges related to funding and sustainability remain.

Case Studies: Case studies on platforms such as arXiv and institutional repositories demonstrate the impact of open access on academic research. Research by Tennant et al. (2016) highlights the benefits of open access in increasing visibility and citation rates of scholarly work.

4. Collaborative Tools and Platforms

Evolution and Use: Digital collaborative tools have transformed research practices and academic communication. Studies by Ellison and boyd (2013) and the work of Liu et al. (2013) highlight the evolution of tools like Google Scholar, Mendeley, and collaborative platforms such as Slack and Microsoft Teams, which facilitate real-time collaboration and information sharing.

Impact on Research and Publication: The use of collaborative tools has streamlined the research process and manuscript preparation. Research by Gasser et al. (2017) and the case study on the Human Genome Project by Collins et al. (2003) illustrate how collaborative technologies have enhanced research productivity and innovation.

Case Studies: Examples of successful integration of collaborative tools in large-scale research projects demonstrate their effectiveness in improving research outcomes and efficiency. The collaborative approach used in the Human Genome Project, as detailed by Collins et al. (2003), exemplifies the potential of these tools in complex, interdisciplinary research endeavors.

5. Challenges and Considerations

Digital Divide: The digital divide remains a significant issue, impacting equitable access to educational technologies. Research by Warschauer (2004) and more recent studies by van Dijk (2020) address the disparities in technology access and the need for policies to bridge this gap.

Data Privacy and Security: As digital technologies become more prevalent, concerns about data privacy and security are paramount. Research by Solove (2021) and studies on cybersecurity in education by Wills and Tynan (2016) underscore the importance of safeguarding personal and institutional data.

Training and Support: Effective adoption of digital innovations requires adequate training and

support for educators and students. Research by Becker and Park (2011) highlights the need for professional development to ensure successful integration of technology in teaching and learning.

Theoretical Framework:

A. Technological Acceptance Model (TAM)

- **Concept:** This model explains how users come to accept and use new technology. It focuses on perceived ease of use and perceived usefulness.
- **Application:** Analyze how educators and students perceive the utility and usability of digital innovations in academic settings.

B. Diffusion of Innovations Theory (DOI)

- **Concept:** Proposed by Everett Rogers, this theory describes how new ideas and technologies spread among populations.
- **Application:** Investigate how digital innovations are adopted in academic institutions and the factors influencing their diffusion.

C. Constructivist Learning Theory

- **Concept:** This theory, associated with Piaget and Vygotsky, posits that learners build knowledge through experiences and interactions.
- **Application:** Examine how digital tools support constructivist approaches by enabling interactive and personalized learning environments.

D. Technology-Enhanced Learning (TEL)

- **Concept:** TEL refers to the use of technology to enhance the learning experience.
- **Application:** Explore how digital innovations such as multimedia content, online collaboration tools, and adaptive learning technologies contribute to academic learning.

E. Community of Inquiry (CoI) Framework

- **Concept:** This framework emphasizes the importance of social, cognitive, and teaching presence in creating a successful online learning environment.
- **Application:** Assess how digital innovations impact these presences and the overall effectiveness of online learning environments.

3. Integration of Theories

Combine the theories to create a comprehensive understanding of digital innovations in academics:

- **Adoption and Implementation:** Use TAM and DOI to explore how digital innovations are adopted and implemented within academic institutions.
- **Learning Processes:** Apply Constructivist Learning Theory and TEL to understand how these technologies support and enhance learning processes.
- **Online Learning Environments:** Leverage the CoI Framework to evaluate the effectiveness of digital innovations in online and hybrid learning environments.

4. Critical Perspectives

Incorporate critical perspectives to address potential limitations and challenges:

- **Digital Divide:** Consider the implications of varying access to digital technologies among different demographic and socio-economic groups.
- **Privacy and Security:** Analyze concerns related to data privacy and cybersecurity in digital learning environments.
- **Quality and Effectiveness:** Assess the quality and effectiveness of digital tools and their impact on learning outcomes.

5. Research Questions and Hypotheses

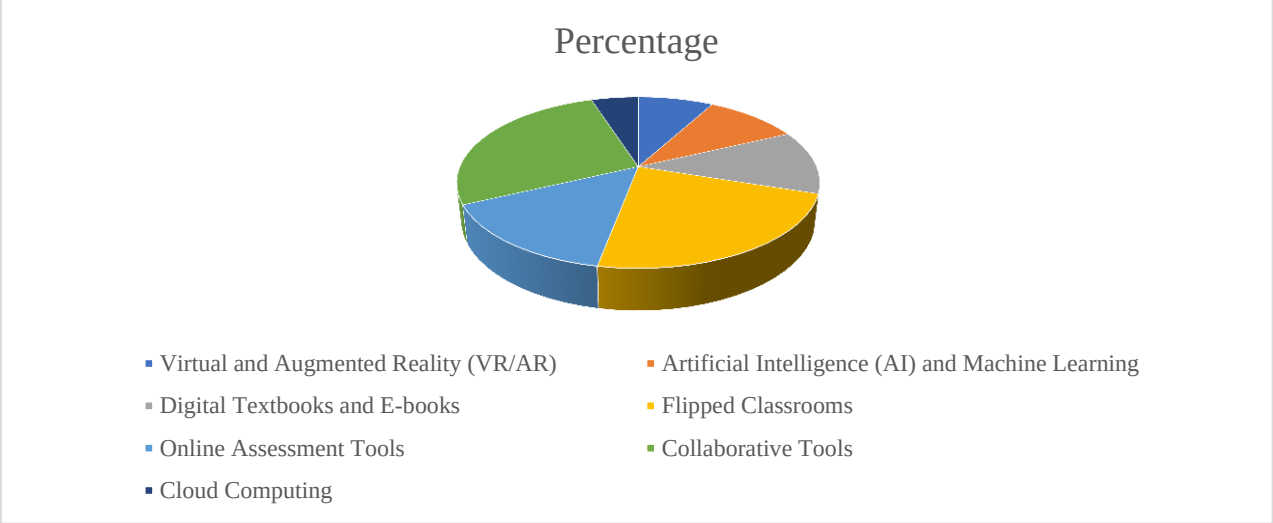
Formulate specific research questions based on the theoretical constructs:

- How do perceived ease of use and perceived usefulness influence the adoption of digital innovations in academics?
- What factors contribute to the successful diffusion of digital technologies in educational institutions?
- In what ways do digital tools align with constructivist learning principles?
- How do digital innovations affect social, cognitive, and teaching presence in online learning?

Data analysis and interpretation:

To identify and categorize the various digital innovations that have been implemented in academic settings.

Digital innovations that have been implemented in academic settings.	Effected respondents	Percentage
Virtual and Augmented Reality (VR/AR)	8	8
Artificial Intelligence (AI) and Machine Learning	10	10
Digital Textbooks and E-books	12	12
Flipped Classrooms	23	23
Online Assessment Tools	15	15
Collaborative Tools	27	27
Cloud Computing	5	5
Total	**100**	**100**



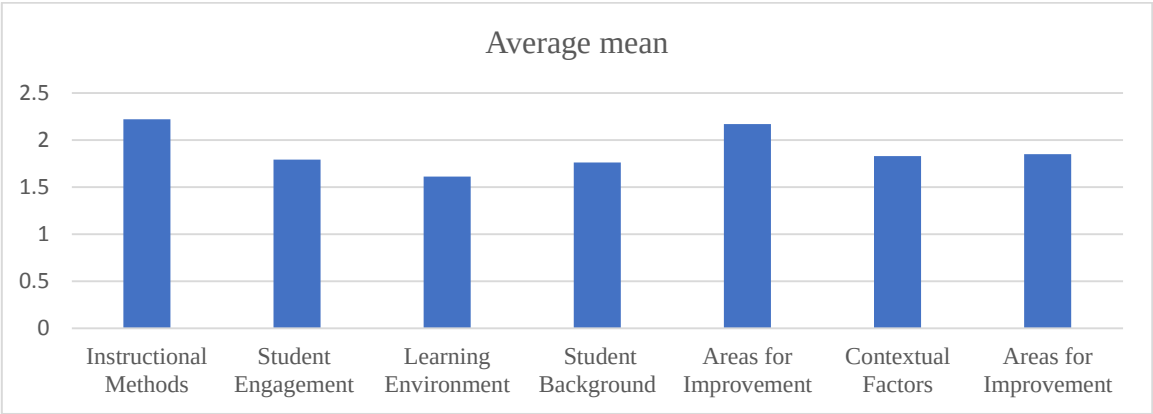
Interpretation:

As the above graph reveals most of the respondents are using flipped classrooms and collaborative tools digital innovations that have been implemented in academic settings and less respondents have the opinion of cloud computing and digital textbooks as digital innovations.

Weighted Average Mean

Evaluate the Impact on Learning Outcomes

Impact on Learning Outcomes	Very high (5)	High (4)	N (3)	Low (2)	Very low (1)	Weighted total	Average mean
Instructional Methods	50	60	90	18	4	222	2.22
Student Engagement	75	48	30	16	10	179	1.79
Learning Environment	80	48	24	8	1	161	1.61
Student Background	80	60	18	16	2	176	1.76
Motivation and participation	73	80	23	35	6	217	2.17
Contextual Factors	80	12	45	32	14	183	1.83
Areas for Improvement	64	34	30	45	12	185	1.85



Interpretation:

The above graph reveals that most of the respondents have good opinion about there is high impact on the learning outcomes such as Instructional Methods, motivation and participation. And other respondents have average opinion that low impact on learning environment and student background.

Chi-square test: Independence of two attributes

H0: There is association Assess the Quality and Usability of Digital Tools

H1: There is no association between Assess the Quality and Usability of Digital Tools

Quality of digital tools	Whether or not satisfied with Usability of Digital Tools		
	Yes	**No**	**Total**
Good	65	7	72
bad	20	8	28
Total	85	15	100

X^2 = $(ad-bc)^2 * N/(a+b)(c+d)(a+c)(b+d)$

= (520-140)2*100/(65+7)(20+8)(65+20)(7+8) =5.61

Level of significance = 5%, Degree of freedom = (r-1) (c-1) =1, Table value=2.75

Interpretation:

The calculated value is less than the table value. So, we accept the null hypothesis. That means there is an association between the Quality and Usability of Digital Tools.

Conclusion:

The exploration of digital innovations in academics reveals a transformative impact on education, underscoring both opportunities and challenges inherent in this evolving landscape. most of the respondents are using flipped classrooms and collaborative tools digital innovations that have been implemented in academic settings and less respondents have the opinion of cloud computing and digital textbooks as digital innovations. most of the respondents have good opinion about there is high impact on the learning outcomes such as Instructional Methods, motivation and participation. And other respondents have average opinion that low impact on learning environment and student background. There is an association between the Quality and Usability of Digital Tools.

In summary, digital innovations are reshaping the academic landscape, offering promising avenues for enhancing education while also presenting challenges that require thoughtful consideration and strategic implementation. As technology continues to evolve, ongoing research and adaptation will be essential to harness its full potential and address the complexities it brings to the educational sphere.

Suggestions:

1. Categories of Digital Innovations:

- Learning Management Systems (LMS): Review popular platforms (e.g., Moodle, Blackboard, Canvas) and their features.
- Educational Apps and Tools: Discuss apps for learning, productivity, and assessment (e.g., Duolingo, Quizlet, Evernote).
- Virtual and Augmented Reality: Explore applications in creating immersive learning experiences.
- Artificial Intelligence: Examine AI tools like personalized learning algorithms, chatbots, and grading systems.
- Gamification: Analyze how game mechanics are used to enhance engagement and motivation.
- Collaborative Technologies: Review tools that facilitate group work and communication (e.g., Google Workspace, Microsoft Teams).

2. Impact on Teaching and Learning:

- Pedagogical Shifts: Investigate how digital tools have changed teaching methods and learning theories.
- Student Engagement and Motivation: Assess how these tools affect student participation and enthusiasm.
- Access and Inclusivity: Evaluate how digital innovations have improved or hindered access to education for diverse populations.

3. Case Studies

- Successful Implementations: Provide examples of institutions or programs where digital innovations have been particularly effective.
- Challenges and Failures: Analyze cases where digital tools did not achieve their intended goals.

4. Evaluation and Effectiveness:

- Metrics for Success: Discuss how the effectiveness of digital innovations is measured (e.g., student outcomes, user satisfaction).
- Research Findings: Summarize key research studies and their findings on the impact of digital tools in academics.

5. Ethical and Privacy Considerations:

- Data Security: Address concerns related to the protection of student data.
- Digital Divide: Consider issues of equity and access, particularly for underrepresented or disadvantaged groups.

6. Future Directions:

- Emerging Trends: Highlight new and upcoming technologies that may shape the future of academia.
- Potential Developments: Speculate on how current trends might evolve and their possible implications.

Reference:

1. Books

- "The Digital University: A Dialogue and Comparative Study" by David L. Hall and Steve Jones
- "Handbook of Research on Digital Content, Mobile Learning, and Technology Integration

Models in Teacher Education" edited by Silva, D., & Ferreira, M.

2. **Journal Articles**

- "The Impact of Digital Technology on Learning: A Summary for the Education Endowment Foundation" by Higgins, S., Xiao, Z., & Katsipataki, M. (2012). Journal of Educational Research.
- "The Role of Technology in Education: A Review of the Literature" by Selwyn, N. (2016). Educational Technology Research and Development.
- "Emerging Technologies and Their Impact on Learning: A Systematic Review" by Popenici, S. A. D., & Kerr, S. (2017). Educational Research Review.

3. **Conference Papers**

- "Innovations in Digital Learning: Best Practices and Future Directions" presented at the International Conference on Education and New Learning Technologies (EDULEARN).
- "Technology Integration in Higher Education: A Review of Case Studies" presented at the IEEE International Conference on Education and Information Technology (ICEIT).

4. **Reports and White Papers**

- "The Horizon Report: 2024 Higher Education Edition" by EDUCAUSE. This report covers emerging technologies and trends in higher education.
- "Global Education Technology Market Report" by Research and Markets, detailing trends and innovations in educational technology.

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Emerging trends in Leadership

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Abstract:
The role of leadership has always been central in shaping the employees, thereby fulfilling the expectations of the organizations. The concept of leadership has gone through a lot of changes through the years, thereby adding a new meaning to it every time. Whether leaders are born or created is still debatable but the leader's importance does not decrease even today. Different researchers defined leadership differently and gave new theories in each instance, but the essence still remains the same. The leader always represents his people by playing different roles. Digitalization has added a new dimension in the ways a leader has to think, speak and act. Though the way ahead is not easy for the leaders today but it is definitely worth it. The 21st century leader walks behind his followers to continuously support them and help them grow into new leaders. Future requires leaders to continuously evolve with the change in environment.
Keywords: Leader, Leadership, theories, digitalization, future

Evolution of leadership concept:

Since centuries, authors, thinkers, philosophers, psychologists have been proposing innumerable definitions of the term Leadership and have tried to explain the concept from various perspectives. As per Ralph Stogdill (1974), "there are almost as many different definitions of leadership as there are persons who have attempted to define the concept" (p.259). The leadership concept as explained by various authors and thinkers in the beginning was more inclined towards defining leader as an individual with some basic traits or characteristics. For example, the renowned Chinese thinker Confucius (Confucius, circa 475 BC/1998) suggested that a leader must be virtuous and serve his people. Philosophers like Plato and Machiavelli said that a leader must be wise and intelligent (Machiavelli, 1513/1992). Carlyle pointed out that a leader should be a "great man" (Carlyle, 1841/2011). It was Spencer who said that leaders are what their society or context makes them (Spencer, 1873/2013). As per Plato, the leader must be wise (Takala, 1998). Before around 1970, a leader was identified as an individual (like the great man theory and trait theory), as one who leads a group of people and resultant effectiveness of the group as explained in the Ohio state and Michigan studies (Bass, 2008; Yukl, 2010). In the coming decades of 1980s, 1990s and 1990s, leadership concept changed further and now the research suggested that leadership may be replaceable, scalable and even diminishable by other factors which are operational in nature (Dansereau, Alutto, & Yammarino, 1984; Bass (1990); Drucker (1996); Avolio (2007); Javidan, et al. (2010). One more very interesting aspect of leadership discussed in the past was whether leaders are born or made? (Bass, 2008); (Campbell, 1949).

The definition and concept of leadership has gone through a lot of changes through the years and what it was meant centuries ago, does not hold true today. This change may be attributed to the continuous transformation in the formation and reformation of social set up. According to Francis Yammarino (2013), "Leadership is a multi-level (person, dyad, group, collective) leader-follower interaction process that occurs in a particular situation (context) where a leader (e.g., superior, supervisor) and followers (e.g., subordinates, direct reports) share a purpose (vision, mission) and jointly accomplish things (e.g., goals, objectives, tasks) willingly (e.g., without coercion)." (p.2). The above definition explains leadership as an intersection of three important elements of leadership – Leader, Followers and Situation depicted as (L, F and S) if shown as a Venn diagram (Hollander, 1978).

Defining leadership:

Definition of Leadership has evolved greatly over the period, shifting its focus from being leader centric to follower focussed. These definitions have been reshaping themselves according to the changes that have been taking place in the leadership concept. Rost (1991) and Northouse (2016), made an attempt to conclude the essence of these definitions for over a century in the following table:

Evolution of definition of Leadership (Rost, 1991; Northouse, 2016)

Decade	Definition Emphasis
1900-1920s	control, power
1930s	traits, influence
1940s	groups
1950s	groups, relationships, goals, effectiveness behaviour
1960s	organizational behaviour, reciprocal process
1970s	influence, traits, transformation
1980s	leadership vs. management, process, authenticity, values, follower focus
21st century	

The Leadership definition has evolved through each passing year, showcasing its different aspects and dimensions. A few of them are listed below:

1. "Leaders are those who consistently make effective contributions to social order, and who are expected and perceived to do so." (Hosking, 1988, p.153)
2. "Leadership is the capacity to translate vision into reality."(Warren Bennis, 1989, p.5)
3. "Leadership is an influence relationship among leaders and followers who intend real changes that reflect their mutual purposes." (Joseph Rost, 1993, p.102)
4. "The only definition of a leader is someone who has followers" (Drucker, 1996: p. 54) .
5. "Leadership is a social process in which one individual influences the behaviour of others without the use of threat or violence." (Buchannan and Huczynski, 1997, p.606)
6. "Leadership is influence, nothing more or less" (Maxwell, 1998: p. 3) .
7. "Leadership is the process of influencing others to understand and agree about what needs to be done and how it can be done effectively, and the process of facilitating individual and collective efforts to accomplish the shared objectives" (Yukl, 2002, p. 7).
8. "Leadership is a process whereby an individual influences a group of individuals to achieve a common goal." (Northouse, 2004, p 3)
9. Bill Gates: "As we look ahead into the next century, leaders will be those who empower others." (cited in (Kruse, 2013))
10. Leadership is the art of mobilizing others to want to struggle for shared aspirations (Kouzes & Posner, 1995, 2017).

Theories and styles of Leadership:

Since the beginning, the concept of leadership has gone through major changes due to researchers perceiving the concept from different angles and viewpoints. To explain the concept properly, time and again authors have propounded various theories of leadership, giving it a different meaning each time. Let us understand these theories in brief and try to extract the central theme of these theories:

- Great man theory: According to the theory, a leader is a "great man" or a hero, who is wise, well gifted and kind hearted and is the sole person responsible for achievements in the world, which were the results of the thoughts that emerged in his mind (Carlyle, 1840)
- Leadership trait theory: This theory was given by Ralph Stogdill (1974) where he identified certain traits in leaders which appeared more often than others. There were further traits added to the list proposed by Stogdill, but these traits are not sufficient to identify or develop superior leaders.
- Kurt Lewin's framework of leadership styles: The three basic styles of leadership given by him were Authoritarian (also known as autocratic), Participative (also known as democratic) and Delegative (also known as laissez-faire) (Lewin, Lippitt, and White, 1939).
- Leadership behavioural theories: Douglas McGregor (1960) is largely responsible to bring up this approach. He identified two separate opinions of managers in organisations, which he named as Theory X and theory Y. Blake and Mouton (1964) also suggested another behavioural approach in their Managerial Grid, which emphasises upon the people and task orientation of managers and combination of these extremes. These theories speak about how leaders behave with tasks and people, assuming that these leadership traits can be copied and learned by others (Vroom and Jago, 2007).
- Fiedler's contingency theory: This theory claimed that there is not a single best way for leadership, rather efficacy of leaders relies upon the situation they face. Favourableness of situation is depicted by three variables namely leader follower relations, structure of the task, and power of the position. For this he devised a Least preferred coworker (LPC) scale to understand one's leadership style (Fiedler, 1964).
- Situational leadership: According to Blanchard and Hersey (1969), Telling, Selling,

Participating and Delegating are the four basic styles of leadership and there are four maturity levels. Different leadership styles match different maturity levels and suggest the behaviour of leader. John Adair (1973) suggested that leadership is maintaining a balance between the needs of task, team and individual.

- Transformational leadership: James Downton gave the leadership concept for the first time in 1973, which was further explained in 1978 , by James Burns and then finally further expanded by Bernard M. Bass in 1985. In Transformational leadership style, a leader persuades, motivates and uplifts his followers to nurture in such a way that it benefits them, their careers and growth of organisation in future (Fairholm, 2001)
- Transactional Leadership: This describes leaders "who practice the authority of their office under formal legality; they obey only the law, obligate others, and follow the principle of hierarchy" (Weber, 1968, p. 238).
- Charismatic Leadership: The Charismatic leader is a combination of qualities of a transformational leader and 'the great man' (from great man theory). A charismatic leader is perceived as the one who gives a vision for the future and boosts up the morale of followers in a demoralising atmosphere. The notion of charismatic leader was established by Weber (1947) and House (1976) but it popularised in 1980s and 1990s.
- Servant leadership: Concept of servant leadership at first was introduced by Robert Greenleaf through his essay titled "The Servant as Leader" in the year 1970. This style of leadership begins when a leader is willing to serve and eventually changing his role to lead. "The servant leader is servant first... it begins with the natural feeling that one wants to serve, to serve first. Then conscious choice brings on to aspire to lead. He or she is sharply different from the person who is leader first, perhaps because of the need to assuage an unusual power drive or to acquire material possessions." (Greenleaf, 1970, p. 13)
- Team Leadership: Katzenbach and Smith (1993) proposed that leader should be more of a facilitator than being a director. As a facilitator, a leader should be asking questions rather than answering them, give his followers enough opportunities to grow and lead, support others genuinely, sought for common understanding rather than consensus.
- Authentic leadership: It concentrates on being aware of one's own strengths and weaknesses, being true, moral perspective to self, and balanced perspective (Walumbwa et al., 2008). Such leaders have high integrity standards, they assume responsibility of their actions and their decisions are based on principles rather than short lived success.
- Ethical Leadership: In ethical leadership, a leader demonstrates a conduct which is acceptable and suitable in every area of life. The leader focuses on leading by example, teaching the importance of ethics to followers and communication (Brown, Trevino, and Harrison, 2005).

Future trends in Leadership:

The concept of leadership has gone through seminal changes since its inception. It started with its focus on the individual, then on his characteristic or traits, then on the group, and then on a leader's behaviour in a situation. But 21st century leadership is more about followers than the leader himself. From moving ahead of followers, then moving with them, the leadership now suggests moving behind the followers to push them forward and help them become leaders. With globalization, a leader's role has grown manifolds. A leader now is given a diverse team to handle, which is far more challenging than leading a team of people with same nationality. This requires him to be more empathetic, compassionate and sensitive to people's needs and getting the job done at the simultaneously! The COVID era has brought about more changes in the way a leader behaves. With everything going digital, a leader now has to handle his team virtually which is the most challenging task. Here are a few trends shaping the future of leaders as we are entering in the world of artificial intelligence.

1. **Digitalisation:** with the advent of digital transformation during and after the COVID era, technologies like artificial intelligence (AI), Internet of Things (IOT), augmented reality (AR), virtual reality (VR), Machine learning, Blockchain, Robotics and Bigdata etc. are continuously emerging and forcing the organisations to transform their marketing, development and expansion strategies. To handle this dynamic scenario, we need leaders equipped with digital skills to handle new challenges posed by these technological advancements every day. Leaders today have to continuously upskill and transform themselves into digital leaders to drive these changes and keep their organisations alive in this era of industry 4.0. they need to play the role of 'digital change agents' (Venkatesh, 2020) to bring the whole organisation on board to encash the benefits of digitalisation.
2. **Handling remote, virtual teams:** Due to digitalisation and since the pandemic era, more companies are thinking of operating in a hybrid

mode, which would help these companies to save infrastructural and other costs. But every change has its own pros and cons. Going online may pose some performance issues from employees as they might not feel like working from the comforts of their homes. The bigger challenge is faced by leaders handling such employees sitting over a virtual platform. Leaders will face greater challenge in creating a culture which unites all employees and makes them feel committed to their work and organisation, regardless of their location.

3. **Empathetic leadership:** the concept of empathic leadership is not new but in present scenario it entails greater importance because employees today handle stress way more than what they faced a few years ago. Every organisation expects its employees to upscale their knowledge, skills and abilities (KSAs) in tune with the environmental changes, especially with technological changes, which creates enormous pressure on employees with regard to their performance as expected by the organisation. Under such situations, they need someone to understand their problems, mindsets and emotions so that they may be able to fulfil the expectations of the organisation as well as their own. Today's leaders have to excel into understanding the problems of their employees and help them cope with difficult situations.
4. **Dealing with diversity:** diverse team management began as soon as globalisation occurred, people from all nationalities, genders, races, age, religions and preferences came together as a team. This was a challenge for the leaders as they had to first understand these diversities themselves and then begin handling such teams. Digitalisation has made this more complex as now the leaders have to deal with diverse teams in virtual mode. Also, these teams now have members from Gen Z (born between 1997 to 2012), who have a very different approach towards work and life as a whole. This needs training leaders on equality, diversity and inclusion.
5. **Developing an attitude of Change mindedness:** Change is an inevitable part of our existence but when it comes with technology, it becomes very swift. An organisation today, not being able to cope up with the dynamism of the environment has to meet its end very soon. Leaders therefore have to continuously foster an attitude of change mindset among their employees so that the organisation and the employees move through every change smoothly and come up more strongly. This requires leaders to be flexible enough to absorb change themselves first and then guide others.
6. **Ethics and transparency:** Ethics have been the heart and core of every successful organisation. Modern day organisations also need to maintain transparency along with professional ethics in front of their stakeholders so that they may create a positive image which will help them survive for a longer time. A leader also needs to practice ethics and transparency in his thoughts, words, choices and actions so that he may motivate and inspire his team effectively. This will not only help the leader grow but also his followers and organisation as a whole.
7. **New talent requirements:** The employee skill sets required from new entrants in the organisation have also changed these days. Technical soundness is essential these days for the new recruits. In view of this, the companies need to revise their talent requirements accordingly in order to recruit, train and retain employees. The leaders have to assist employees now not only in shaping their career paths but also providing equal opportunities to every employee regardless of demographics. At the same time the motivation and job satisfaction also have to be ensured so that the employees stay longer with the organisation.

Conclusion:

A leader has always played a crucial role in the organisation at all stages of its development. Leadership which was once considered as a trait has now become a process. It has gone through a lot of changes through the years, but the core theme of leadership still remains the same where the leader has to be with his people whether ahead of them, with them or behind them in support. Many researchers had tried to define leadership in the way they understood it therefore we can say that there is no one best definition of leadership, it is still developing and will keep on evolving always. There have been innumerable theories and styles of leadership suggested by learned people, these styles also are changing with change in times. Each theory and style have its own uniqueness as well as pros and cons. The current era is highly dynamic and requires leaders also be equally dynamic and vigilant. The current trends in leadership and the way the leaders must behave are shaping a new class of leaders who are ready to transform the world with their mindset and actions.

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Evolution of Education for Sustainable Development (ESD): Integration of Educational Policies and Curriculum over time in India

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Abstract:
Over the past few decades, we are consuming resources much faster than their replacement rate. This level of consumption leads to environmental damage like climate change, pollution, declining ecosystem etc. Sustainability means responsible use and consumption of natural resources, reduce and preserve natural resources to maintain these resources forever. Education is required to learn how to live sustainably and to preserve our globe for the upcoming generations. With the help of Education for Sustainable Development we can gather knowledge, skills, values that help us to understand the complex and interconnected challenges such as loss of biodiversity, climate change, inequality, unsustainable use of resources etc. and the adverse effects of these problems. It empowers learners of all ages to make thoughtful choices, informed decisions and to take initiatives to change the world and care for the globe in individual and collective levels. In India, the incorporation of ESD in policies and curriculum has evolved over time reflecting global commitments to national priorities and sustainability. This article is a brief overview of how ESD has been included in the school curriculum and policies.
Keyword: Sustainable Development, Education for Sustainable Development, Environmental Awareness, Conservation of Resources

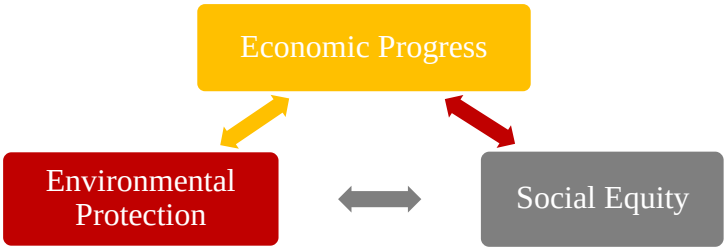
The Prologue:

Sustainability is about our future generations. How do we live today so that they can thrive and have a good life. Our planet has many resources that we are dependent on for our basic needs. Many of those resources can replenish. But that only works if we do it at a rate that these systems can replenish. Over the past few decades, we are consuming resources much faster than their replacement rate. The limited amount of resources on earth are exploited every day. As a result of that, resources are going down. This level of consumption leads to environmental damage like climate change, pollution, declining ecosystem etc. Sustainability means responsible use and consumption of natural resources, reduce and preserve natural resources to maintain these resources forever **(UCLA, 2021)**.

Ultimately when we excessively use resources it leads to a disequilibrium which creates life thretening problmes. Hence, sustainability is about understanding how all of this are inter-connected. A framework that is used to exaplain sustainability is the three E's Environment, Economy and Equity. If we only look at short term economic profit then we are not going to end up with a thriving economy in the long run. Again, if we only look at conserving the environmrnt without thinking about economy and human life than we will end up with a thriving scociety. If we overlook equity, we will end up with a society where a few people will have most of the resources and majority of people will be hungry and not living a good life which will not be a successful human society. Thus, sustiability is all about addressing all of these and understanding the connections between them **(UCLA, 2021)**.

Sustainable Development:

According to **Sustainable Development Commission** Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. We all know the need to grow our economy, but not all of us takes into account the adverse effects that imbalanced economic growth can have on the people's well-being as well as on environment. Sustainable development is all about the big picture with a critical approach **(United Nations, 2015)**.



It is about finding a proper balance between economic progress, environmental protection and social equity. It aims to improve the lives of each one of us in every corner and achieving all these together. There is a need to grow economies, create new innovative technologies, everyone wants to have a decent work, each of us must have access to nutritious food, quality and affordable education regardless of where we live but without any violence or harming the environment. Sustainable development is about ensuring all of these aspects with a strong and better society where people and the planet both will be benefitted **(United Nations, 2015)**.

Sustainable Development Goals (SDGs):

The SDGs replace the **Millennium Development Goals (MDGs)** which were born in 2000 to tackle extreme hunger and poverty, preventing deadly diseases and other development priorities. In fifteen years the MDGs drove progress in various essential area such as driving down poverty, combatting diseases, providing access to water and sanitation, improving maternal health as well as reducing child mortality etc. Although MDGs were intended to address numerous important aspects but they had some limitations. In 2015, the SDGs were introduced with a bold commitment by reaffirming to change the entire globe with comprehensive and universal set of goals which addresses a wide range of the pressing challenges facing that affects all of us.

Dreamstime (n.d.)

These 17 goals cover each one of us to build a more prosperous, safer and sustainable planet for all humanity. All the goals are unique and connected to each other in a way that success in one goal will directly or indirectly affect success for other. They assure us a better planet where no one left behind **(United Nations Development Program, n.d.)**.

Education for Sustainable Development (ESD)

ESD is the response of UNESCO to the dramatic and urgent challenges the globe faces. In simpler term, ESD is the answer to the question, "How do we need to learn to make the future possible?" Education is required to learn how to live sustainably and to preserve our globe for the upcoming generations. With the help of ESD we can gather knowledge, skills, values that help us to understand the complex and interconnected challenges such as loss of biodiversity, climate change, inequality, unsustainable use of resources etc. and the adverse effects of these problems. It empowers learners of all ages to make thoughtful choices, informed decisions and to take initiatives to change the world and care for the globe in individual and collective levels. UNESCO promotes Education for Sustainable Development internationally with a new global framework called ESD for 2030 **(Deutsche UNESCO- Kommission, 2021)**.

Integration of ESD in Educational Policies and Curriculum in India

In India, the incorporation of ESD in policies and curriculum has evolved over time reflecting global commitments to national priorities and sustainability. A brief overview of how ESD has been included:

Early Foundations and Environmental Education Initiatives (1970-1990)

- **Initial Environmental Awareness:** In India, the focus on environmental education was began in 1970 which was influenced by global

environments movements especially the United Nations Conference on Human Environment and Global Environmental Movement **(Stockholm Conference, 1972)**. This conference raised worldwide awareness of environmental degradation which resulted to an international consensus on the need of educating our future generations about protection of our environment. This era can be considered as the beginning of including environmental challenges into public discourse in the context of education in India **(United Nations Conference on the Human Environment Stockholm, 1972)**.

- **National Policy on Education (NPE) 1986:** NPE 1986 was a stepping stone in Indian education reform, emphasizing the need to promote a sense of environmental responsibility among the students by suggesting incorporation of environmental consciousness in curriculum. The policy recognized the urgent need for environmental awareness among the students. It recommended inclusion of environmental consciousness in education system, focusing on value education related to environmental awareness. This policy was a landmark for future policies and initiatives that would include sustainable and environmental education in education system.
- **Environmental Education in Schools: Ministry of Environment, Forest and Climate Change** (Earlier it was known as the **Ministry of Environment and Forests**) started promoting environmental education in educational institutions though projects like **National Green Corps**. In 2001, the National Green Corps was launched to provide a platform for schools to include students in environmental activities. Various NGOs, such as **Centre for Environment Education (CEE)**, played active role to foster environmental education through programs which introduced concepts like sustainability in classroom. These initiatives promote hands-on learning and engagement with environmental challenges **(Sharma, 1995)**.

Decade of Education for Sustainable Development and Policy Integration (2000)

- **National Curriculum Framework (NCF) 2020:** NCF 2000 was a key milestone in including environmental concern in formal education. This framework focused on the importance of environmental education as a core element in curriculum. The NCF introduced environmental education as a part of school curriculum. This framework focused on the need for an integrated approach to address environmental concerns.
- **National Curriculum Framework (NCF) 2005:** NCF 2005 had taken a significant step towards Education for Sustainable Development. This framework outlined a more structured approach to incorporate environmental education in the curriculum. It introduced environmental studies as a mandatory subject for the students of primary stage. NCF 2005 also recommended to integrate themes related to environment in other subjects at higher levels.
- **Supreme Court Mandate (2003):** Supreme Court of India mandated environmental education in all educational institutions leading to the teacher training and development of specific textbooks emphasized on sustainable development and environmental awareness **(Sharma & Menon, n.d.)**.

National Missions and Action Plans (2010)

- **National Action Plan on Climate Change (NAPCC) 2008:** This action plan focused on promoting sustainable development and the role of education in addressing climate change**. The National Mission on Strategic Knowledge for Climate Change** emphasized the need of escalate awareness with the help of education. This mission also aimed to foster sustainability education and climate literacy.
- **Sarva Shiksha Abhiyan (SSA) and Rashtriya Madhyamik Shiksha Abhiyan (RMSA):** These two flagship programs for universalisation of elementary and secondary education covers aspects of ESD. These initiatives included focused on the need of environmental awareness by integrating sustainable and conservation practices. Schools were motivated to teach students about environmental responsibility and sustainability.
- **Swachh Bharat Abhiyan (Clean India Mission) 2014:** Although it basically a sanitation campaign, this programme also covered educational components, encouraging educational institutions to teach students about sustainable practices, waste management, hygiene etc.

National Education Policy 2020

NEP 2020 marks a notable advancement in including ESD in the educational framework. The policy emphasises on:

- The necessity of teaching students about environmental conservation from a young age as well as the concept of sustainability.
- Rather than being limited to specific courses, this policy talks about a multidisciplinary approach where sustainability is included across subjects.
- Focus is paid on critical thinking, problem solving and experiential learning related to real word issues including sustainability.

- Inclusion of local and Indigenous Knowledge System (IKS) in curriculum by recognizing sustainable practices inherent in traditions.

Higher Education and Research in ESD

- **University Grants Commission (UGC):** UGC has developed guidelines to include environmental studies as a mandatory subject for the undergraduate courses. This step aims to promote a deeper understanding of sustainability and environmental issues among the under graduate students.
- **Indian Institute of Technology (IIT) and Indian Institute of Management (IIM):** Various IITs and IIMs have introduced centres for sustainable development where specialized courses are offered and researches are conducted on sustainability topics.
- **National Green Tribunal (NGT):** The NGT has been active in fostering environmental awareness and justice, raising awareness about sustainable practices among leaners and educators, influencing educational curriculum.

ESD in NON-formal Education and Community Outreach

- **NGOs and Civil Society:** The Centre for Environment Education (**CEE**), The Energy and Resources Institute (**TERI**) have been crucial in fostering ESD through non-formal education programs, community-based initiatives, teacher training workshops etc.
- **Initiatives by Schools and Colleges:** Most of the colleges and schools in India have adopted eco-clubs, green campus initiatives, community outreach programs to instill and spread sustainable practices among students as well as stuff.

India's journey in incorporating ESD in educational policies and curriculum reflects a growing recognition of the role of education plays in attaining sustainable development. The evolving practices and policies highlight the nations commitment to promoting a generation that is capable, responsible and aware of contributing to sustainable development.

Challenges and Future Direction:

In spite of remarkable progress, challenges remain widespread. implementation of ESD in India, including need for teacher training, resource constraints and ensuring that sustainability education reaches all socioeconomic groups and regions. Efforts could emphasize on strengthening partnership between educational institutions and government, Private sectors, NGOs to foster scalable and innovative practices.

Conclusion:

Pandemics, poverty, rising sea levels, loss of biodiversity etc. these interconnected global challenges affect us all no matter where we live. These hunting challenges can only be solved if we work together. The United Nations has called upon everyone to act now for the interconnected future of people and the planet. With ESD we strengthen our society for the future. Let's shape the world with education for sustainable development.

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Diverse Forms of Women in Saratchandra's Novel Srikanta (Part-1)

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Abstract:
Saratchandra Chattopadhyay is a significant personality in the world of Bengali literature. The achievement he has seen especially in characterizing women is rare in Bengali literature. Some of the women in his novels come from ordinary homes, some from middle-class or lower-middle-class families. He was the first to value women. He has established through the character that women are also human made up of flesh and blood. The female characters created by him may not have fought, may not have done politics, but he has drawn a human image of women within the family life. At the same time, he describes how different people or women can be while analyzing Rajalakshmi and Annadadidi in the first episode of *Srikanta* novel. In the novel he presents a definite picture of the life of Annada and Rajalakshmi. He shows Annadadidi and Rajalakshmi as two such women who are prostitutes and outcasts in the so-called social eyes. But Saratchandra has shown a noble form in the femininity of these two women which is not visible to ordinary people. Therefore, the author has revealed the form in the heart of these two characters and showed us. In my discussion I will try to discuss the different lives of these two women based on Saratchandra's *Srikanta* novel.
Keyword: Women, Character, Prostitutes, Outcasts, Femininity

Discussion:

Saratchandra Chatterjee is a notable figure in the world of Bengali fiction. He is the greatest speaker of our urban and rural middle class life. Sometimes he also wrote under the pseudonym 'Anila Devi'. Saratchandra's heroines refer to the main character of his novels. These characters are unique among many characters. Saratchandra wrote about girls continuously for twenty-five years (1913-1938). Some of the women he wrote about are ordinary girls, some are from middle-class or lower-middle-class families, and some are depraved in the eyes of society. He continued to write stories of loving girls. Not only women, Saratchandra plunged into the heart of all people.

Harlot, widow, Vaishnavite, Sati or extra-marital love, whatever it was - Saratchandra was overwhelmed by their love. His narratives in characterizing women are told in simple language and with romantic ideologies in Aptitude Saratchandra felt that women are cheap and it is not possible to determine their exact value. According to him - *The day women become scarce, society will be able to realize the true value of women*[1]

The female characters in Saratchandra Chatterjee's novels are presented with passion, enthusiasm and extraordinary brilliance. He basically magnified the humanity of people. That is why the normal happiness and sadness of women's life has been colored with immense sympathy and tenderness. He found humanity in women who are considered characterless by society. In Saratchandra's view, if a person suddenly slips under the injustice-tyranny of the society, it is absolute injustice to consider him as an outsider of the society forever. According to Saratchandra, "Hate the sin, not the sinner." He was always strong against the exploitation of helpless women in the society. In fact, Saratchandra has also depicted socio-economic and political problems in his novels. In his novels, a sense of rebellion against the prevailing principles, religion, behaviour and social discipline can be seen. His novels mainly depict the life of lower middle class and poor women. In Saratchandra's 'Srikanta' novel (Part 1) two such extraordinary women have been drawn. One of them is a clan and the other is a prostitute.

In the novel we see Annadadidi slur and Rajalakshmi prostitute. These two women have had a considerable influence on the life of hero Srikanta. In my research paper, I will try to discuss this strange description of women's life based on the first episode of Saratchandra's novel Srikanta.

Objective of the study: In my research paper, I will try to analyze the various descriptions of women's life in the first chapter of Saratchandra Chattopadhyay's novel Srikanta.

Source of study: Saratchandra's book 'Srikanta' (Part 1) has been taken as the main source and various critical books have been taken as secondary sources for preparing the discussion paper.

Study Methodology: Descriptive and analytical methods have been taken to prepare the discussion paper.

Scope of the Study: In the research paper I will try to present a vivid picture of the life of two women - Annada and Rajalakshmi based on Saratchandra's novel Srikanta.

One of the characteristics of Saratchandra's artist is that he blames the society for the conflict between the individual and the society. He looked for light in the darkness. He has found much good in those who are for the time being unattractive, loud, vulgar, harlot, characterless, vagabond in nature.

That is why he wrote - *Those in the world who only gave and did not get anything, those taken into account, those who never think about it in their miserable life - why do they who are deprived, those who are weak, oppressed, people whose tears are never have no right to anything? -.... If I give them pain, I will open my mouth, if they send me to complain to people as a human being.*[2] So Saratchandra wanted to reveal the hidden glorious being that lies in the depths of these apparently different characters of the society, and in this way, Annadadidi and The character of Rajalakshmi is inspired by his writings.

Annadadidi and Rajalakshmi are two women who are called *Kultyagin*i and *Patita* in the so-called social view. But Saratchandra has shown in the novel *Srikanta* that these two women have such a noble form in their female nature, which is not revealed to the general public. So the writer has revealed the character's inner nature and showed us effortlessly.

That's right, even though Annadadidi and Rajalakshmi are cast in opposites; the main theme of their characters is love. That is why Annadadidi, a unique common woman in sacrifice, tolerance, devotion and truthfulness, tender and strict, and Rajalakshmi, a character full of spiritual glory, shining with the radiance of goodness, are two characters in the same pen of the writer.

Saratchandra's approach to creating the image of a chaste woman in revealing the nature of female character is different. Devoted love for one's husband despite repeated insults--this is the concept of chastity. The greatest example of this chastity is Annadadidi in the novel 'Srikanta'. Shrikumar Banerjee commented – 'There are people who collect things from the streets. The gem that Srikanta picked up in the beginning of his life journey in the midst of ignorance became the path of his future life.'[3] This sister of Indranath is comparable to Sarat literature in sacrifice, devotion, tolerance and honesty. In the novel, Srikanth said - *The result of my many births is that I didn't back down in fear that day! On the occasion of that day, the thing that I had seen, in the whole life of the world, how many people happen to the fate? I or him like anywhere else? Such auspicious moments in life do not come often.*[4]

Srikanta saw Annadadidi and discovered a benevolent image of women. One cannot understand the glory of humanity that can exist even in a person who is considered by the society to be a bitch without seeing Annadadidi. The influence of this Annadadi in Srikanth's life is immeasurable. The impression that Indra's Annadadi made on the human consciousness helped shape Srikanth's later life. On seeing Annadadidi for the first time, Srikanta felt –"As if a fire covered with ash! It is as if he has just come up from his seat after performing severe austerities for ages. Annadadidi is the sum of how much sense of duty, suffering, idealism and devotion. Leaving a rich father's house, abandoning happiness and comfort, Annadadidi takes the hand of her misguided heathen husband and steps into the dark on an unknown path. She knows her husband is the murderer of her characterless, widowed elder sister. However, she could not leave her husband, a converted Muslim and a snake charmer, despite knowing that she would be a Kulotyagini. A concubine woman feeds her husband by collecting wood, selling it. She gives him money to buy marijuana. Still doubt it *Did Annada leave the house loving her husband, or did she commit such a big adventure because of the ideals of husbandry? The husband who had killed his elder sister and abandoned her after putting a heavy burden of humiliation on his wife, Annada had so much uncomplaining love for that husband that Annada left the house on seeing him in the guise of Sapura, it is hard to believe. It seems that women like Annada care more about the ideals of marriage than their husbands, that's why their husband's personal life is not their judgement, they are happy if they can protect the ideals of marriage.*[5]

The ideals of honesty and integrity have become bigger in Annadadidi than the ideals of concubinage. The adulterous woman, however, rebelled against her husband. She exposed Shahuji's business of tricking people, hooliganism to Indra - *Indranath, I thought I would tell you all my words today! But I think that time has not yet come. Just believe my word today, brother, all are just a false thing. And don't go back and forth behind Shahuji with false hope. We don't know anything about Tantra mantra; we can't save a dead also.*[6]

After telling this statement to Indranath, Shahuji was hurt but Annadadidi revealed the truth. After her husband's death she could easily have stayed with her mother and with Indra. But she did not think of anything other than repaying her husband's debt. This idealism is characteristic of Annadadidi's character.

Women's reform is present in Annadadidi. So she is a Muslim even though she is a Hindu. Husband's religion is his religion. After Shahuji's death, he had to make arrangements to repay the debt. 'My husband's debt is my own debt'. Annadadidi did not even take five rupees from Srikanth because she did not want to be in debt. *Don't feel sad brother. I returned the money, but I took that small chest of yours with Me.*[7] In Srikanth's words, this Annadadidi is pious. Indranath's strong speech cannot make her old. No lawlessness can touch her. Her whole life is a constant self-sacrifice to the ideal of chastity. Srikanta got his travelling expenses from here.

Like Annadadidi, Rajalakshmi is also a female figure of affection and love, but Annadadidi's

problem is not the same as Rajalakshmi's problem. Annadadidi is the epitome of devoted love, while Rajalakshmi is the contrasted lover. Although she is full of beauty on the outside, she is a loving Rajalakshmi on the inside of society

There is a sense of reformation in both. But Annada accepted the sorrows of life only by clinging to Sanskar, but Rajalakshmi by accepting the sorrows and protecting the family, she found a new way to keep her lovingness alive. Of course, Annada didn't have that chance, but I will say that Annada is inferior because of love and sufferer for Sanskar, but Rajalakshmi is a prostitute because of the curse of the so-called social injustice and is lovable despite being a prostitute because of the speed of love. Rajalakshmi tried to spend the rest of her life keeping that love only as heart treasure or God given treasure.

In Sarat literature we see deep respect for women. So, Saratchandra does not consider every woman to be fallen. He has repeatedly shown and protested against the humiliation of women in the male-dominated Hindu society. Saratchandra chose Rajalakshmi to establish the love of women. Being a sweetheart, Rajalakshmi had no shortage of wealth. She could easily live in luxury. But Rajlakshmi did not walk that way. It is as if she has moved forward with the right to serve Srikanth at the behest of love. In order to establish this right, Piyari said - 'Do I have the forehead that I shake with my hands and serve to make you healthy and strong in times of trouble. Then I knew I had done a job of this birth.'

Piyari knows that Srikanta will not be hers in this life. Faulty social system is responsible in this case. That's why Saratchandra brought Banku's mother forward. Whenever Srikanta-Rajalakshmi came very close, Banku's mother stood in the middle, blocking the way like the mighty Himachal. Beloved beings are swallowed up by human beings here. And Rajalakshmi is in conflict with these two entities. As soon as he saw Srikanth, the sand dam in his heart broke. But Srikanth is not easily caught. But as soon as he came close to being caught, he removed himself from Srikanth, thinking that people would say something. Subodh Sengupta said - 'Society has not directly prevented it. There was no rural society. His mother's heart prevented his desire.' Many a time at night when Rajalakshmi secretly entered Srikanta's bedroom to feel the warmth of his body and to fix the removed cloth, Srikanta secretly let her go around secretly.

Saratchandra has expressed his views on women in the essay 'Narir Mulya'. From that point of view, he does not believe in the invaluable asset of women and stigmatization of women. Saratchandra's Srikanta also does not consider the trampling of women to be poisonous. He believes that it is a curse of the contemporary social infrastructure. So Annadadidi, in the eyes of Srikanta, is a fire covered with ashes and within Rajlakshmi he experienced an idol of love. One remembers Tarashankar's novel *Kavi* in which Nitai thinks Thakurji is *Kashful* and Basan is *Keya Phul*. Saratchandra has presented these two female characters in a different form, but both are traditional Indian loving women.

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E-waste management in Educational Institutions

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Abstract:
The number of generations of electronic products has significantly expanded in the recent years, during a time when science and technology are developing at a rapid pace. Electronic garbage, or "e-waste," is increasing at a compound annual growth rate of roughly 30% in the nation as a result of globalization and upgrades. A number of health and environmental risks, including air, water, and land pollution, the depletion of non-renewable resources, and the loss of priceless elements, have been brought to light by this topic. Geographical circumstances have also been negatively impacted by rising CO_2 emissions in the atmosphere. The suggested effort consists of an e-waste survey conducted by Cambridge institute of Technology, to collect data for raising awareness regarding the development of e-waste and its elimination. The current study on the disposal and recycling of e-waste combines quantitative and qualitative methods with a compilation of findings. The survey's conclusions about the risks to public health, the effects on the environment, and current disposal methods will be advantageous not only domestically but internationally as well. Before launching the final poll, a prototype survey was done to gain insight into the issue. The final survey was greatly enhanced by the suggestions made by the corresponding respondents and the changes in the pilot survey's responses and have additionally suggested a cloud-based strategy for educational institutions to reduce e-waste in an efficient manner, based on the survey data its eradication. The current study uses both quantitative and qualitative methodologies in addition to compiling information on the disposal and recycling of e-waste. The survey's findings regarding the environmental impacts, public health dangers, and existing disposal techniques will be beneficial both domestically and globally. To obtain understanding of the problem, a prototype survey was completed prior to the final poll being launched. The related respondents' ideas and the modifications to the pilot survey's responses significantly improved the final survey. Based on the survey results, have also recommended a cloud-based approach for educational institutions to efficiently minimize e-waste. The suggested remedy would represent a significant advancement in the worldwide effort to reduce carbon emissions and the production of e-waste.
Keywords: electronic trash, management of electronic waste, cloud computing, virtualization, green computing, and e-resource

Introduction:

One of the main issues facing the modern world is environmental conservation. It appears that humans have the right to take advantage of others in this unquenchable quest for prosperity and greed. Nature in some manner, neglecting the reality that every action has a reaction. Individuals are eager to own a luxurious lifestyle and rely heavily on electronic resources for the majority of whether it's a very tedious job at an institution or a household duty. However, the result of this great dependence is the production of e-waste. E-waste is the garbage produced as a result or to the abandoned or useless electronic waste items. The computers, memory devices, cables, routers, printers, and Batteries eventually come to be considered e-waste. In general, electrical and electronic equipment (EEE) has made life more pleasant and easy due to its effectiveness and program that saves time. Regretfully, given the quick growth of the electronic sector and ongoing improvements the majority of electronic trash is produced by electronic products. Numerous investigations have been carried out to comprehend and examine the effects of electronic waste on the environment. E-waste generation was anticipated by the Associated Chambers of Commerce and Industry of India (ASSOCHAM) to be 1.8 million metric tons (MT) annually in 2016 and would attain 5.2 million metric tons annually by 2020[1] and 75 million metric tons annually by 2025. The fastest-growing type of waste in the today's world is electronic waste. The majority of wealthy nations have started to pay focusing on the recycling and disposal of electronic waste have begun setting up an appropriate method for disposing of electronic debris. Recycling [2] Additionally, the CSIR Water Research Institute has demanded a prohibition on "primitive recycling of e-wastes," as it puts it. The research showed that harmful substances are discharged into the environment when electronic garbage is burned in order to recover materials such as copper [3]. Concerning the same issue, the Indian government also created a law governing the treatment of e-waste based on the Extended Producer Responsibility (EPR), which attempts to the final stages of e-waste product treatment that is environmentally friendly of the living. It did not, however, establish collection goals. Consequently, the law was changed in 2016, and a new 'Producer

Responsibility Organization' arrangement (PRO) was included in order to strengthen EPR [4]. Additionally, the government has implemented awareness campaigns in this manner. The Information and Electronics Ministry Additionally, technology has sparked increased awareness of e-waste program within the Digital India Campaign, in addition to business associations since 2015, in order to raise consciousness among the people about the risks of recycling of e-waste by the unstructured industry, and to educate them of other ways to get rid of their electronic garbage. The curriculum emphasizes how important it is to adopt eco-friendly procedures for recycling e-waste. The Participation in "Swachh" is also encouraged from the general population. "Digital Bharat," by entrusting their electronic garbage to licensed recyclers only [5] awareness of e-resource management, Resource optimization and appropriate e-waste disposal are modern issues that have surfaced recently. Despite the government attempts, efforts must still be made to the individual level consistently. Commencing at the personal level and expanding the movement to multiple organizations, then society as a whole, and lastly, to the total nation will achieve the intended outcomes. These days, even Scholars and thinkers are taking notice of this issue in addition to the situation as it is now. In addition to conducting an e-waste survey to raise awareness of the detrimental effects of e-waste, this research has suggested an e-cloud model as a remedy for the issue facing educational institutions. The remainder of the paper is structured as follows: Section 2 presents the research that has already been done by different researchers, highlighting their varied perspectives, stances, and fields of study. The authors' suggested methodology, which includes the research methodology, the two stages of survey analysis, and the specifics of the suggested model, is covered in Section 3. The paper is concluded in the concluding section.

Statement of Problem: Bangalore, also referred to as India's Silicon Valley, produces a lot of e-waste because of the IT sector, the high concentration of tech companies there, and the city's fast expanding population's heavy reliance on electronics. The following are the main elements of Bangalore's e-waste generation: **High Volume of E-Waste:** The city is one of India's biggest generators of e-waste, producing approximately 92,000 metric tons of e-waste annually. **Key Sources**: Corporate Headquarters, IT Parks, and Households are the main sources of e-waste. Small enterprises, the government, and educational institutions all make substantial contributions as well. **Improper Disposal**: Bangalore has recycling facilities, but a large portion of its e-waste finds up in the unofficial economy, where poor recycling and disposal practices can pose health and environmental problems. **Recycling Challenges:** Despite the fact that Bangalore has licensed recyclers for e-waste, the unorganized sector still holds sway, and a significant amount of e-waste is treated improperly in terms of safety precautions and recycling procedures.

Government Initiatives: The Karnataka State Pollution Control Board (KSPCB) has been actively encouraging people and businesses to dispose of their electronic trash appropriately and promoting e-waste recycling through approved channels.

Objective of the study

The following are the objectives of the study.

1. To present the e-waste in educational institutions and its impact.
2. To present the sample institutions buying and replacing of electronic products and level of awareness of e-waste.
3. To offer solutions to reduce e-waste in educational institutions.

Literature Review:

Over the past decade, various research papers have also been published on the awareness factors and challenges related to e-waste management. Unfortunately, the studies are limited to certain organizations or disciplines and may not reflect the complete picture. We have used random sampling to select 11 standard students from Bangalore City for the academic year 2023-2024, whereas the population of this study comprises students, non-teaching staff and teaching staff from Bangalore University and various other institutions. The present work also aims for the varied categorical analysis based on the different age groups, academic and social background. Thus, it depicts a broader view of opinions and perspective. Further, a paper [7] presents a synopsis of toxic substances present in e-waste, their potential environmental and human health impacts together with management strategies currently being used in certain countries. In the same line of research, authors [8] in their paper ‘An innovative approach of e-waste issues solving’ presented some detailed solutions to tackle the issue. Authors in the other paper [9] explained that the disposal of e-waste is a particular problem faced in many regions across the globe. Adding another item to the list, the authors in [10] briefly explained why e-waste management is important challenge to public health in India. The provision of a specific technical solution, and the author of their articles [11] focused on reducing electronic waste by virtualization to maintain all costs of material resources, but the author's actual. Work should build a model in the field of education and be will. Install a cloud computing base. This develops mainly on the basic concept of virtualization. Link to Paper [12], an audio posting application designed to help students visually

disturb the cloud [12] Platforms, authors have good cloud computing, but not only resource investment costs, There are storage and speed, but also removes physical barriers. The author of their articles [13] provided a common cloud model to provide resources to improve normal educational systems. The importance of cloud computing technology in the basic education system is justified by incorporating the latest tools as resources in a cost-effective manner. This model not only addresses the issue of affordability in the education sector but also reduces the purchase of electronic resources and thereby the generation of e-waste. Research institutes with limited budgets cannot afford to spend a lot on infrastructure, so cloud providers can provide resources on a pay-as-you-go model for the amount and duration of time. This also reduces the facilities required to build advanced infrastructure, which in turn reduces the generation of e-waste. The authors of this article have adopted this general model as a framework and refined it to be used as one of the solutions to reduce e-waste generation and carbon footprint. Continuing with the discussed aspects, the next section will elaborate on the proposed approach.

Research Methodology:

Research was done by taking 15 educational institutions for data collection in and around Bangalore. This study accepts management, engineering, and polytechnical universities. Practical sampling method accepted by this study. The questionnaire was formulated by the management of electronic waste from institutions, especially IT systems. Educational institutions regularly purchase new computer systems and replace old computers. Many businessmen buy them and recycle them, and old computers are e-waste, but they are not very aware of it. This study was conducted to determine the level of e-waste in educational institutions and their level of awareness about e-waste tools and techniques: Adopted two tools i.e., percentage analysis and chi square test. The following table shows the percentage analysis output.

Table 1: Type of Institution

Sl. No.	Type of institution	No. of institutions	Percentage
1.	Engineering	7	46.66
2.	Polytechnic	5	33.33
3.	Management	3	20.01
	Total	**15**	**100**

Source: Survey data

The above table shows the type of institutions, out of fifteen institutions which were taken for this study, seven (46.66%) institutions are engineering colleges, five (33.33%) institutions are polytechnic colleges and remaining three (20.01%) are management colleges. Majority (46.66%) of the institutions are engineering colleges.

Table 2: Periodical purchase of Systems

Sl. No.	Periodical purchase	No. of institutions	Percentage
1.	5 years once	7	46.66
2.	5 years to 10 years	3	20.01
3.	After 10 years	3	20.01
4.	Whenever need	2	13.33
	Total	**15**	**100**

Source: Survey data

The above table shows the periodical purchase of computer system in their institutions, out of fifteen institutions, seven (46.66%) institutions are buying computer systems 5 years once. Three (20.01%) institutions are buying computers 5 to 10 years once. Three (20.01%) institutions are buying computer once or after 10 years of using the same computers and remaining two (13.33%) institutions are buying computer whenever they need for expansion of computer laboratory and/or upgrade of computers. Majority (46.66%) of the institutions are buying 5 years once.

Table 4: Pattern of disposal of Systems

Sl. No.	Pattern of disposal	No. of institutions	Percentage
1.	Following Government rules	3	20.01
2.	Handover to buyers	7	46.66
3.	Followed disposal rule	4	26.66
4.	Not aware	1	6.66
	Total	**15**	**100**

Source: Survey data

The above table shows the pattern of disposal of old computer systems, three (20.01%) institutions are following Government rules for disposal of old computers, seven (46.66%) institutions are handover the old computers to the second-hand buyers. Four (26.66%) institutions are followed disposal rules and not aware of the disposal of old computer systems. Majority (46.66%) of the institutions are handover the old computers to the second-hand buyers.

Table 5: Cross table - Type of Institutions and level of Awareness

Sl. No.	Type of Institution	Level of awareness of E-waste			Total
		Low	Medium	High	
1.	Engineering	2	2	3	7
2.	Polytechnic	1	3	1	5
3.	Management	1	1	1	3
	Total	**4**	**6**	**5**	**15**

Source: Computed data

The above cross table prepared to present that the types of institutions and level of awareness of e-waste, followed by chi square test to find the type of institutions which influence the level of awareness of e-waste. Out of fifteen institutions, four institutions have low level of awareness of e-waste, out of which one institution each of Polytechnic, management, two are engineering. Out of six institutions have medium level of awareness of e-waste three Polytechnic institutions and two engineering institutions and remaining one is management. Five institutions are having high level of awareness of e-waste out of that three institutions are engineering institutions and remaining one institution each of polytechnic and management.

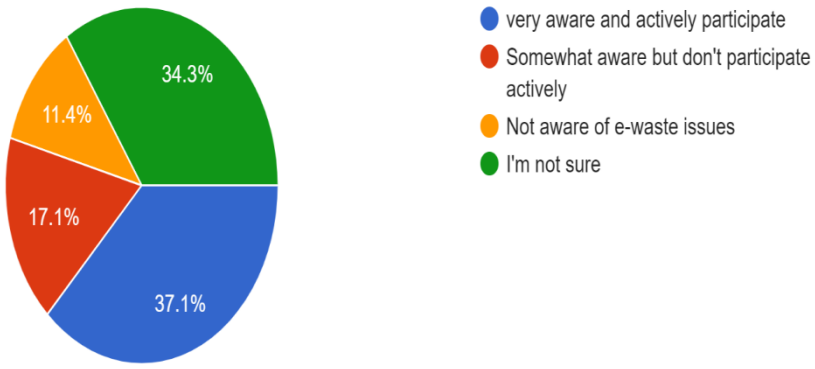
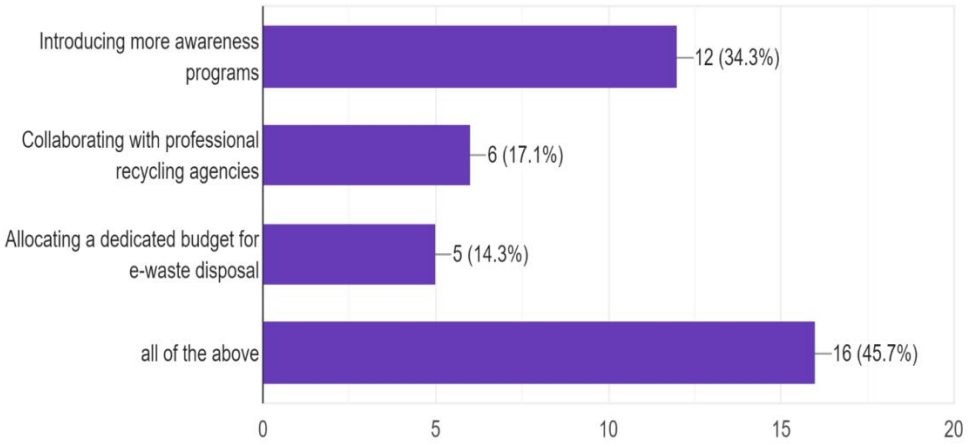


Chart – 1: Level of Awareness

The above pie chart shows the awareness level of e-waste of computers in students of their institutions. Out of fifteen institutions, 34.3% students not sure how their colleges are managing e-waste, 17.1% students are somewhat aware but don't participate actively, 11.4% students are not aware of e-waste issues. Majority 37.1% of students are very aware and actively participating in e-waste management of computers.

Chart – 2: How to create Awareness



Hypothesis: The type of institutions does not influence the level of awareness of e-waste at 5% significant level.

Table 7: Chi Square table

Sl. N0.	O	E	$(O_i-E_i)^2$	$(O_i-E_i)^2/E_i$
1.	1	2	0.250	0.1667
2.	3	3	0.350	0.7140
3.	4	2	1.000	0.3333
4.	1	1	0.0004	0.0042
5.	3	2	0.6600	0.3018
6.	1	2	0.7660	0.4083
7.	1	1	0.0191	0.3403
8.	1	1	0.098	0.0744
9.	1	1	0.016	0.0139
				1.7143

Source: Computed data

The above table shows the chi square calculations, O taken from the table, E calculations, $(O_i-E_i)^2$and $(O_i-E_i)^2/E_i$. The chi Square calculated value is 1.7143. DF 4, the p value taken from the table. The p – value is 0.788, it is greater than 0.05, hence the null hypothesis has been accepted, the type of institutions not influence the level of awareness of e-waste management in their institutions at 5% significant level. The institutions concentrate only replacing the computers whenever they need and development part of their institutions, they need more awareness of e-waste and how to reduce the e-waste. We have given suggestions to the management to reduce the e-waste.

Solutions to reduce e-waste in Educational Institutions:

The present section will describe the solutions for the reduction of e-waste in the educational domain. It will further discuss the model proposed in detail.

1. ***Optimization of resources through efficient laboratory timetable and design of extracurricular activities***

Universities should design the semester schedule in such a way that the same laboratory resources can be used throughout the year. Just to give an example, if an undergraduate science course includes both electronics and computer science labs, then those subjects should be taught in separate semesters. Conversely, if a computer science and mathematics department offer the same general electives in its curriculum and includes lab hours, then those courses should be taught in separate semesters, be taught in departments in different semesters so that the effective cost of equipment and management is low and resources can be fully utilized throughout their lifetime. Thus, optimization of resources and their proper use will lead to a reduction in electronic waste.

2. Autonomous V / S customer server system model

The customer server model is a technology that the customer process deals with server process services. The request and response process between the server and the client is carried out by the network. But over time, the evolutionary transition from thin clients to standard PCs has changed the world of technology and globalization. These modern workspace managers, desktops and personal computers, offer comprehensive functionality and productivity with easy-to-use and versatile features. But upon reflection, they come equipped with a host of hardware and software features that can quickly become useless if not used correctly. Now, if we look at the problem in fully functioning and well-armed organizations, the picture becomes clearer in terms of investment costs and the e-waste generated. Implementing a client-server model in these organizations will remain cost-effective and will also help reduce their carbon footprint. This leads to the appropriate use of resources and does not need to buy them. The amount spent to the purchase of these resources is saved.

3. Public cloud-based virtual desktop environment

To conduct high-tech research in universities, instead of purchasing infrastructure for a short period of time, universities can rent resources from the public cloud to conduct specialized research work. A large university runs many colleges under its umbrella. Instead of setting up a lab with state-of-the-art customized machines in each college, a private cloud can be set up and all the colleges equipped with thin clients or minimal infrastructure required. Keeping these points in mind, the authors have proposed a model called "Electronic Cloud Model" that combines the solutions proposed above into a single framework. In this way, it will be a more economical and environmentally friendly step and will lead us towards green and energy-efficient computing. We will discuss this model in more detail in the next section.

4. The E-cloud Model

Undoubtedly, Educational organizations need computational power as well technological supporting equipment for carrying out various procedures. Therefore, depending on the needs and efficiency of the system, not only software but also a lot of hardware is required. As a result, faculty, staff, and students also needed to be able to utilize these electronic resources for various purposes. But after a while these electronic devices are exceeded due to growth of the technology. This leads to a large generation of numbers electronic waste in these organizations. Inconsistency in the management of this e-waste can lead to serious problems. The proposed model will promote efficient utilization of resources in the long run, making the environment clean, green and safe. The architecture of the proposed model shown in Fig. 3.10 consists of five layers as described below. The first layer of the cloud architecture includes the data centre, which is a key element of the cloud computing environment. In the data centre, multiple data virtual servers usually run simultaneously to host many tasks, and at the same time, the cloud system continues to task request packages. It is a repository of dynamics and scalable resources. The second level contains the services required to consumers. Infrastructure services , platform services and application software services. The third layer is the main integral part of this architecture. He is involved in cloud management, accounting, billing, auditing, reporting, load balancing, virtualization. Allocates resources to consumers in any combination required as per their requirements. This is done after verifying the identity of the consumer, and users can pay on demand. The fourth level verifies the identity of the consumer. Different users are given different access rights due to: Privacy and security issues. Unauthorized use of resources is not permitted. Cloud service providers define access rights based on different levels of consumers. The final layer is the cloud consumer, who submits requests for resources and gets them allocated by the cloud provider. The author suggests the centralized universities to have their own cloud according to their requirements. Small Universities, if can't afford for the same, can rent their resources or even tie up from central universities with cloud facilities.

The working of the model is explained as follows: How the proposed model works? the model represents three key roles: Supplier of the cloud, Cloud Consumer and Cloud Developer. In the current scenario, the cloud provider is a university and the consumers are various departments and colleges of the university. Consumers can request information about the infrastructure, platform and application services. An infrastructure service, storage, CPU access time, Memory and network. The service is included according to the platform Operating system, virtual class, virtual research institute, application Development and test tools. Applications Software Services Include all the apps you use directly. Decision-making power as far as price assessment goes, it's in your hands Suppliers. Cloud technology developers manage the development and deployment of services such as virtual classrooms, virtual laboratories, online admissions processes, examination procedures, student/faculty/staff information, etc. In the next section, we discuss its superiority. We compare the proposed model with other architectures.

Superiority of the proposed model: This model has many advantages over other environments. It has various features that will allow an organization

to achieve greater scalability. Because the hardware resources distributed at the university level, it will reduce the cost of hardware, software and maintenance at the user level, as well as for access to the cloud via Internet requires only basic capabilities. The organization also needs a huge amount Information tank and storage location for storing clouds Platform is the best option. After that Large bass for virtual classrooms, virtual research institute, Online reception and test process, online students Information system. It is a paid platform that can be standardized to meet the university's standards. Universities request resources from cloud providers based on their educational programs and pay as per-use fee. This leads to proper use of resources. Their purchase is mandatory and also effective in saving the amount spent on the purchase of these resources. Secondly, since the cloud service provider is the same university, colleges within the same university could potentially share resources. Thus, the production of electronic resources is reduced by at least half, which leads to a reduction in the generation of e-waste. Thirdly, the we also advise that universities develop even and odd semester programs in such a way that lab resources can be shared. This model helps in reducing production Utilization of electronic resources with the help of cloud technology and reduces the generation of e-waste. Suppose a university had a bulk of hardware and supporting electronic equipment for their functioning and educational purposes. The labs for the different departments are loaded with enormous facilities for the students. However, resource utilization is less than 50%, and as a result, these resources will lose their lifespan over time and become e-waste. Flat Other electrons, ACs, network devices Switches, outlet rotors, equipment similar to wires Effective and non - working resource. As a result, technically the institution faces a large amount of money. It was spent to maintain and purchase these resources. This model helps to improve education and work University standard. The long-term perspective shows that the production of electronic resources can be reduced by implementation Proposed models can cause electronic waste production to decrease. The next section concludes the article by highlighting future possibilities.

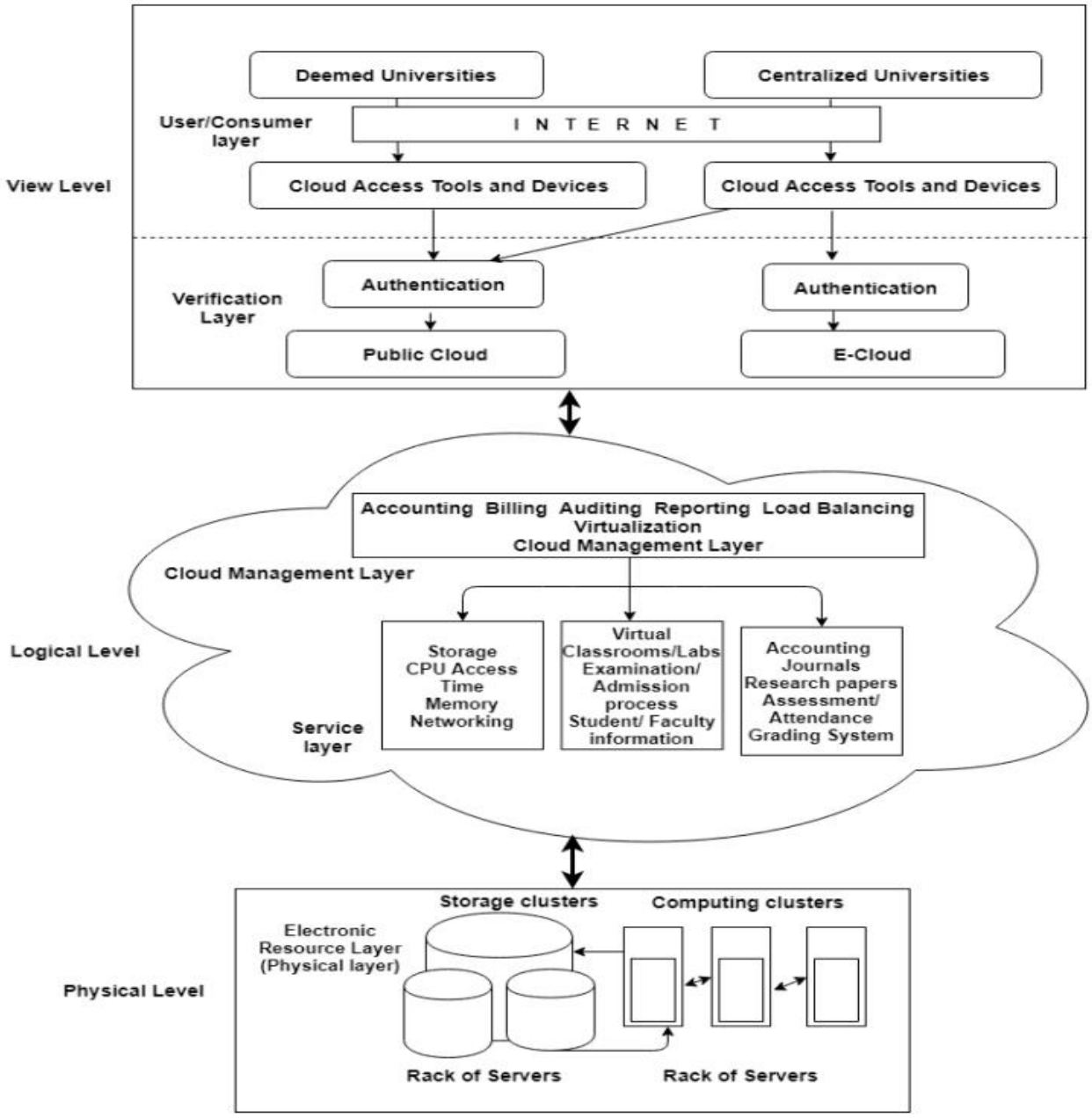


Fig 3.10 E-cloud Model

Conclusion:

The problem of electronic waste is derived from new problems recently. This has a strong impact on the environment A living creature. Hence, this study will cover: Analysis of e-waste studies at Cambridge institute of technology, Bangalore University and various other institutions that are aware of the dangers of e-waste. Studies Reflecting differences in views and perspectives Population belonging to different age groups, academics and education social origins. The survey results show a lack of awareness among the population about this issue of concern. It also shows that there is a need to disseminate knowledge about latest technologies and electronic resources among the youth through various seminars and workshops in the educational field. Therefore, based on the research observations, the authors proposed an e-waste reduction model, i.e. "e-cloud", as a solution for educational institutions that act as huge e-resource centres for the population. Organizations that adopt this model will not only become ambassadors for environmental protection but will also have the opportunity to encourage and inspire their students to use resources sustainably. Even better, these organizations would incorporate this issue as a new topic in their education programs, thus paving the way for sustainable technology practices.

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The Economics of Digital Currencies: Implications for Financial Systems and Economic Policy

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Abstract:
Digital currencies encompassing cryptocurrencies and central bank digital currencies (CBDCs) have emerged as transformative forces within global financial systems and economic policies. This paper examines the economic implications of digital currencies, including their impact on traditional financial institutions, monetary policy, and regulatory frameworks. Cryptocurrencies, such as Bitcoin and Ethereum, challenge conventional banking models by introducing decentralized financial systems and altering transaction dynamics. Moreover, CBDCs represent a significant innovation in monetary policy, potentially reshaping central banks' roles and influencing inflation and deflation trends. The paper assesses the disruptions and opportunities digital currencies present for traditional banking, focusing on financial stability, transaction efficiency, and financial inclusion. It also addresses the regulatory challenges posed by the emergence of digital currencies, including cybersecurity risks, fraud, and the necessity for revised legal frameworks.
Keywords: digital currencies; financial stability; central bank digital currency (CBDC); financial inclusion

Introduction:

The rapid growth and widespread adoption of digital currencies, exemplified by the rise of Bitcoin, have sparked significant interest and debate in the realms of finance and economics (Yi et al., 2023). The disruptive nature of these emerging financial innovations challenges traditional understandings of money and payment systems, compelling policymakers and economists to scrutinize their potential ramifications for the broader financial landscape (Casola et al., 2023) (Vora, 2015). Blockchain technology, which underpins many digital currencies, has also garnered the attention of central bankers, who have explored the use of central bank digital currencies – a digital form of central bank money that can be exchanged in a decentralized manner (Gomber et al., 2018). The implications of digital currencies and blockchain technology are multifaceted, with potential impacts on financial stability, monetary policy, and the role of central banks.(Gomber et al., 2018)Blockchain technology has the potential to transform various aspects of the financial system, such as payment processing, record-keeping, and asset trading. The decentralized and transparent nature of blockchain could enhance efficiency, security, and accessibility in financial transactions, while also challenging traditional financial intermediaries and their roles. (Brunnermeier et al., 2019)The integration of blockchain technology into financial infrastructure could lead to the development of new financial products and services, as well as changes in the way monetary policy is implemented and the relationship between central banks and the broader financial system. (n.d.) However, the disruptive nature of digital currencies and blockchain technology also raises important policy concerns (cryptocurrencies: tracing the evolution of criminal finances, n.d). The potential for cryptocurrencies to facilitate illegal activities, such as money laundering and tax evasion, has led to increased regulatory scrutiny. Additionally, the volatility and speculative nature of some digital currencies have raised concerns about their stability and their impact on financial stability. (Virtual Currencies: Emerging Regulatory, Law Enforcement, and Consumer Protection Challenges, 2014)

Objectives:

1. To analyze the economic impact of cryptocurrencies on traditional financial systems
2. To examine the role of Central Bank Digital Currencies(CBDCs)in modernizing monetary policy
3. To Evaluate the Impact of Digital Currencies on Transaction Costs and Financial Inclusion
4. To Assess the Regulatory and Legal Challenges Associated with Digital Currencies

Overview and Types of Digital Currencies:

Digital currencies are currencies that exist solely in electronic form, without any physical counterparts like coins or banknotes. They are mainly utilized for online transactions and represent significant innovations in the financial sector. Digital currencies can be divided into two primary categories:

1. **Cryptocurrencies:** These are decentralized digital currencies that employ cryptographic techniques to secure transactions and regulate the creation of new units. They operate on blockchain technology, which offers a transparent and unchangeable distributed ledger. Prominent examples include:

a) **Bitcoin (BTC):** Launched in 2009 by an anonymous individual or group under the pseudonym Satoshi Nakamoto, Bitcoin is the first and most well-known cryptocurrency. It

serves as a digital alternative to traditional currency and acts as a store of value.

b) **Ethereum (ETH):** Introduced in 2015 by Vitalik Buterin, Ethereum extends beyond simple transactions by facilitating smart contracts and decentralized applications (DApps), thereby providing a wide range of functionalities.

2. Central Bank Digital Currencies (CBDCs): These are digital currencies issued and regulated by central banks. Unlike cryptocurrencies, CBDCs are centralized and are designed to either complement or replace traditional fiat currencies. They represent a digital form of a nation's official currency and aim to enhance payment efficiency and promote financial inclusion. Examples include:

a) **Digital Currency Electronic Payment (DCEP):** The digital yuan from China exemplifies a CBDC, aimed at modernizing the Chinese payment system and improving the effectiveness of monetary policy.

b) **Digital Euro:** The European Central Bank is exploring the potential of a digital euro to strengthen the financial framework of the eurozone and enhance cross-border payment processes within the region

Historical Context and Evolution:

- **Initial Development:** The idea of digital currency emerged in the 1980s with the advent of early digital payment systems such as DigiCash and eCash. These pioneering systems established the foundation for subsequent advancements in digital monetary solutions.
- **Cryptocurrency Breakthrough:** The launch of Bitcoin in 2009 represented a pivotal moment, showcasing the possibilities of decentralized digital currencies. Bitcoin's success catalyzed the emergence of a multitude of other cryptocurrencies and facilitated the advancement of blockchain technology, which serves as a crucial component for secure and transparent transactions.
- **CBDC Developments:** In recent years, central banks around the world have begun to investigate or create Central Bank Digital Currencies (CBDCs) in response to the rising prominence of cryptocurrencies and the demand for more efficient payment mechanisms. These efforts signify a move towards modernizing financial systems and tackling the challenges presented by digital currencies.

Essential Features of Digital Currencies

- **Decentralization vs. Centralization:** Cryptocurrencies are generally decentralized, functioning independently of a central authority, whereas CBDCs are centralized and governed by a country's central bank.
- **Blockchain Technology:** The majority of cryptocurrencies utilize blockchain technology to uphold a secure and transparent transaction ledger. This decentralized ledger ensures a high degree of security and transparency.
- **Privacy and Anonymity:** Cryptocurrencies frequently provide varying levels of privacy and anonymity, although transactions can be traced on the blockchain. In contrast, CBDCs are structured to adhere to regulatory requirements and may incorporate features that ensure transaction traceability.
- **Volatility and Stability:** Cryptocurrencies are characterized by significant price volatility, often influenced by market speculation and regulatory developments. CBDCs, however, strive to maintain stability by ensuring that the currency's value aligns with that of the national fiat currency.

Economic Implications:

The use of digital currencies, including cryptocurrencies and central bank digital currencies (CBDCs), significantly impacts global financial systems, affecting traditional banking, financial stability, and transaction efficiency. Key economic consequences include:

1. **Transformation of Banking Models:** Cryptocurrencies challenge conventional banking by enabling direct peer-to-peer transactions, reducing the need for intermediaries. This shift may diminish traditional banks' roles in payment processing and decrease their income from fees and interest.
2. **Banking Sector Evolution:** In response, traditional banks are adopting blockchain technology, exploring digital currency integrations, and partnering with fintech firms to enhance their digital services and remain competitive.
3. **Price Volatility and Speculation:** The significant price volatility of cryptocurrencies poses risks to financial stability, as rapid fluctuations can undermine investor confidence and impact broader markets. Regulatory authorities are concerned about the potential spillover effects on traditional financial systems and recognize the need for regulatory measures.
4. **Systemic Risk and Contagion:** The connection between digital currencies and traditional financial institutions introduces new systemic risks. Significant losses in the cryptocurrency market could impact institutions involved with these assets. Additionally, decentralized finance (DeFi) platforms using cryptocurrencies for lending may heighten systemic risk if they face operational or financial issues.
5. **Regulatory Challenges:** The decentralized nature of cryptocurrencies complicates

regulatory oversight and financial stability. Governments are working to create frameworks to address issues like fraud, market manipulation, and cybersecurity threats while balancing effective regulation with the need for innovation.

6. **Transaction Costs and Speed:** Digital currencies can reduce transaction costs and speed up processing times, enabling quicker and cheaper cross-border transactions compared to traditional banking, which often involves multiple intermediaries and high fees.
7. **Innovation in Payment Solutions: Digital** currencies are driving advancements in payment solutions, such as smart contracts that automate agreements, reducing reliance on intermediaries and transaction delays. Their integration into payment systems can also enhance financial inclusion.
8. **Financial inclusion:** Cryptocurrencies and central bank digital currencies (CBDCs) enable access to digital financial services, particularly in areas with limited banking, allowing individuals to participate in the global economy.
9. **Impact on Monetary Policy Instruments:** CBDCs could alter traditional monetary policy tools like interest rates and open market operations by changing money supply and demand dynamics. A shift of funds from bank deposits to digital currencies may disrupt monetary policy transmission mechanisms.
10. **Digital Currency and Interest Rate Management:** Widespread CBDC adoption could change the demand for central bank reserves, affecting interest rate regulation. Central banks may need to adjust their strategies to maintain effective influence over economic activity.
11. **Economic Stimulus and CBDCs:** CBDCs could facilitate new economic stimulus methods, such as direct distribution to citizens, enhancing the efficiency and speed of financial assistance, and boosting consumer spending.
12. **Establishing Regulatory Frameworks:** The rise of digital currencies necessitates strong regulatory frameworks to address financial stability, consumer safety, and market integrity. Policymakers must create regulations that balance innovation with risk management for the safe integration of digital currencies into the financial system.
13. **International Regulatory Cooperation:** Digital currencies operate globally, presenting challenges for regulatory alignment. Policymakers need to collaborate internationally to establish unified standards for regulating digital currencies, addressing issues like anti-money laundering (AML), counter-terrorism financing (CTF), and tax compliance.
14. **Enhancing Consumer Protection and Fraud Mitigation:** As digital currency adoption increases, so does the need for consumer protection. Regulators must develop frameworks to protect users from fraud and cyber threats, ensuring compliance with security protocols and informing consumers about potential risks.
15. **Minimizing Transaction Expenses:** Digital currencies can lower transaction costs and improve payment efficiency for consumers and businesses. Policymakers should assess their potential to optimize payment systems and reduce international transaction costs.
16. **Embracing Technological Advancements:** Policymakers must stay flexible and proactive in adapting to advancements in digital currencies and related technologies, including blockchain, smart contracts, and decentralized finance.
17. **Assessing Long-Term Consequences:** Continuous evaluation of the long-term economic impacts of digital currencies is essential for understanding their effects on growth, monetary policy, and financial stability, ensuring relevant regulations.

Challenges and Considerations

Integrating digital currencies into the financial ecosystem presents various challenges for policymakers, financial institutions, and stakeholders. Addressing these is crucial for enhancing economic stability and promoting financial inclusion while minimizing risks. Key challenges include:

1. Security and Privacy Concerns

- Cybersecurity Risks: Digital currencies, particularly cryptocurrencies, are vulnerable to hacking, fraud, and theft. Their decentralized nature complicates security measures and responses to breaches, necessitating robust protection for wallets, exchanges, and transaction networks to maintain user confidence.
- Privacy Issues: Digital currencies raise concerns about user privacy. While cryptocurrencies offer some pseudonymity, transactions can be traced. Central Bank Digital Currencies (CBDCs) may exacerbate privacy issues due to central monitoring. Balancing privacy with the need for transparency and regulatory oversight is a significant challenge.

2. Regulatory and Legal Challenges

- Developing Comprehensive Regulations: Crafting effective regulations for digital currencies is complex due to their rapid evolution. Regulators must address issues like anti-money laundering (AML), counter-terrorism financing (CTF), consumer protection,

and market integrity, requiring adaptable regulatory frameworks.

- Global Collaboration: Digital currencies operate across borders, necessitating international regulatory cooperation to tackle issues like market manipulation and tax evasion. Establishing universal standards and aligning regulations is crucial for effective oversight, though differing national priorities can complicate this process.
- Financial Stability and Systemic Risk: Cryptocurrencies' high price volatility poses risks to financial stability, particularly with increased adoption by traditional financial institutions. Policymakers must assess and mitigate these risks to prevent systemic disruptions. Additionally, the rise of decentralized finance (DeFi) platforms introduces challenges such as operational failures and inadequate investor protections, which could create systemic risks if integrated with traditional finance. Regulators must address these risks while promoting innovation.

3. Challenges in Technology and Infrastructure

- Integration with Current Systems: The incorporation of digital currencies into existing financial systems presents considerable obstacles, necessitating significant upgrades or complete overhauls of current technologies, along with substantial financial investment.
- Scalability and Performance: Digital currencies, especially those based on blockchain technology, encounter scalability challenges as transaction volumes rise, requiring systems capable of managing high transaction rates without sacrificing performance or security.

4. Economic Inequalities and Access

- Addressing Economic Inequalities: Although digital currencies have the potential to improve financial inclusion, they may also worsen economic inequalities if access to technology and services is not equitable. It is crucial to ensure that underserved and low-income populations have access to these resources for fair economic participation.
- Obstacles to Education and Technology: The successful adoption of digital currencies hinges on individuals' understanding of technology and their access to digital tools. Policymakers need to tackle educational and technological barriers to empower people to take advantage of digital currencies.

Conclusion:

Digital currencies, which include cryptocurrencies and central bank digital currencies (CBDCs), are reshaping financial systems and impacting economic policies. They offer opportunities to enhance transaction efficiency, reduce costs, and promote financial inclusion. However, they also present challenges such as regulatory complexities, security risks, and potential threats to financial stability. The integration of digital currencies necessitates careful management of monetary policy tools, the creation of robust regulatory frameworks, and international cooperation to address cross-border issues. As this sector evolves, stakeholders must remain adaptable, finding a balance between encouraging innovations and managing risks to ensure that digital currencies positively influence the global financial landscape. Effectively tackling these challenges will be essential for harnessing the benefits of digital currencies while preserving economic stability and security.

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Optimizing Land Use: Pathways to Sustainable Development in Assam

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Abstract:

Increasing growth of population pressurizes land and other resources for a variety of reasons. Since the demand for resources far outweighs their availability, therefore, the optimization of the use of such limited resources like land has become indispensable to defeat unwanted situations like unemployment, food scarcity, hunger, poverty and death. At the same time, it is equally important to adopt only those means of development which takes care of the health of our surrounding environment. This paper thus, makes a sincere attempt to (a) study the land use pattern in the state of Assam with the help of secondary data collected from sources like Directorate of Economics and Statistics and Reserve Bank of India; and tries to (b) justify whether the land-use pattern in the state complies with the goal of sustainable development of the region or not. By observing the nature of land usage for agricultural and/or non-agricultural purposes and further, by comparing the land productivity of Assam with that of other selected states of the country, the study envisages the need for optimizing land use in the state for achieving sustainable development.

Keywords: land use, resource optimization, sustainable development, Assam

Introduction:

Land being an invaluable but limited resource needs appropriate management especially in developing countries such as ours where population is increasing at an alarming rate and therefore, the pressure on land resources for livelihood, agricultural and non-agricultural uses etc. has been increasing day by day. In the absence of appropriate planning of land resources, an ever-increasing population will impose a variety of unmanageable problems in the form of unemployment, poverty, food scarcity and health hazards etc. which, in turn, will affect the dream of achieving sustainable development in concerned regions.

The world's population is expected to cross at least 8 billion in the near future of 2025, according to the last census. Along with such growth of population, demand for land is increasing for different purposes such as for growing crops, construction of residential homes, building public properties such as streets, government institutions etc. The demand for land being more than its availability, it is necessary to optimize land distribution that meets the developmental needs of this increasing population while minimising the harmful consequences of anthropocentric activities imposed on the environment.

Achieving food security and improving the quality of life while preserving the environment is another issue that has been posing major challenges to the decision-makers, scientists, sociologists and politicians alike in the years to come. The wise use of land has paramount importance in the provision of food supply not only to the present but also to the future generations. Optimising land resources for agricultural and non-agricultural production is of utmost importance to address the issue of food supply for the ever-increasing population.

Objectives and Methodology:

This paper attempts to study the land-use scenario in the state of Assam and its possible impact on sustainable development of the state. To meet this objective, this paper tries to put forward a general picture of land use scenario in the state under certain broad sub-headings like land utilisation under forest cover, barren and uncultivable land, total cropped area etc. Moreover, land used for producing different foodgrains, vegetables and fruits are studied and the possible impact of such land use on sustainability aspect is also addressed. Besides these, Assam's agricultural productivity is compared with two agriculturally rich states viz. Punjab and Andhra Pradesh in order to develop a comprehensive understanding about the sustainability aspect of land use pattern in Assam.

This study is based on secondary sources of data collected from sources like the Reserve Bank of India and the Directorate of Economics and Statistics, Govt. of Assam. As per data availability, very simple statistical tools have been used in this study.

Land use pattern in Assam:

The total geographical area of any region covers many living and non-living objects other than land. Lands of all types, on the other hand, are not put to use due to many reasons. Land resources are usually used for habitation purpose, for industrialisation and for producing agricultural goods. The following table gives a clear picture of the use of land resources in the state of Assam.

Table: Utilization of land resources in Assam during 2014-2019. (Area in Hectares)

Year	Geographical Area	Forest	Area not available for Cultivation/Area not for agricultural uses	Barren and uncultivable land	Other uncultivated land excluding fallow land	Fallow land	Total uncultivated land	Total cropped area
	1	2	3	4	5	6	7 (=3+4+5+6)	8
2014-15	7843800	1852676	1270718	1189599	528757	174726	3163800	4082594
2015-16	7843800	1852676	1281913	1199612	525730	182397	3189652	4059934
2016-17	7843800	1852694	1293212	1191251	535744	197044	3217251	4087449
2017-18	7843800	1852694	1293291	1215875	560694	198716	3268576	4045496
2018-19	7843800	1852695	1300065	1214592	553575	199407	3267639	4004462
2019-20	7843800	1852695	1304952	1217177	553004	216505	3291638	3974812

Source: Directorate Of Economics And Statistics, Assam.

The above table gives an overview of land use pattern in Assam during the recent period starting from 2014-15 to 2019-20. Out of the total geographical area of the state (7843800 hectares), forest cover has marginally increased only by 19 hectares during this period. Area not available for agricultural uses include waterlogged land, social forestry, land under still water and other land. Water-logged land is any area where water is present at or close to the surface for the majority of the year. It is mostly found in low-lying regions; lakes, ponds, and tanks are not included. The area designated for social forestry comprises of land where trees are planted alongside roads, rivers, canals, and railway lines to provide fuel and fodder for the rural populace. Additionally, the larger objectives of soil conservation and providing a shed or shelter for crops are served by this practice. It also includes plantations of village forests that are utilized by the average person. The area covered by water bodies, such as rivers, lakes, ponds, reservoirs, backwaters, canals, and tanks, is generally referred to as still water.

Area not available for cultivation or uncultivated land is that category of land which is put to use of other than agriculture purposes such as construction of buildings, railway tracks, playground, streets etc. This area of land has increased from 1270718 hectares to 1304952 hectares during 2014-15 to 2019-20 period. The column 4 of the above table shows the status of barren and uncultivable land of the state. Land areas like mountain hills, desert, Swamps (doloni), silted lands, sandy lands etc. where cultivation is not possible are classified as Barren and Uncultivable Land. It is clear from the table that land resources under this category have increased from 1189599 hectares to 1217177 hectares during the said period. More specifically, the area under barren and uncultivable land has increased by 27578 hectares during this period. Another category of land resources is termed as other uncultivated land as shown in column 5 of the above table. Other uncultivated land includes permanent pastures, grazing land, land under miscellaneous groves and trees and waste lands. From the table, it is clear that other uncultivated land has increased from 528757 hectares to 553004 hectares with an increase by 24247 hectares of land area during this period. Column 6 of the above table depicts the status of fallow land. Fallow lands are cultivable lands but kept fallow or uncultivated during a period. Table 1 shows that such fallow land has increased by 41779 hectares from 2014-15 to 2019-20 period. The total uncultivated area as shown in column 7 of the above table indicates the land area not used for cultivation due to many reasons as mentioned earlier. Unfortunately, the total uncultivated land area has increased by 127838 hectares in the state during this period. The last column of the table showing total cropped area of the state expresses that land used under this head instead of increasing has reduced from 4082594 hectare to 3974812 hectare during the period from 2014-15 to 2019-20.

After giving a broad classification of land utilization in the state, this study attempts to exhibit the status of land use pattern for agricultural purposes. Table 2a and table 2b below provides a clear picture of land used for the production of foodgrains and non-foodgrains for a period of 17 years in Assam.

			Area utilised for the production of				
Year	**Gross Sown Area**	**Net sown area**	**Rice**	**Wheat**	**Cereals**	**Pulses**	**Total foodgrains**
2004-05	3896	2753	2376.8	63.9	27.2	107.6	2575.5
2005-06	3949	2753	2420.3	50	26.7	100.5	2597.5
2006-07	3763	2753	2189	60	25	106	2380
2007-08	3839	2753	2324	56	25	113	2518
2008-09	3999	2810	2484.2	50.1	22.8	113.7	2670.8
2009-10	4099	2811	2495.8	58.4	26.1	115.3	2695.6
2010-11	4160	2811	2570.3	44.8	25	126.4	2766.5
2011-12	4174	2811	2537	52.6	26.9	119.7	2736.2
2012-13	4076	2809	2488.2	33.9	28.1	141.2	2691.5
2013-14	4100	2820	2449.1	31.3	29.5	150	2659.9
2014-15	4083	2827	2495.3	23.7	33.3	148.3	2700.5
2015-16	4060	2801	2485	21	35	142.1	2683.1
2016-17	4087	2774	2467.1	17.5	36.1	146.4	2667
2017-18	4045	2723	2433.7	17.8	36.8	154.7	2343
2018-19	4004	2723	2425.2	16.9	37.5	150.2	2629.8
2019-20	3975	2699	2290.5	11.3	41.8	144	2487.7
2020-21	3888	2724	2360.5	9.3	46.1	142.3	2558.2

Table 2a: Land used in agriculture- foodgrains (in thousand hectares)

Source: Handbook of statistics on Indian states, RBI 2022-23.

Table 2a above clearly shows that though the gross sown area has decreased from 3896 thousand hectares to 3888 hectares during 2004 to 2020 whereas the net sown area has decreased from 2753 thousand hectares to 2724 hectares during the same period. Net sown area is the actual area where crops of different variety are cropped either once or many times in a given year. From this perspective, the net area under cultivation of foodgrains has decreased in the state. It is also clear from the table that the land used for the production of rice and wheat has decreased whereas land used for the production of cereals and pulses has increased. Land used for wheat production has reduced from 63.9 thousand hectares to 9.3 thousand hectares during this period.

Table 2b: Utilisation of land resources in agriculture- non-foodgrains (in thousand hectares)

			Non foodgrains		
Year	**Total fruits**	**Total vegetables**	**Oilseeds**	**Sugarcane**	**Raw Jute and Mesta**
2004-05	93.3	194.5	277.4	23.9	63.1
2005-06	112.6	319	243.4	23.4	62.7
2006-07	118.5	331.4	270.5	27	63
2007-08	122.7	328.9	266	26	65
2008-09	105.2	240.1	254.7	26.6	65.4
2009-10	117.3	235.2	275.3	27.1	70.3
2010-11	137.5	260.1	266.7	29.7	67.3
2011-12	142.8	266	268.3	25.7	71.6
2012-13	150.7	278.7	306.2	28.9	69.6

2013-14	144.7	281.4	304.2	29.1	74.3
2014-15	145.2	289.3	306.9	29.9	75
2015-16	145.7	317.6	310.1	29.5	76.4
2016-17	142.9	300.8	317.6	31.4	78.7
2017-18	147.3	300.2	314.2	30.6	73.4
2018-19	146.8	300	308.9	31.2	69.1
2019-20	148.60	301.00	310.80	29.70	67.50
2020-21	147.20	301.00	309.70	30.50	66.00
2021-22	162.00	306.20	311.70	29.80	64.50
Growth Rate	73.63	57.43	12.36	24.69	2.22

Source: Handbook of statistics on Indian states, RBI 2022-23.

Table 2b above, shows that land used for the production of fruits, vegetables, oilseeds, sugarcane, raw jute and mesta has increased in absolute terms with different growth rates which is definitely a positive aspect. The growth rates of land used during this period expresses that land used for the production of fruits recorded the highest growth followed by land utilized for vegetables production and sugarcane production.

Optimisation of land use and the issue of Sustainability in Assam:

Optimisation of land use in a particular region depends on a variety of factors. Apart from the broad heads of allotment of land and its management for different purposes arising out of ever-increasing demand of growing population, it requires more and more intensive study about the uses of land and its possible impact on the environment and also on future generations to come. Such an intensive study definitely requires research and appropriate data. Unfortunately, availability of such data to address the issue of sustainability in connection with the use of land resources is very difficult to procure. However, depending on the available data, a general picture about sustainability in connection with land use pattern in Assam can be drawn.

One objective of sustainable development is to ensure the availability of food to everyone and eradication of poverty from the state. This could be possible, along with others, if land utilized for agricultural purposes can maintain self-sufficiency by intensification of agriculture. Otherwise, insufficiency of agricultural production in a state of rapidly growing population may create an immediate threat to sustainable development in the form of food shortage, hunger and poverty in days to come.

A close scrutiny of Table 1 analysed earlier above indicates few important issues about the sustainable development of the State. More clearly, the amount of uncultivated land in the state has increased from 3163800 hectares in 2014-15 to 3291638 hectares in 2019-20. Instead of decreasing, even barren and fallow land area in the state has increased during this period. Increase of Fallow land, which can be cultivated, certainly indicates the underutilization of land resources in the state. Similarly, increase in barren and uncultivable land may be a sign of environmental loss or loss of the quality of soil due to which the quantity of barren land has increased. Apart from these, the total cropped area of the region has also decreased posing more pressure on existing land to produce enough food to meet the growing demand of the population.

As mentioned earlier, to meet the goal of sustainable development, land used for agriculture must be able to produce and supply enough agricultural goods to defeat hunger and poverty in the days to come. It means that the productivity of agricultural land must increase to the possible extent with environment friendly scientific techniques. But in real practice, it is observed that Assam's productivity is far away from many states of India and even below the national average. The Following Table 3 and diagram 1 clearly indicates this fact.

Table 3: Estimated yield of total foodgrains in selected states (Kg/ Hectare)

Year	Assam	Andhra Pradesh	Punjab	All India
2004-05	571	565	801	577
2005-06	537	772	804	598
2006-07	557	679	850	612
2007-08	558	803	804	625
2008-09	567	818	908	659
2009-10	561	740	887	630
2010-11	555	675	910	691
2011-12	573	711	789	699
2012-13	598	847	823	789
2013-14	695	958	872	764
2014-15	748	911	846	728
2015-16	757	848	965	655
2016-17	735	659	887	786
2017-18	748	865	876	853
2018-19	756	558	938	757
2019-20	737	932	871	823
2020-21	764	880	971	885
2021-22	767	859	1213	888

Source: Handbook of statistics on Indian states, RBI 2022-23.

Diagram 1: Yield of total foodgrains (Kg/ Hectare) in selected States

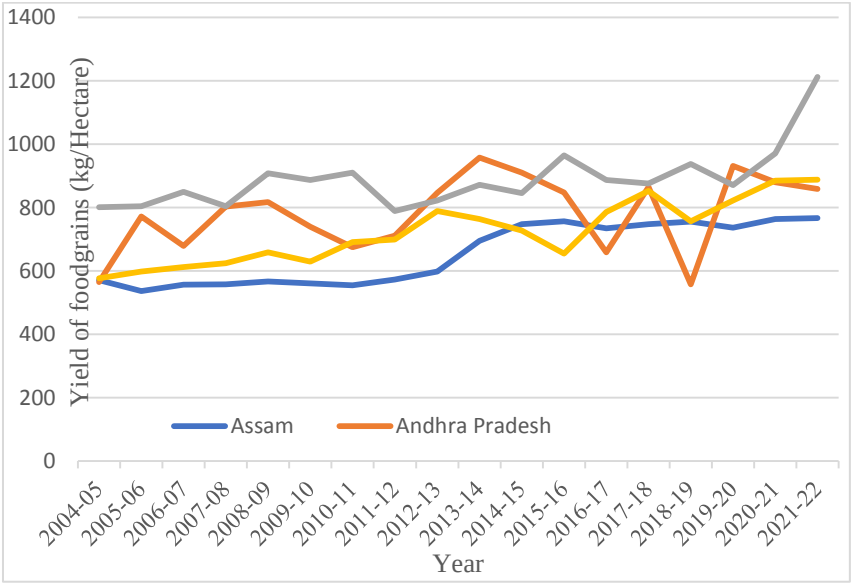

Table 3 is a clear indication that per hectare yield of total foodgrains in the state is comparatively less than two leading agriculture-based states of the country namely Andhra Pradesh and Punjab. Except two years 2014-15 and 2015-16, the productivity of agricultural land in terms of foodgrains production in Assam is even less than the national average for all the years from 2004-05 to 2021-22. Assam's productivity of land for foodgrains production is found much below the levels of Punjab. Similarly, for most of the years; Andhra Pradesh's land productivity is found better than that of Assam in the study period. This clearly indicates that land used for agricultural production need more attention to meet the goals of sustainability in the state.

Conclusion:

Linking land optimisation with sustainable development of a region has many challenges. Continuous pressure of population growth demands land for livelihood and for industrial production. At the same time, land is required for the production of agricultural goods to supply enough food for growing population without which living would be impossible. All these aspects, along with environmental issues, when addressed properly, brings about the sustainability aspect of development of a region. Such a study requires appropriate data in all above-mentioned dimensions. Along with these, proper policies from the government and development of consciousness and spread of education in connection with sustainable development among the stakeholders will certainly help to achieve the dream of sustainable development of the state.

In order to mitigate such challenges and ensure sustainability, a collaborative effort of the government, concerned agencies, government departments, policy makers etc can bring about positive results. Accordingly, certain positive changes like utilising uncultivable and barren lands can free up other lands suitable for cultivation. Moreover, forests being an indispensable resource for the future needs to be expanded and hence vigorous afforestation drives need to be implemented by the government so as to achieve sustainability. Again, other constructive measures may include bringing strict laws which prohibit conversion of agricultural lands to other lands. Further, an all-inclusive programme related to organic farming from sowing of seed to selling the product in the market should be supported and promoted by the government in the form of distributing seeds/saplings, providing loans and granting subsidies. Moreover, awareness regarding sustainable development must be created among the general public and the society.

Such endeavours as mentioned above will certainly bring desired results by achieving development, efficiency and sustainability of the region and thereby will offer a better way of living to the society in the days to come.

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Desiring Machines: Deleuzo-Guattarian Resistance to Machinic Enslavement

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Abstract:
This paper explores Gilles Deleuze and Félix Guattari's concept of *desiring-machines*, which presents desire as a productive force rather than stemming from lack. Desiring-machines operate within interconnected networks of biological, social, and technological elements, constantly forming new connections and producing new realities. The critique of the Oedipus complex and the expansive potential of desire are also examined. The concept of machinic enslavement is discussed, wherein desiring-machines are subordinated to dominant systems, limiting their potential. Strategies to counter this include lines of flight, deterritorialization and reterritorialization, forming new assemblages, and embracing a becoming-revolutionary mindset. The role of technology as a social machine is also highlighted. For an example, social media platforms are viewed as desiring-machines that produce and circulate desire. Challenges such as algorithmic control, perpetual performance, and data exploitation are discussed, along with strategies for creative resistance, including artistic subversion, community building, and advocacy. By embracing creativity and resistance, individuals and communities can break free from machinic enslavement in the digital era and unlock the productive potential of desire in a Deleuzo-Guattarian sense.
Keywords: Deleuze, Guattari, desiring machines, assemblage, becoming-revolutionary, machinic enslavement, sustainable development

Introduction:

Gilles Deleuze and Félix Guattari's concept of desiring-machines is a cornerstone of their collaborative work, particularly in *Anti-Oedipus: Capitalism and Schizophrenia* and *A Thousand Plateaus*. This concept challenges traditional psychoanalytic views of desire, presenting it as a productive force rather than a lack. Desiring-machines are integral to understanding how desire operates within individuals and society. Additionally, Deleuze and Guattari's ideas on resistance to machinic enslavement provide a framework for understanding how individuals and groups can resist oppressive systems and structures embedded in what they call Social Machines.

Desiring-Machines: An Overview

"…desire is always discussed in terms of machines: what we normally take as a desire to see a movie is in reality a mere result, a product of desiring-machines." (UD, 259)

Desiring-machines are not literal machines but abstract constructs that describe the processes of desire and production. Deleuze and Guattari argue that desire is inherently productive and that it operates through a network of interconnected machines. Traditional psychoanalysis, particularly the work of Sigmund Freud, views desire as a need that seeks fulfilment. In contrast, Deleuze and Guattari propose that desire is a productive force that generates reality. This shift from lack to production is fundamental to their philosophy. Desiring-machines are the mechanisms through which desire flows and produces reality. These machines are always in motion, connecting with other machines to create new assemblages and experiences. Desiring-machines do not operate in isolation. They are part of a larger network of machines that include biological, social, and technological elements. For example, a hungry person (desiring-machine) connects with food (another machine) to produce the act of eating. For this, other components such as cooking utensils and crockery are used. If desired, he may invite guests to share the meal. Together they form an *assemblage.* Their interconnectedness highlights the fluid and dynamic nature of desire. Another example is cited from the book *Understanding Deleuze, Understanding Modernism* by Paul Ardoin et al.:

"a court cannot be understood unless you take into account the entire social order wherein laws, law schools, lawyers, trespasses, and juries conduct a series of events through those desiring-machines—similarly, the desire to become a lawyer only testifies to a machinic investment within the entire assemblage of desiring-machines that produce lawyers and courts." (UD, 259)

Desiring-machines are thus, constantly forming new connections and assemblages, producing new realities and experiences. Going by Freudian theory, somehow the person's hunger and act of eating would be associated with the Oedipus Complex. In *Anti-Oedipus*, Deleuze and Guattari critique the Oedipal complex and the psychoanalytic framework that focuses on familial structures. They argue that the Oedipus complex is a form of repression that limits the productive potential of desire. Desiring-machines, in contrast, operate outside of these repressive structures, allowing for a more expansive and creative understanding of desire.

Desiring Machines vs. Social Machines:

In order to understand the significance of Desiring Machines, we may place them in

opposition to Social Machines. The latter is defined as "configurations that the desiring-machines form according to the laws of large numbers" (AO, 287) Desiring machines are the productive forces that generate desire and reality at a micro level, while social machines are the regulatory structures that organize and control these forces at a macro level. Both are interconnected and influence each other, shaping the dynamics of desire and production within society. The following features characterize desiring-machines:

1. **Productive Nature:**
- Desiring machines are fundamentally productive. They generate reality by connecting with other machines and creating new assemblages and experiences.
- Desire is seen as a positive force, not a lack. It is always in motion, producing new flows and connections.

2**. Interconnectedness:**
- Desiring machines do not function in isolation. They are part of a larger network that includes biological, social, and technological elements.

3. **Micro-Level Operations:**
- Desiring machines operate at a molecular level, focusing on the microphysics of desire. They are concerned with the small-scale, individual processes that generate desire and production.

Social machines, on the other hand, refer to the larger structures and systems within society that organize and regulate desiring machines. Mentioned below are some fundamental characteristics:

1. **Regulatory Function:**
- Social machines are responsible for organizing and controlling the flow of desire produced by desiring machines.
- They include institutions, norms, and social practices that shape and regulate individual and collective behavior.

2. **Macro-Level Operations:**
- Social machines operate at a molar level, focusing on large-scale structures and systems. They are concerned with the broader, societal processes that control desire. For example, capitalistic models.

3**. Interdependence with Desiring Machines:**
- There is a constant interaction between desiring machines and social machines. Desiring machines produce the flows of desire that social machines regulate and control.
- Social machines, in turn, influence the operation of desiring machines by shaping the context in which they function.

For an example, contextualizing the case of Social Media Platforms in the light of the above-mentioned differences, these can be seen as desiring-machines that produce and circulate desire. Users' posts, likes, comments, and shares are all part of a continuous flow of desire, creating a network of interactions and connections. At the same time, certain characteristics qualify them as 'social machines':

1. **Algorithmic Control:**
- Social media platforms use algorithms to curate content, prioritize posts, and suggest interactions. These algorithms shape user behavior by promoting certain types of content and interactions, while suppressing others.
- Users become ensnared in a feedback loop where their actions are continuously monitored, analyzed, and influenced by the platform's algorithms. This can lead to a form of enslavement where users' desires and behaviors are shaped by the platform's goals rather than their own.

2**. Perpetual Performance:**
- Social media encourages users to constantly perform and present themselves in ways that garner likes, comments, and shares. This creates a cycle of endless self-presentation and validation-seeking.
- The pressure to maintain a certain image or level of engagement can lead to anxiety and stress, as users feel compelled to conform to the platform's standards and expectations.

3. **Data Exploitation:**
- Social media platforms collect vast amounts of data on user behavior, preferences, and interactions. This data is used to refine algorithms, target advertisements, and generate profit for the platform.
- Users' personal information and online activities are commodified, turning them into products for the platform's benefit. This exploitation of data further entrenches users in the system of machinic enslavement.

On social media, therefore, two dimensions may be underscored: the users' posts, likes, comments, and shares can be seen as desiring machines. These actions produce and circulate desire, creating a network of interactions and connections. Whereas, the algorithms, community guidelines, and platform policies of social media platforms function as social machines. They regulate and control the flow of desire by promoting certain types of content and interactions while suppressing others.

Resistance to Machinic Enslavement:

"We distinguish machinic enslavement and social subjection as two separate concepts. There is enslavement when human beings themselves are constituent pieces of a machine that they compose among themselves and with other things (animals, tools), under the control and direction of a higher unity. But there is subjection when the higher unity constitutes the human being as a subject linked to a now exterior object, which can be an animal, a tool,

or even a machine. The human being is no longer a component of the machine but a worker, a user. He or she is subjected to the machine and no longer enslaved by the machine." (ATP, 456-457)

Machinic enslavement occurs when desiring-machines and social machines are subordinated to a dominant system or regulatory function, limiting their potential and creativity. Deleuze and Guattari propose several strategies to counter machinic enslavement, emphasizing creativity, resistance, and continuous transformation. They suggest the following ideas to support their counter-political philosophy:

1. **Lines of Flight:**

These are paths of escape or transformation that allow individuals and groups to break free from oppressive systems. In the context of social media, for example, lines of flight could involve finding new ways to use platforms creatively, subverting their intended purposes, or even creating alternative platforms that prioritize user autonomy and creativity.

2. **Deterritorialization and Reterritorialization:**

Deterritorialization involves breaking down existing structures and norms that constrain desire and creativity. Reterritorialization, on the other hand, involves creating new structures and norms that better align with liberated desires and potentials. Users can challenge dominant narratives and norms on social media by creating content that defies conventional expectations and promotes new ways of thinking and interacting.

3. **Assemblages:**

Assemblages are dynamic networks of relationships that include both human and non-human elements. By forming new assemblages, such as communities or networks that prioritize collective creativity and resistance, users can create spaces that resist machinic enslavement.

4. **Becoming-Revolutionary:**

This involves a continuous process of transformation and resistance against oppressive systems. Users can engage in ongoing acts of resistance and creativity, constantly seeking new ways to challenge and subvert the constraints imposed by social media platforms.

Revolutionary Potential of Desiring Machines

Desiring machines, as conceptualized by Deleuze and Guattari, are imbued with significant revolutionary potential due to their inherent productivity and capacity to generate new realities. Here are some key aspects of their revolutionary potential:

1. **Subversion of Traditional Structures:**

- Desiring machines challenge traditional psychoanalytic and societal structures by presenting desire as a productive force rather than a lack. This subversion allows for a rethinking of how desire operates within individuals and society, opening up new possibilities for creativity and transformation.

- By operating outside of repressive structures like the Oedipal complex, desiring machines enable individuals to explore and express their desires more freely, fostering a more expansive and inclusive understanding of human potential.

2**. Continuous Creation and Innovation:**

- Desiring machines are constantly in motion, forming new connections and assemblages. This continuous process of creation and innovation disrupts static and hierarchical systems, promoting fluidity and change.

- In practical terms, this can lead to the development of new technologies, artistic expressions, and social practices that challenge the status quo and offer alternative ways of living and interacting.

3. Resistance to Machinic Enslavement:

- Desiring machines resist machinic enslavement by continuously seeking lines of flight—paths of escape or transformation that break free from oppressive systems. This resistance is not a one-time event but an ongoing process of deterritorialization and reterritorialization, where existing structures are dismantled and new, more liberating ones are created.

- This dynamic resistance can inspire social movements, grassroots activism, and other forms of collective action that challenge dominant power structures and advocate for more equitable and just societies.

4**. Empowerment of Individual and Collective Agency:**

- Desiring machines empower individuals and communities by emphasizing the productive potential of desire. This empowerment encourages people to take control of their own desires and destinies, fostering a sense of agency and autonomy.

- Collective assemblages of desiring machines can create powerful networks of resistance and creativity, enabling communities to organize, collaborate, and enact meaningful change.

5. **Application to Contemporary Issues:**

- The revolutionary potential of desiring machines can be applied to contemporary issues such as environmental sustainability, social justice, and digital freedom. For example, the creation of green technologies and sustainable practices can be seen as the result of desiring machines that connect human creativity with environmental needs.

- In the digital realm, desiring machines can drive the development of alternative social media platforms and digital tools that prioritize user autonomy, privacy, and creativity, challenging the exploitative practices of mainstream platforms.

Thus, the revolutionary potential of desiring machines lies in their ability to subvert traditional structures, promote continuous creation and

innovation, resist machinic enslavement, empower individual and collective agency, and address contemporary issues. By harnessing the productive force of desire, desiring machines offer a powerful framework for imagining and enacting transformative change in various aspects of life and society.

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Exploring Tourists Perceptions And Attitude Towards Responsible Tourism With Special Reference To Himachal Pradesh

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Abstract:
In Himachal Pradesh, a state known for its natural beauty and rich cultural legacy but experiencing serious difficulties as a result of the tourism industry's explosive expansion, this research investigates tourists' views and attitudes towards responsible tourism. Examining the elements affecting tourists' attitudes and actions towards sustainable practices in the context of Himachal Pradesh tourism, as well as their knowledge and comprehension of responsible tourism concepts, are the main goals of the study.
Keywords: Responsible tourism, tourists, perception, sustainability, Himachal Pradesh, awareness, attitudes, behaviour

Introduction:

India's Himachal Pradesh is a beautiful state known for its dynamic local communities, breathtaking scenery, and rich cultural legacy. It is tucked away in the Himalayas. Himachal Pradesh is one of the most visited tourist destinations in India, drawing millions of travellers each year who come for the majestic mountains and valleys, peace, and spiritual renewal. But the sudden surge of visitors has sparked worries about the region's tourism-related socio-economic injustices, cultural deterioration, and environmental effects. Around the world, tourism has become a major factor in both economic expansion and cross-cultural interchange; this is also the case in India. It has been suggested that responsible tourism, which emphasizes sustainability and moral travel behaviour, can help to reduce these negative effects while encouraging beneficial contributions to the surroundings and local communities. This study investigates how tourists in Himachal Pradesh see and feel about responsible tourism. It is important to comprehend these views because they may help policymakers, travel agencies, and local communities create plans that reflect the values and expectations of travellers and, in the end, promote a more sustainable tourism sector. The goal of responsible tourism is to increase the positive aspects of travel while reducing its detrimental consequences on the environment, nearby communities, and cultural heritage. It entails making moral decisions that are advantageous to the community and its residents on both a social and environmental level.

Principles of Responsible Tourism include:

- Minimizing environmental impact: This involves reducing waste, conserving resources, and supporting eco-friendly practices.
- Respecting local cultures and traditions: Travelers are encouraged to engage with local communities, learn about their customs, and support local businesses.
- Supporting local economies: Choosing locally-owned accommodations, restaurants, and tour operators helps to ensure that tourism income stay within the community.
- Preserving natural and cultural heritage: Responsible tourists strive to protect and conserve the natural environment, wildlife, and historical sites of a destination.
- Promoting social responsibility: Travelers are encouraged to respect local laws, customs, and traditions, and to contribute positively to the communities they visit.

Objective:

To examine the tourist perception and attitude towards responsible tourism and sustainable practices in Himachal Pradesh.

Literature Review

A New Era of Responsibility in Tourism

Cheer, Ting, and Leong (2021) talked about how the idea of responsible tourism is changing in light of the global trend towards more moral and environmentally friendly travel habits. Their research focused on how responsible tourism might help address modern issues including socioeconomic inequity, over-tourism, and climate change. It has been discovered that worldwide trends and the growing availability of knowledge about sustainable travel options influence tourists' opinions of responsible tourism. According to the research, tourists are more likely to adopt responsible attitudes and behaviours when they become more aware of their influence. This is important for the sustainable development of tourism in places like Himachal Pradesh.

Regional Cuisine and Destination Development

Sharma, Pal, and Singh (2022) investigated how Himachal Pradesh's local food may be used as a strategy for destination development. Their research emphasised how regional cuisine enhances the traveller experience and strengthens the bond between tourists and the location. According to the research, visitors who experience local food are

more likely to adopt a favourable viewpoint about sustainable behaviours, such as minimising their environmental impact and patronising small businesses in the area. Given the link between culinary tourism and responsible tourism, highlighting local cuisine may be a useful tactic for improving travellers' opinions on environmentally friendly behaviour.

Eco and Sustainable Tourism Practices

Specifically, Nag et al. (2024) looked at how ecotourism and sustainable tourism practices improved local well-being and nurtured the environment in Himachal Pradesh. According to the report, travellers are becoming more conscious of the social and environmental effects of their trips and are eager to take part in initiatives that advance environmental preservation and the well-being of local communities. The study shows that travellers are becoming more conscious of their travel habits and travelling responsibly to make a good impact on the places they visit. Because it is in line with the region's objectives for the preservation of its natural and cultural heritage, this change in visitor attitudes is essential to the sustained growth of tourism in Himachal Pradesh.

Rural Tourism and Local Development

In their 2015 study, Katoch and Gautam examined the contribution of rural tourism to local development in Kangra, Himachal Pradesh, and villages surrounding Dharamshala. The significance of responsible tourism in promoting economic prospects for rural communities while safeguarding their cultural and environmental assets was underscored by their study. It was discovered that visitors' impressions of rural tourism were shaped by their contacts with the locals and their experiences with genuine local culture. According to the research, travellers who value these kinds of experiences are more likely to be in favour of responsible tourism behaviours, such as honouring regional traditions and boosting the local economy.

Impact of Responsible Tourism on Destination Sustainability

Mathew and Sreejesh (2017) evaluated how responsible tourism affected both the local people's standard of living and the sustainability of tourism destinations. The long-term sustainability of destinations is greatly enhanced by responsible tourism practices, according to their study, which was carried out in several tourist sites, including Himachal Pradesh. Travellers' awareness of environmental and social challenges, as well as their desire to effect good change, shaped their views towards responsible tourism. According to the research, travellers' perceptions of and desire to participate in sustainable activities can be improved by teaching them about the advantages of responsible tourism.

Methodology

Quantitative research design, using structured questionnaires to collect data from tourists visiting key destinations such as Shimla in Himachal Pradesh. The questionnaire was designed to measure tourist's awareness and understanding of responsible tourism principles, as well as their attitudes and behaviours towards sustainable practices.

Data Interpretation:

A total of 145 tourists 97.9% of whom were Indian were invited to complete standardised questionnaires regarding responsible tourism in Himachal Pradesh. Most of the visitors were between the ages of 18 and 30, then 31 to 45, or 87 and 42, in that order. Women made up 61.4% of the participants. Data reveals that the educational attainment of tourists was as previously stated: 16.6% of tourists held a professional degree, 40.4% possessed a graduation degree, 21.4% had a secondary degree, and 20.7% had a post-graduate degree.

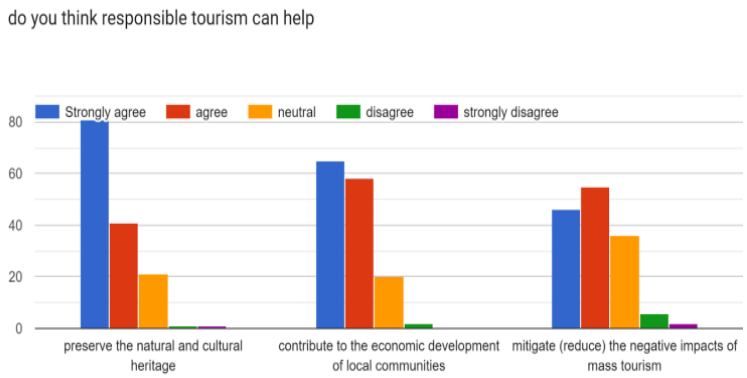

Figure 1

Figure 1 shows the responses to what respondents think about responsible tourism can help preserve the natural and cultural heritage around 81 strongly agreed with the statement and 41

agreed and 21 were neutral. Responsible tourism contributes to the economic development of local communities majority strongly agreed and agreed to the statement i.e. 65 and 58 respectively where as 20 were neutral. About 55 agreed and 46 strongly agreed whereas 36 responded neutrally to the thought that responsible tourism can help mitigate the negative impacts of mass tourism.

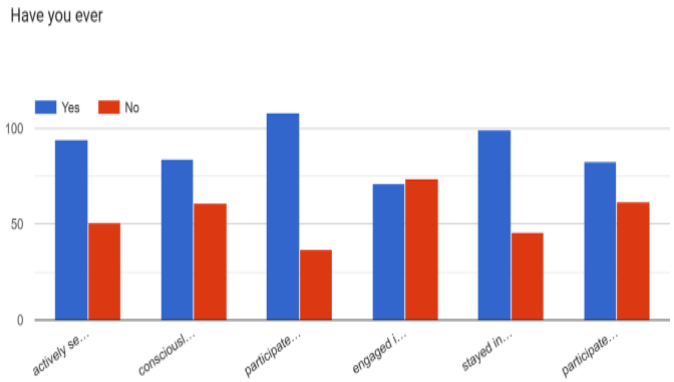

Figure 2

In the above figure 2 large number of participants i.e. 92 have actively sought out information about sustainable practices before visiting a destination. Around 84 consciously choose accommodations that promote sustainable practices during their stay.108 out of 145 tourists participated in responsible trekking or hiking tours. 71 participants engaged in any wildlife conservation activities during the visit. Tourist participants in tree planting and who stayed in an eco-friendly accommodation were 83 and 99 respectively.

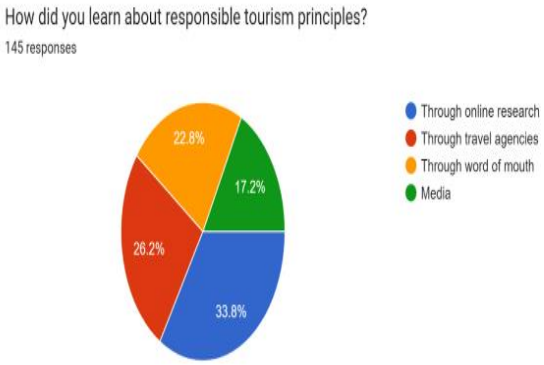

Figure 3

Figure 3 shows how the respondents learned about responsible tourism principles where 33.8% through online research followed by travel agencies i.e. 26.2%, 22.8% through word of mouth and 17.2% by media.

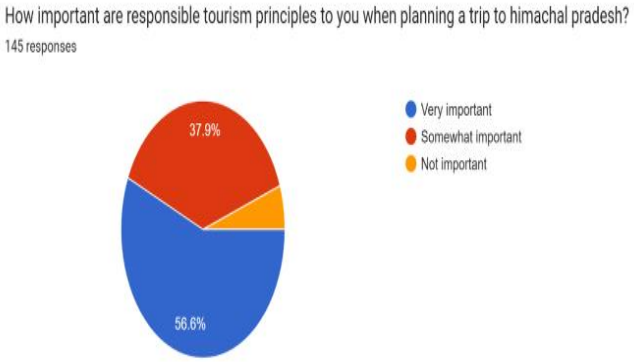

Figure 4

Figure 4 shows how important are responsible tourism principles to tourists when planning a trip to Himachal Pradesh where for 82 it is very important,55 somewhat important and for 8 it is not important.

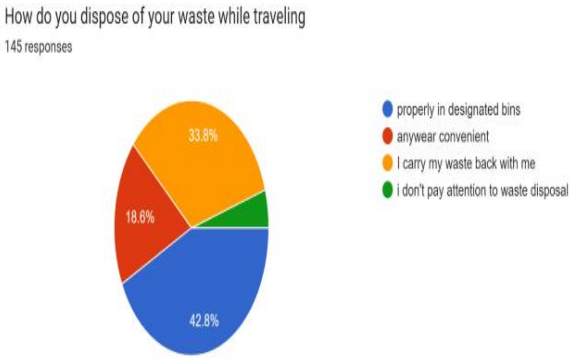

Figure 5

The above figure 5 shows how tourists dispose of waste while travelling where it was observed that 42.8% properly in designated bins, 33.8% carry waste with them 18.6% dispose of it anywhere convenient and the rest 4.8% don't pay attention to waste disposal.

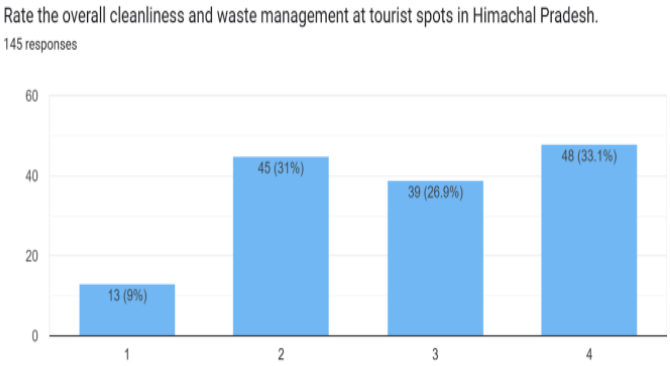

Figure 6

Figure 6 shows the overall rating of cleanliness and waste management at tourist spots in Himachal Pradesh where there was a thin line difference between 4 and 2 rating i.e. 33.1% and 31% followed by 3rd which is 26.9%.

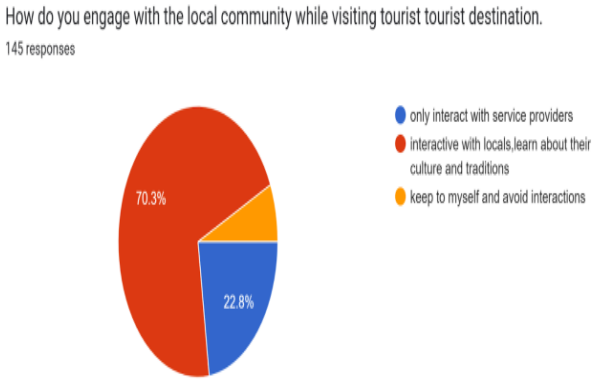

Figure 7

How tourists engage with the local community while visiting tourist destinations is shown in Figure 7 where 70.3% interact with locals, and learn about their culture and traditions, 22.8%

only interact with service providers and 6.9% avoid interaction.

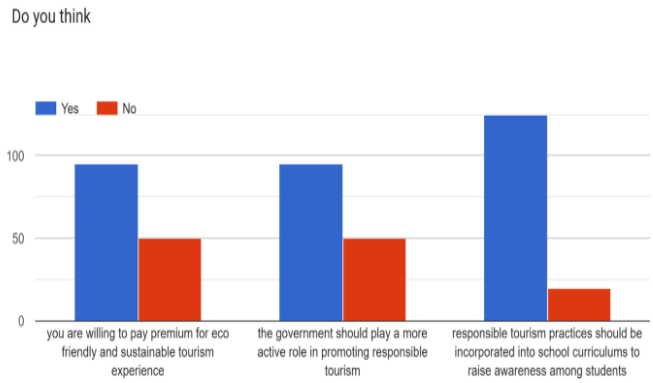

Figure 8

Figure 8 shows the tourists' perception of whether they are willing to pay a premium for an eco-friendly and sustainable tourism experience was 95. According to 95, the government should play a more active role in promoting responsible tourism. 125 think that responsible tourism practices should be incorporated into school curriculums to raise awareness among students.

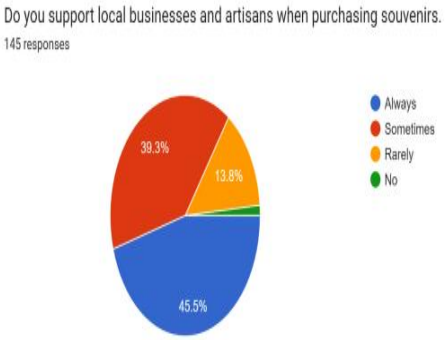

Figure 9

The above figure 9 shows that around 45.5% always, 39.3% sometimes and 13.8% rarely support local businesses and artisans when purchasing souvenirs.

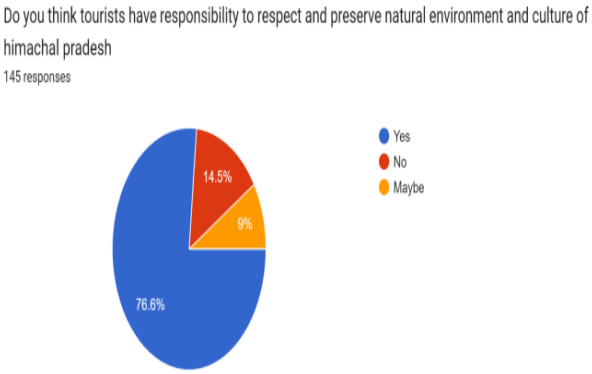

Figure 10

In Figure 10 we can observe that 111 of the 145 tourists think that they have the responsibility to respect and preserve the natural environment and culture of Himachal Pradesh.

Result

Tourist awareness and understanding of responsible tourism: The data revealed that a significant portion of tourists are aware of the basic principles of responsible tourism, though there is considerable variation in the depth of understanding.

Tourists with higher levels of education demonstrated better awareness.

Factors influencing attitudes and behaviours: The results indicate that factors such as age, education level, prior travel experience and environmental consciousness significantly influence tourist's attitudes towards responsible tourism. Younger tourists are more likely to engage in sustainable practices.

Discussion

Implication for tourism in Himachal Pradesh: The results indicate that raising tourists' awareness of responsible tourism can greatly improve their willingness to participate in environmentally friendly activities. This emphasises the necessity of marketing campaigns and educational programs to educate travellers on the value of responsible travel.

Recommendation for stakeholders: It is advised that travel agencies, legislators, and local communities in Himachal Pradesh work together to create comprehensive programs for responsible tourism in light of the findings. Campaigns to raise awareness, the marketing of environmental friendly travel and lodging options, and the development of infrastructure to facilitate sustainable tourism should all be part of these tactics.

Suggestions for tourists:

- Research your destination: Learn about the local culture, customs, and environmental issues before you travel. This will help you better understand how to respect and support the local community.
- Choose eco-friendly accommodations: Look for hotels, lodges, or guesthouses that have sustainable practices in place, such as recycling programs, energy-efficient systems, and water conservation measures.
- Support local businesses: Eat at local restaurants, shop at markets, and book tours with locally-owned operators to support the local economy and promote cultural exchange.
- Minimize waste: Bring a reusable water bottle, refuse single-use plastics, and dispose of waste properly by recycling or using designated bins.
- Respect wildlife: Avoid activities that exploit or harm animals. Choose responsible wildlife tours that prioritize animal welfare and conservation.
- Conserve resources: Be mindful of your water and energy usage while travelling. Turn off lights when not in use, and use public transportation or walk.
- Engage with the local community: Learn a few words in the local language, interact with locals respectfully, and participate in cultural activities to gain a deeper understanding of the destination.
- Leave no trace: Follow the principles of "Leave No Trace" by packing out your trash, staying on designated trails, and respecting wildlife and natural habitats.

Conclusion

This study has provided valuable insight into tourist's perceptions and attitudes towards responsible tourism in Himachal Pradesh. By confirming the positive relationship between awareness and sustainable behaviours, the research underscores the importance of education and awareness in promoting responsible tourism. Future research should explore long-term strategies for sustaining responsible tourism practices in the region.

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A Survey on Women and Work Environment Challenges in Chandrapur City

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DOI- 10.5281/zenodo.13848213

Abstract:

The role of women in the workforce has evolved significantly over the centuries, transforming from traditional domestic responsibilities to diverse participation across various industries. Despite this progress, women continue to face numerous challenges in the workplace, ranging from systemic inequalities to pervasive discrimination. These challenges not only affect women's career advancement and job satisfaction but also have broader implications for economic growth and social equality. This research paper aims to explore the multifaceted challenges that women face in today's work environments. By examining historical trends, current issues, and potential solutions, this paper seeks to provide a comprehensive understanding of the barriers women encounter and the efforts needed to overcome them. In doing so, this paper will contribute to the ongoing conversation about gender equality and the critical steps needed to create a more inclusive and supportive work environment for all women.

The universe of the study covers whole Chandrapur city as its population. The sampling is selected by using convenient sampling and the sample size is confined as 60.

Keywords: Working Women, Work Environment, Labour force, Challenges

Introduction:

The concept of gender equality in the workplace is often celebrated in theory, but in practice, it remains an elusive goal. Although there have been significant strides in promoting women's rights and representation in the workforce, issues such as the gender pay gap, underrepresentation in leadership positions, and workplace harassment persist it further complicates the experiences of many women, leading to unique challenges that are often overlooked in mainstream discussions Women excel in all fields including space exploration and rocket science also apart from other fields. Women play a vital role in economic development of the country and their contribution is nothing short of their male counterparts. However there are still several issues and problems that women face today. Sometimes, they are not treated equally in their workplace and are considered as inferior to their male co-workers. In some cases they do not get the same benefits as that of a male employee. The major issues and problems that women face in their work places includes unequal pay, security, sexual harassment, lack of proper family support, deficient maternity leave, etc. The world of Working women in India are faced with lot more challenges than their counterparts in the other parts of the world. It has been anticipated that to fulfill multiple roles simultaneously would result in increased stress and hence women are facing competition and challenges at workplace, home and society. Now with their increasing need for getting some income for the family, they have to work all the more harder. They have to take up a full day job plus handle all the household chores that they handled as a homemaker. If they happened to work in a highly pressurized environment, then they will bring home their work and that cuts few more hours of sleep. It is not just about the reduced sleep, but such a lifestyle builds stress. This stress is passed on to the family and frustration level builds up in the family. They have to handle harassment's at their work place, sometimes just over look things to ensure that their job is not jeopardized in anyway.

According to the World Economic Forum it will take another 132 years to close the gender pay gap globally, additionally COVID-19 pandemic has further highlighted gender inequality in the workplace, with women being disproportionately impacted by job losses and reduced working hours.

About Chandrapur:

Fort city of Chandrapur is of historical importance, it was set up by Gond King Khandkya Ballal Shah in 13th Century. The city is situated on the banks of Irai river on one side and Zarpat river on the other. It is the district headquarters of Chandrapur district. It is famous for TADOBA National TIGER RESERVE just a 37 kms from heart of the city. The area of Chandrapur is rich with Coal, Lime Stone as well as other important minerals and High quality Bamboo forests. The important industries in this region include Ballarpur Industries Limited (BGPPL), Aditya Birla Group Cement Factory, ACC Cement, Gujjrat Ambuja Cement, ManikGargh Cement (a house of Basant Kumar Birla) to name a few. Earlier Chandrapur was a Nagar Palika now it is a Muncipal Corporation with a population around 3,50,000 .

Review of literature:

1) ***Begin Boldly*** **by Christie Hunter Arscott**

2) Working Women: Issues And Challenges

By Kavita Mishra

Objective of the Study

1) To study the Specific challenges faced by Working Women
2) To study the gender bias at the work place
3) To Study the negative attitude of the society.

Need for the study:

The difficulties that females face in balancing personal and professional life are analyzed by carrying out a survey.

Hypothesis

1) The prospects of working women are positive
2) There is support from family

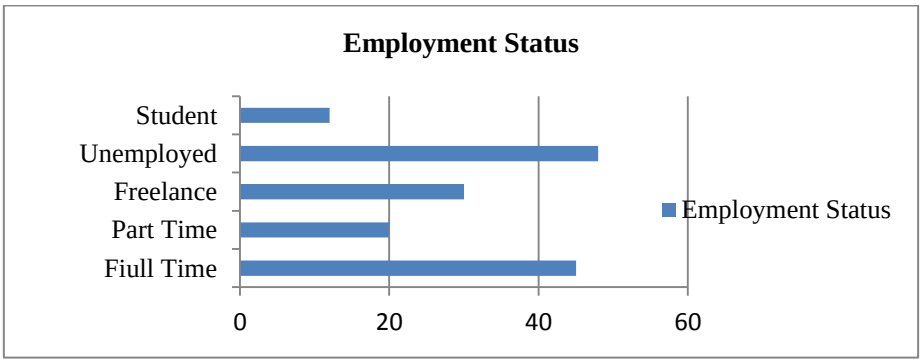
Research Methodology

The study under taken is descriptive in nature, for the collection of data different recourses were used. Primary data collection methods can be divided into two groups: quantitative and qualitative. Primary data was collected through close ended questionnaire.

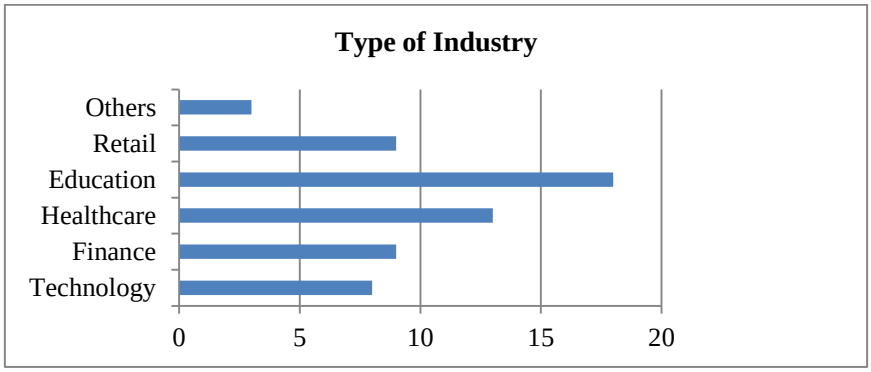
Sampling: - The universe of the study covers whole Chandrapur city as its population. The sampling is selected by using convenient sampling and the sample size was confined to 60.

Data Analysis:

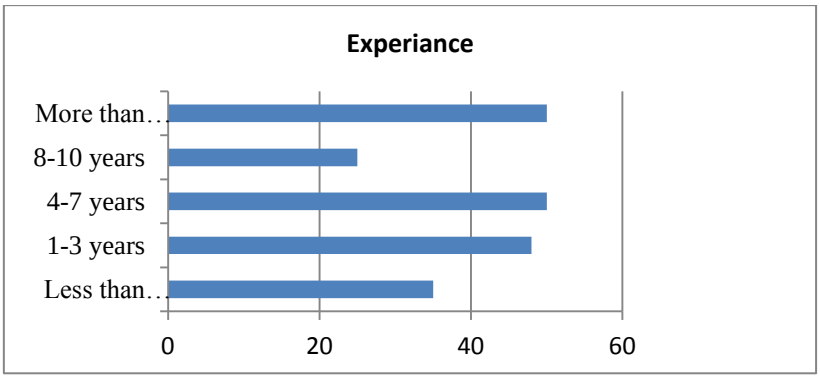
Employment statuses?



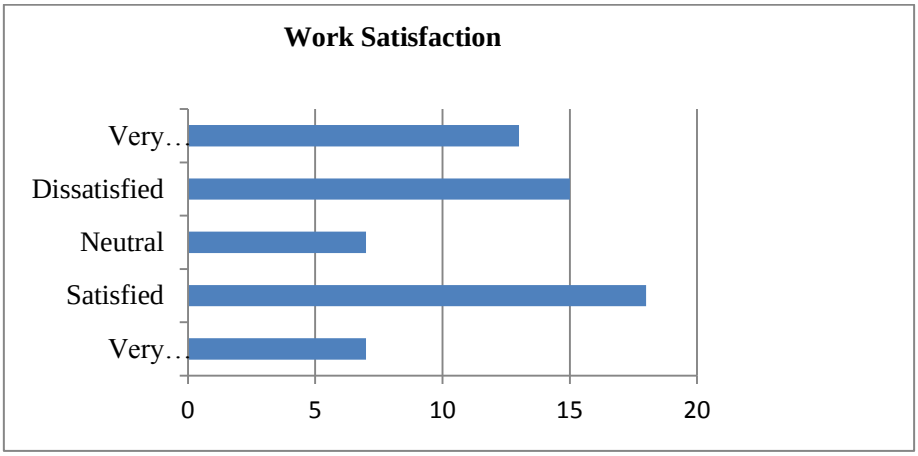
Type of Industry?



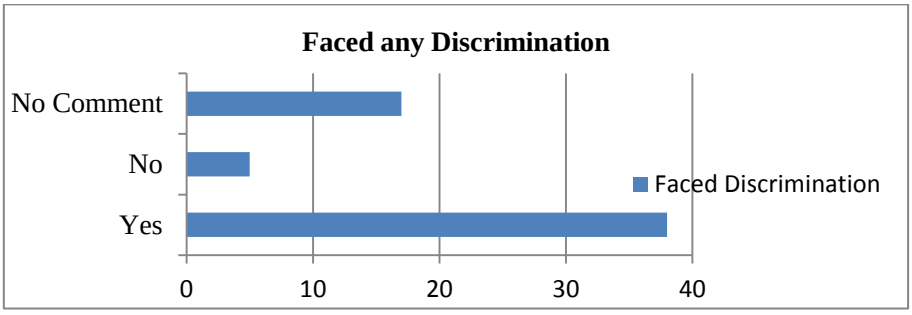
Experience in years



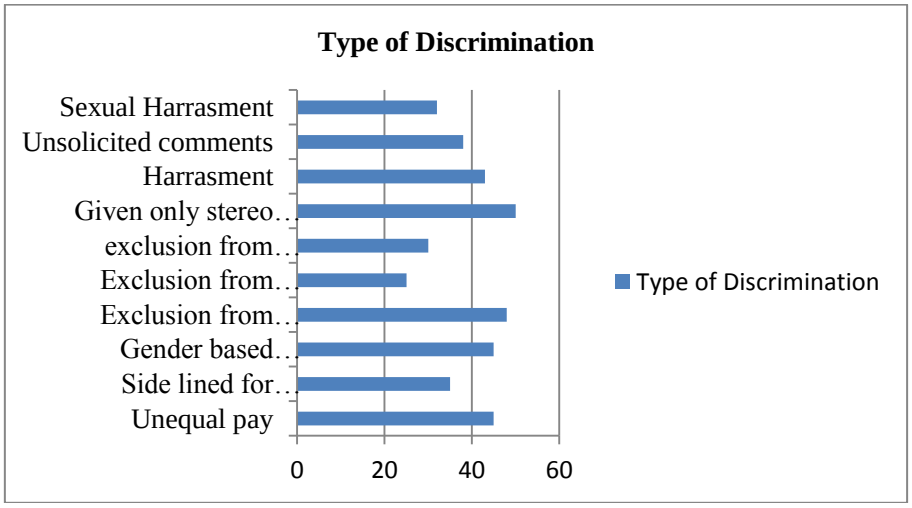
Are satisfied with present Work Environment?



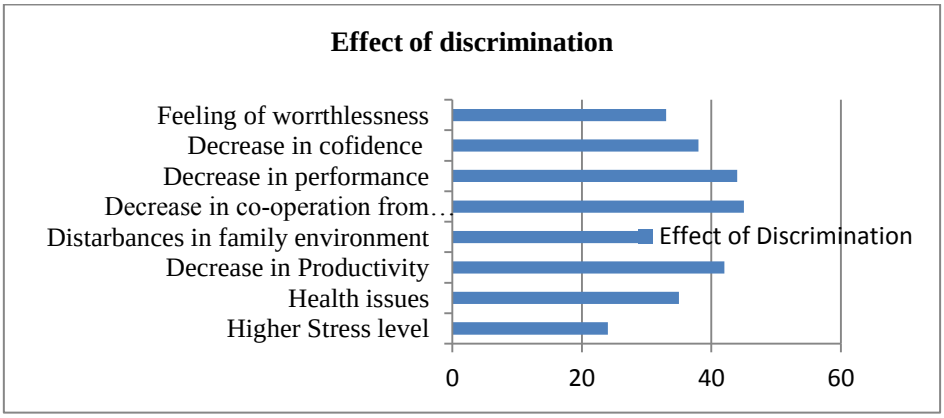
Did you face any discrimination?



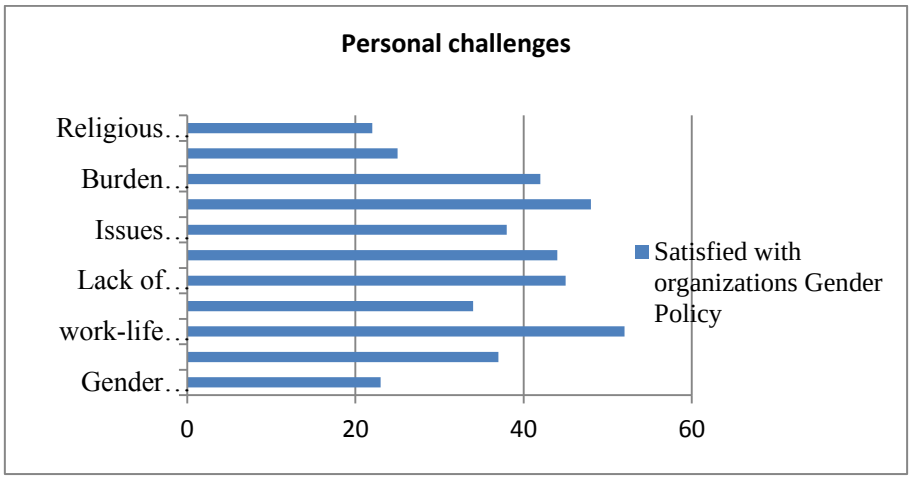
What form of discrimination prevails at the work place?



What is the effect of discrimination?



What type of personal challenges do you face?



Findings:

Work place discrimination

- Women do face discrimination in the work environment
- Basis of harassment is mostly gender based.
- They are not given a chance to prove their caliber.
- There is issue of personal safety.

Adverse effect of discrimination

- Higher stress level
- Effect on health
- Reduced performance level
- Less co-operation from colleagues
- Disturbances in family environment

Conclusion:

Women make up nearly half of the global work force failing to address these issues means losing out on their potential contributions to economic growth and development. Addressing issues regularly faced by women in the work place requires a multifaceted approach that involve not just employees but also policy makers and society at large. By promoting gender equality and creating inclusive work environment, we can ensure that women have equal opportunities to succeed and thrive in their chosen careers. This in turn benefits individuals, businesses and society as a whole, creating more prosperous future for all.

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A psychological review of the Srimad Bhagavad Geeta

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Abstract:

The sacred Geeta is not only a book of religion and philosophy but also a timeless clinical guide to psychiatry. Most of the great writer, philosopher, atomic scientist, critic, intellectual, academician, scholar, pioneer India & world criticised about the Geeta. However although the field of western psychology has expanded in this way. Verse 700 of the Geeta there are 18th chapters it has two speakers. The main speaker is Lord Krishna and the main listener is Arjuna. The secondary speaker is Sanjoy and the secondary listener is Dhritarashtra.

Respectively, in the first chapter of the Geeta, psychological problems are expressed through Arjuna . The treatment of their mental disorder is started by Lord Krishna in the eleventh verse of the second chapter fear and anxiety are the main source of depression among the fears deaths is the most frightening . The Geeta begins with the knowledge of the inequality of the soul, psychological medicine also includes, cognitive therapies to treat mental illness. For the realization of self-knowledge, self-realization of life is not possible until wisdom consciousness arises ignorance obscures the meaning of life. The Geeta begins with sadness the complete opposite salvation, light on one side and the darkness on the other. The dark side of the mind is called 'sadness' and the light side is called 'supreme peace' or bliss for life.

So my Research paper discussed introduction part of the Geeta is not only ordinary book I established as a very significant part of our life, other part I discussed origin as development of Indian psychology and analytical study of core part & psychological review of the Geeta and lastly as a result will be focus Lord Krishna is the first psychologist in the world . we have limited the Geeta devotion and bound to universal eternal possibilities with emotion. This is the opposite of Geeta worship analytical empirical interpretation and application of the Geeta should be introduced to make the traditional method of trading the Geeta dynamic and practical in today's society.

Keywords: Psychology, Geeta, Sadness, Peach

Introduction:

The Geeta, which originated on the eve of the Battle of Kurukshetra, dates back to around 2500 BC. The present edited form of the Geeta, consisting of 700 verses, was probably completed in 500-400 BC[1].

The incomparable appreciation of the ideals of the Geeta among Western intellectuals brought up in modern civilization as well as in Asia is very important and a matter of great pride for Indians and ultimately for Hindus in 1745,Charles Bilkins made the first English translation and interpretation of the Geeta. A valuable preface was written by Warren Hastings. The Geeta has been translated by the philosophers George Friedrich Hegel, Arthur Schopenhauer, J.H. Mc Carthy, and others. G.S. Harder, Paul Duchene, Herman von ,Kechaling, the linguist Humboldt[2],the famous writer Balt Whitman, Aldox Huxley, Christopher Isherod, the mystic Bodolf Steiner, the leader of the Theosophy Society Anne Besant In addition, the famous Nobel Prize-winning poet and play wright T.S. Eliot said: "That balance of mind which which a highly civilized individual such as Arjuna, the hero of the Bhagawat Geeta can maintain in ac-tion[3]" J.W. Howar, a German Sanskrit scholar and pioneer of yoga teaching, wrote: "The Geeta gives us not only profound insight that are valid for all times and for all religious life. Here spirit is at work belongs to our spirit[4]" The German philosopher who translated the Geeta into Latin. W.Schlegel writes in the introduction. "O thou sacred singer…..I salute thee above all singers and I worship unceas-ing by the trace of thy footsteps[5]"The famous American writer David Thoreau considered the Geeta to he commented on the Geeta: "In the morning I bathe my intellect in the stupendous and cosmological philosophy of the Bhagavad Geeta[6]" Apart from these, the scientist Einstein and the atomic scientist Oppenhammer also respected and studied the Geeta with reverence. The Geeta is not only a book of religion and philosophy but also, a timeless clinical guide to Psychiatry.

Origins and Development of Indian Psychology:

Indian psychology is very ancient and different from modern Western Psychology. Modern Western psychology is still divided into many branches. Its independent discipline has only emerged since 1879, but the peace of development has been very rapid and several communities have emerged in the name of psychology. However, although the field of Western Psychology has expanded in this way, it remains confined to a limitation. This is because this stream of psychology is limited to the study of mental processes such as sensation, anxiety, perception, imagination, judgment. Memory, etc. and the physical causes and physical conditions that produce them. They believe

that all the knowledge we have acquired is only a charge of excitement generated by nerves in specific centers of the brain in collaboration with the senses. They regard mental thoughts and feelings as the actions and reactions of the physical theory of the brain. "They believe that sensation and consciousness are the functions of the cerebral cortex of the brain. The brain they do not acknowledge that there is a separate entity called mind or soul besides actions[7]," On the other hand, the views of Modern Psychology are Western.

In corporated in the style of psychology, the traditional time less flow is understood. However many western scholars who have studied Indian yoga such as George Feuberstein Ken Wilber Jabald Jemes Larson, Bosec Printe etc. Have left behind many valuables writings respecting the timeless flow of Indian Psychology[8] the flow of Indian psychology begins in the Rig Veda, the oldest book in the world[9] and its movement is embedded in the spiritual practices of Hinduism, Buddhism and Jainism Indian psychology emphasizes the physical body and the five senses as well as the mind as the sixth sense and Beyond it the soul, the three elements(sattva,Raja, tama), the five cells ,etc. For the study of human behaviour or personality. He also discovered the techniques of Knowledge, devotion and karma yoga for the attainment of a strong body, healthy mind and spiritual welfare. It is expanded in the Upsnishadic texts. The Agama scriptures of Jainism, such as the Sthanga, Sutrakritanga and Bhagavati sutra, discuss psychology in detail[10] He has reviewed the analysis of psychology in meditation -orientated works such as Dharmmapada of Buddhist Literature and the Abhidharma kosha[11] with a very extensive and serious insight. Mental illness treatment is extensively discussed in Ayurvedic texts such as Charaka and Sushruta . The Atharav Veda was the source of Ayurvedic treatment of mental illness. The purpose of the Atharve Veda is to guide the means of human welfare. According to this Veda, there are four physical elements in the human personality Veta, Pitta, Sleshma and Kaph. These four principles are the state of good health. Therefore, it is important to understand the importance of the three modes of nature (Sattva,Raja and Tama) in the development of a healthy and strong personality[12] Yoga is essential in the Indian educational tradition to build a healthy and strong personality. Hatha. Yoga, Mantra Yoga, Laya Yoga, Karma-Bhakti-Jnana Yoga etc. Were invented by Indian sages to give fulfillment to life. The review of the psychology occupies a vest Field in the Nyaya of Rishi Gautama,the Vedanta Of Vadrayana, the Mimansa of Jaimini, the Yoga of Patanjali and the Vaisheshika philosophy of Kanda[13] This Indian philosophy can be called psycho spiritual technology in modern terms. According to the Western yogi, Gorge Forten opinion ancient Indian psychology was 'psychospiritual technology in applied knowledge and wisdom. The larger evolutionary destiny of mankind by fostering the psycho spiritual maturation of the individual[14].

From the mid-19th century, Ramakrishna Paramahansa, Swami Vivekananda, Rabindranath Tagore, Mahatma Gandhi and Sri Arvind Focused on Indian psychiatry. In modern times, Indian methods were welcomed abroad for the treatment of mental and emotional illnesses.The success of the treatment was praised abroad and a revolution began. Mahesh Yogi's T.M. (Transcendentral Meditation) Swami Yogananda's Kriyayoga and some of the methods compiled by Acarya Rajni are very popular abroad.

Psychological Review of the Geeta:

Verse 700 Of the Geeta. There are 18 chapters. It has two speakers one is the main and the other is the secondary. Similarly, there are two listeners. One is the main and the other is the secondary. The main speaker is Lord Krishna and the man listener is Arjuna The secondary speaker is Sanjay and the secondary listener is Dhritarashtra.

The first chapter of the Geeta is called Visada Yoga and t Mokshayoga seen that the word means liberation from all mental feel the bliss of salvation. Therefore, it can be suffering . The introduction of the Geeta begins With sadness, the complete opposite of salvation. Light on one Side and darkness on the other, It is impossible for these two to exist together. The existence of one The disappearance of the other is Inevitable. Like day and night, he last chapter, the eighteen chapter, is called, there are two sides to the mental world. The dark side of the mind is called 'sadness' and the light side is called superme peace or bliss sorrow arises from ignorance and bliss, arises from the light of wisdom so wise people are never sad. Just as darkness must have the opposite of light, So must just have the opposite of bliss as darkness is the source of the search for light , so Sadness is the source of the search for bliss for life. The search for the bliss of the Geeta begins with such a psychological analysis. There is a Psychological analysis involved in the blindness of Dhritarashtra. This Blindness is symbolic. According to Indian Psychology, humans have three eyes, Blood is the fleshy gross eye.

The eye of Wisdom or the third eye is also called Shivanetra. KenWilber in his books The Spectrum of consciousness, The Atma Project, A transpersonal View of human development, Up from Eden, A transpersonal View of human evolution, eye to eye and The Quest for the new paradigm they are discussed from a scientific perspective, He is three to the Eye of knowledge, The "eyes of knowledge" Shown in the type. (a)Sensory eye of Knowledge (b) Intellectual Eye of knowledge and (c)

Contemplative eye of knowledge . (the eye of sense perception, the eye of intellectual knowledge and the eye pertaining to Samadhi knowledge) one who can transcend the instincts the senes and sink into the tranquil consciousness of the state of Samadhi arises the eye of Wisdom This is stated in the Vibhutipada[15] of patanjalis yoga Sutra. Rishi Arvind considers this level to be the Supermind in the practice of Sense . psychologist Joseph Vrinte says for this Senses of mind .Truth Consciousness free from ignorance, in which the sense of integral yoga never lost[16] .

Self realization of life is not possible until wisdom consciousness arises ignorance obseures the meaning of life. This covering is the cause of the suffering of the world. Samadhi means 'full awakening or full awarenes'. (full awareness) in this state of full awareness only the witness state remains. In this state, one is able to see the evil fields of the inner world with the wisdom. Dhritrashtra only heard about the battle but did not see it. because he was blind to knowledge .

On the other hand the path of acguiring knowledge or continuing practice leads to psychological distortion of the seeker. Sometimes before you move forward on the path Of sadness and attain Samadhi or salvation jealousy. Sometimes depression, sometimes Apathy, etc. mental desorders develop. an experienced guru is essential to remove such mental disorders And shape the seeker into a normal Person. This is what ken Wilber Mentions in his book transformation of consciousness about pathology (diagnosis) and Psychotherapy (Psychotherapy)[17] He also divided human consciousness into three levels:(1) Sub consciousness (the State of human consciousness before the creation of Civilization and culture). (2)Self-consciousness (The level of consciousness Created by civilization and culture. This level is what creates the Human personality. (3) Super consciousness it is an artificial pillar coated on the true Consciousness of a person.) Prepersonal Unity, Personal Unity and Transpersonal unity[18].

Respectively In the first chapter of the Geeta, Psychological problems are expressed through Arjuna . The Second verse to the nineteenth verse of the First chapter can be regarded as'environmental psychology'in which there are two fierce warring armies .The story is described. Verses 28 to 45 of the first chapter describe Arjuna's mental depression and verses 4 to 6 of the second chapter describe his mental disorder. The treatment of this mental disorder is started by Lord Krishna in the eleventh vers of the second chapter. Fear and anxiety are the main source of depression. among the fears death is the most frightening . This fear of death is the cause of many fears that modern psychology has named anxiety disorders neurosis and they are phobias, panic disorders, and panic depressive disorder), analyzed the various types of psychotic disorders such as schizophrenia, personality disorders, etc. and developed treatments.

According to Geeta psychology the main cure for mental disorders is self- knowledge.The realization of the inequality of the soul relieves the mental weaknesses of life and inspires infinite action. Therefore. the teaching of The Geeta begins with the Knowledge of the Inequality of the soul, modem psychological medicine also includes, cognitive therapy's to treat mental illness. For the realization of self Knowledge, wisdom must be awakened. So be wise the symptoms are mention in verses 55 to 68 of the second chapter. From this chapter onwards, the theory of the of self. the theory of God, The theory of the Brahman, The theory of the life, the theory of mind, . intelligence. mind, ego. the theory of the body, the theory of karma, the theory of religion, bondage, liberation, meditation, sadness, karma yoga, bhakti yoga and jnana yoga. Above all, the Geeta emphasizes selfless action. this is the only way to attain complete self-surrender yoga. it is in this state of complete surrender that the individual , consciousness become one with the soul of God of the world, freed from the bondage of space time Personality created by civilization and culture in a State of complete egolessness. The Geeta considers the bond of personality to be the bond of religion. Therefore, in order to merge into perfection, he has Imposed the condition of apostasy. This stage is also referred to by ken wilber in his book transformation of consciousness as the 'transpersonal stage' the Geeta analyzes karma, bhhakti and jnana yoga as systematic and complementary To each other and combines them into A complete yoga. It is on this basis that Rishi Arvind lsaid the foundation for the practice of 'in-tegral yoga.

Conclusion:

From a review of various aspects we can conclude that Bhagavad Geeta is the oldest 'Manas Granth' in the world and Lord Krishna is the first psychologist in the world. But we Indians have yet to establish this in the word. We have limited the Geeta to devotion and bound its universal and eternal possibilities with emotion. This is the opposite of Geeta worship. Analytical and empirical interpretation and application of the Geeta should be Introduced to make the traditional Method of teaching the Geeta dynamic And practical in today's society. This work requires the cooperation of a class of revered intellectuals besides ordinary devotees and vaishnavas. Only then will it be possible to improve the overall welfare of the Geeta In society and the great Geeta will gain Special status.

Footnotes:

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2. The yoga tradition, P-252. By georg Feuerstein.

3. This is also mentioned in Eliot's is magazine the Griterion
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   (b)The Yoga Tradition, P-252. By Georg Flint
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7. Indian Educational Psychology K Adhar (Hindi) pp- 23-24. Lajanath Tombr.
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12. Reat, Indian Psychology by Jadunath Sinha.
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A comparative study of awareness about waste management among students at secondary school students in ruler and urban Area

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Abstract:
"There are few things certain in life – one is death, second is change and the other is waste." No one can stop these things to take place in our lives. But with better management we can prepare ourselves. Here we will talk about waste and waste management. Each of us has a right to clean air, water and food. This right can be fulfilled by maintaining a clear and healthy environment. N waste management is one of the serious problems in urban area many people has been affecting from long time but it we have and solution students can play important role in waste management development of a rich social values among citizen and use of modern technology will help to get break through.
Keywords : Awareness, Waste management, Rural and Urban Area

Introduction:

Waste management is defined as: the different approaches and procedures designed and implemented to identify, control and handle the different types of waste from generation and until disposal. Full implementation of waste management processes, including waste prevention and reuse, and recycling wherever possible, has and can further help avoid considerable environmental impacts when assessed from a life-cycle perspective – considering direct effects such as emissions and indirect effects such as resource depletion.

Indian society is going through changing face speed of urmilation is high opportunity of job and business has been increasing in big cities like Mumbai Pune Gurgaon Noida Delhi jobs are easily available in then ruler improving economic condition had increase consuming capacity of people industrial has been changing in the living style of the people everything is now available branded and impact form but the same time entire society is facing problem of his management

Many things are responsible for it but few things are responsible for the problem lack of awareness about environment poor standard social values lack of sensor responsibility and Social Skill among people education place are important role in overcoming search social problems it is an important to inculcate Re social value than awareness of environment and waste management among the student there are different policies about protection and saving environment.

Student in urban and rural area should be aware about it without student participation we can't reach to our goal it was essential to know about young student thinking about the social problem so researcher has selected this problem for research which will help to understand awareness off student of secondary school.

Objective of the study

1. To compare the environment Awareness of student of ruler and urban area
2. To compare the waste management awareness among students
3. To compare the waste management awareness among the boy's student

Hypothesis:

1. There is no significant difference of waste management awareness among the student of ruler and urban area
2. There is no significant difference of the waste management awareness among the girl's students of the ruler and urban area.
3. There is no significant difference of the waste management awareness among the boy's students of the ruler and urban area

Need and significance of the study:

Metro city as producing tone of the garbage everyday but there isn't sufficient infrastructure and facility of processing and carrying the less number of dumping ground and protect of the people living near by the present dumping ground in major problem most of the waist collection on the road or nearby the public places it is said for the people help each and every individual must be aware about a waste management government had been taken some state in his cut direction of compostable waste and solid waste is one of them we must understand the need of clean environment for the quality life Environmental education.

Awareness about waste management implementation of a new ideas useful policies will help us to waste management education is one of the impressive ways to improve the present situation of

waste management students are being responsible citizen of country as well as responsible member of society it is important to know and understand their knowledge and opinion about waste management our society is facing falling problem which are at the route of the poor with management air pollution due to decomposition various type of bacteria and virus and gases management people and animal disease
This problem is having our image at local and global level delimitation

Delimitation of the study:

1. The study is limited to awareness about waste management
2. The studies limited to government and private school of Sangola
3. The study is confirmed to student of secondary school only
4. The Indus reached only demon stick with management was focus industrial clinical and e wastage was not included in this

Population :

Student studying studying at Higher Secondary School level which are affiliated to state board examination is the population of the study

Sample:

Sample of 80 student was elected from population for the study 40 girls' students and 40 boys. students were selected. 20 boys and 20 the students were from urban area and 40(20 boys 20 girls) were from a ruler area.
Student were selected as per random method

Tools and Technique

Tools have important place in research. According to objective questioner was developed by the researcher under guidance of expert teacher and scholars. Open ended questioner which are four options was used in the waste management scale. It consists 20 questions having four option. In this scale researcher has focus five areas about waste management.

- Awareness about problem cousin garbage management
- Awareness about processing of waste.
- Human and animal health and waste management
- Interrelationship between other types of population
- waste management as source of income

Statistical tool:

To get meaningful result and conclusion of present study suitable statistical tools are employed by the researcher. Mean, standard division (SD) and t-test are used for the data analysis.

Analysis and interpretation

The data was analysis by using Mean, SD and t test

Table-1, To comparison of awareness about waste management among rural and urban students

Sr. No.	Group	N	M	SD	Df	t-value	Level of Significance
1	Rural area	20	11.33	7.54	18	0.312	Not Significant at level0.05
2	Urban Area	20	12.37	8.09			

As per first objective of the study first hypothesis was tested which of help of data analysis t value up to group was 0.3.12 which is less than 1.96 at 60 becomes at level 0.05 this indicate this that propose hypothesis has been accepted it will then there was no significant difference between student and ruler and urban area about waste management awareness

Table 2

Sr. No.	Group	N	M	SD	Df	t-value	Level of Significance
1	Rural area	20	53.84	8.2	18	1.19	Not Significant at level0.05
2	Urban Area	20	50.8	11.4			

as per second objective of the study second hypothesis was tested which help of the data necessity value of 2 group of was 1.19 which is less than 1.96 get significance at level 0.05 this indicate their purpose hypothesis has been accepted it means there were no significant difference between girls student in ruler and urban area about a waste management awareness.

Table 3

Sr. No.	Group	N	M	SD	Df	t-value	Level of Significance
1	Rural area	20	53.84	9.1	18	1.54	Not Significant at level0.05
2	Urban Area	20	50.17	9.46			

as per third objective of the study third hypothesis was tested which help of the data analysis t value of the two group was 1.54 which is less than 1.96 significant at 0.05 this indicated their purpose hypothesis has been accepted it means that there was there they are no significant difference between boys' student in ruler and urban areas about waste management.

Finding and conclusion:

1. student in urban and rural are equally aware about problem of waste management
2. No gender factor was putting impact on awareness about waste management among the students
3. There was no significant difference between student studying in private government school about waste management
4. Urban student where more awareness about financial benefit of waste management than rural.

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A Comparitive Study of Tax Paid By Partnership Firm and Association of Persons from Assessment Year 2004-05 to 2014-15

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Abstract:

The study evaluates the taxes paid by twenty partnership firm and twenty association of persons over the assessment year 2004-05 to 2014-15. To shy away from the argument of differential income generation over the period, the study evaluates income-wise comparison of the partnership and the association of persons. These income group has been divided based on the level of income. For the better understanding, the study comprises of the following level of income:

A1: income less than or equal to rupees two lacs, **B2:** income more than rupees two lacs and less than or equal to rupees five lacs, **C3:** income more than rupees five lacs and less than or equal to rupees ten lacs, **D4:** income more than rupees ten lacs.

For the purpose of the level of income wise comparison between the two t_test was used.

Keywords: Association of Person (AOP), Partnership Firm (PF), taxation, tax, assessment year, maximum marginal rate (MMR), previous year.

Introduction:

For the ease of comparison, the taxes paid by the partnership firm and association of persons were evaluated. The partnership firm pay taxes at the rate thirty percent plus surcharge if applicable and cess. The association of person pays tax at the maximum marginal rate, slab rate or the rate higher than the maximum marginal rate. The present study covers the maximum marginal rate of taxation for the association of person. The marginal rate is at the thirty percent flat plus the surcharge plus the cess.

Definition:

1) Partnership Firm: The Association of Person or Partnership Firm registered with the income tax as a partnership firm.
2) Association of Persons: The Association of person or a partnership firm not registered with the income tax as a partnership firm formed with the object of carrying on the business with the aim to share profit therefrom.
3) Assessment year: the year over which the income of the pervious year is assessed to tax at the applicable rates.
4) Special tax rates: Capital gain tax, taxes on winnings of lottery, cross word puzzles.
5) Previous year: the financial year during which the income is earned.
6) General tax rate: tax rate that are applicable to partnership firm and association of person on the normal income earned by transacting the business.

Sample Size:

Twenty responses were collected each from the partnership firm and association of persons.

Scope of the study:

1) The study is applicable to association of persons and partnership firms.
2) The study covers the assessment year 2004-05 to assessment year 2014-15.
3) The study compares the income wise taxes paid by the partnership firm and association of person.
4) The study compares the taxes paid by twenty association of persons and twenty partnership firms over the period of the study.

Limitations of the study:

1) As it is a comparative analysis of the taxes paid the partnership firm and association of persons impact of section 40b viz remuneration paid or payable by the partnership firm to its partners has been ignored.
2) The study covers tax payment by the association of person and partnership firm for the assessment year 2004-05 to 2014-15 only.

Object of the study:

1) To cover the tax rates applicable to the partnership firm and the association of persons over the period 2004-05 to 2014-15.
2) To statistically compare the taxes paid by the partnership firm and association of persons.

Hypothesis:

Partnership firm pays less tax as compared to association of person.

Income-wise classification of partnership firm and association of persons for data collection is as follows:

	A1	B2	C3	D4
Partnership firm / Association of persons	5	5	5	5

Where A1: income less than or equal to rupees two lacs, B2: income more than rupees two lacs and less than or equal to rupees five lacs, C3: income more than rupees five lacs and less than or equal to rupees ten lacs, D4: income more than rupees ten lacs.

Literature review:

1) **Hiremath Sangamesh. S.- PhD thesis titled "Effectiveness of Personal Income Tax in India"** under the guidance of Prof. B. N. Nimdur submitted to Gulbarga University, Gulbarga- 1998 started the study with the notion that Personal income tax has its own significant share in the total national revenue.
2) **Vaneeta Rani- PhD thesis titled "Taxation of Income in India: A Study of Post Liberalization Period" submitted to Department of Commerce, Punjab University, Patiala- November 2010** In the thesis the researcher throws light on Indian Income Tax System and policy perspective, the growth of income tax revenue during the period of study, performance of the Income Tax Administration, the perception of tax professionals with regard to Income Tax System post liberalization period.

Rates of taxation of the partnership Firm:

For a partnership firm as an assessee has been charged to tax at the flat thirty percent slab.

Table number: 6.28

Changes in Tax Rates for Partnership Firm

Assessment year	Tax rate	Surcharge	Tax After Surcharge	Cess	Tax after cess
A. Y. 2004-05	35%	2.50%	35.88%	2%	36.5925%
A. Y. 2005-06	35%	2.50%	35.88%	2%	36.5925%
A. Y. 2006-07	30%	2.50%	30.75%	2%	31.3650%
A. Y. 2007-08	30%	10%	33.00%	3%	33.99000%
A. Y. 2008-09	30%	10%	33.00%	3%	33.99000%
A. Y. 2009-10	30%	10%	33.00%	3%	33.99000%
A. Y. 2010-11	30%	10%	33.00%	3%	33.99000%
A. Y. 2011-12	30%	0%	30.00%	3%	30.90000%
A. Y. 2012-13	30%	0%	30.00%	3%	30.90000%
A. Y. 2013-14	30%	0%	30.00%	3%	30.90000%
A. Y. 2014-15	30%	10%	33.00%	3%	33.99000%

Source-primary data- compiled by researcher

The above table shows the different rates the tax rate applicable to a partnership firm. The partnership firm was chargeable at the rate 35% during the assessment year 2004-05. Later during the assessment year 2006-07 it was brought down to 30%. After the period it remained fixed at 30%. Surcharge applicable to a partnership firm was 2.5 % during the assessment year 2004-05 to the assessment year 2006-07. Later the surcharged remained at the constant rate of 10 %. The assessment year 2011-12 to assessment year 2013-14 was the surcharge free assessment year.

Maximum Marginal Rate of Taxation:

Table 1.2 maximum marginal rate from assessment year 2004-05 to assessment year 2014-15

Tax Impact of changes in provisions	Tax rate	Surcharge	Tax After Surcharge	Cess	tax after cess
A. Y. 2004-05	30%	10.00%	33.00%	2%	33.6600%
A. Y. 2005-06	30%	10.00%	33.00%	2%	33.6600%
A. Y. 2006-07	30%	10.00%	33.00%	2%	33.6600%
A. Y. 2007-08	30%	10.00%	33.00%	3%	33.9900%
A. Y. 2008-09	30%	10.00%	33.00%	3%	33.9900%
A. Y. 2009-10	30%	10.00%	33.00%	3%	33.9900%
A. Y. 2010-11	30%	10.00%	33.00%	3%	33.9900%
A. Y. 2011-12	30%	0.00%	30.00%	3%	30.9000%

A. Y. 2012-13	30%	0.00%	30.00%	3%	30.9000%
A. Y. 2013-14	30%	0.00%	30.00%	3%	30.9000%
A. Y. 2014-15	30%	10.00%	33.00%	3%	33.6600%

Source-primary data-compiled by the researcher

The above table gives the maximum marginal rate of tax from the assessment year 2004-05 to assessment year 2014-15.
During assessment year 2011-12 to assessment year 2013-14 the surcharge was relaxed.

Data collection:

Questionnaire was drafted and circulated among twenty respondents of partnership firm and association of persons. Taxes paid by each respondent falling in the income category separately for partnership firm and association of persons were added. Averages were calculated and tabulated in the later part of data analysis.

Data analysis:

T test for equality of means of two population. A t test is a statistical test that is used to compare the means of two groups. It is often used in hypothesis testing to determine whether a process or treatment actually influences the population of interest, or whether two groups are different from one another.

H_0: $\mu 1 = \mu 2$ against H1: $\mu 1 \neq \mu 2$

For the purpose of null hypothesis, it is assumed that the taxes paid by the partnership firm as compared to the association of persons are the same against our original hypothesis that the taxes paid by the partnership firm is lower than the association of persons.

$$t_{cal} = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\left(\frac{n_1 {S_1}^2 + n_2 {S_2}^2}{(n_1 + n_2 - 2)}\right)}} \sim t_{n_1+n_2-2}$$

The following table gives average of taxes paid by the partnership firm. Responses were collected from the twenty partnership firms.

Table 1. 3: Average tax of partnership firm

Assessment year	A1	B2	C3	D4
2004-05	60630	133910	280536.67	502094
2005-06	67800	165760	306653.33	871732
2006-07	68060	133570	312500	1182920
2007-08	57945	118295	220318.33	1128686
2008-09	66815	180335	215858.3	1163738
2009-10	57770	154455	186721.67	1164180
2010-11	55470	125175	213520	1255616
2011-12	59035	119185	219670	1322202
2012-13	61050	132825	203705	1370242
2013-14	50690	167225	208465	1192214
2014-15	61185	132840	208585	1250002
N	11	11	11	11
Mean	60586.3636		234230.3000	1127602.364
Variance	26244868.5950	142143.1818	1745264475.56870	54065646914.7769
StDev (S)	5122.9746	20215.7523	41776.3626	232520.2075

Source: Responses collected from the partnership firm

And

The following table gives average of taxes paid by the partnership firm. Responses were collected from the twenty partnership firms.

Table 1.4: Average tax of AOP / BOI				
Assessment year	**A1**	**B2**	**C3**	**D4**
2004-05	61540	125060	256970	605880
2005-06	62200	127460	252100	1216646.67
2006-07	76190	148405	376836.67	1868096.7
2007-08	63835	153010	265023.33	1301973.3
2008-09	56700	123030	183440	901573.33
2009-10	57295	125510	250933.33	1274373.3
2010-11	65850	139100	258886.67	1388020
2011-12	57005	135625	241093.33	1218886.7
2012-13	53545	133865	253230	1251696.7
2013-14	51335	168475	416930	1987023.3
2014-15	55045	184315	350730	1539470
N	11	11	11	11
Mean	60048.8182	142986.8182	282379.3936	1323058.182
Variance	44251048.5124	329812919.4215	4313232075.01820	137367923694.5780
StDev	6652.1462	18160.7522	65675.2014	370631.7899

Source: Responses collected from the AOP

Using above formula of statistic, we get				
	A1	B2	C3	D4
Difference	537.5455	-843.6364	-48149.0936	-195455.8182
S^2	38772754.4091	406169258.8636	3332173102.82280	105288463835.1450
SE	2655.1067	8593.5415	24614.0134	138359.5210
t_cal =	0.2025	-0.0982	-1.9562	-1.4127
P-Value =	0.8416	0.9228	0.0646	0.1731

Cut off= 2.0860

All P-values are greater than 0.025, that is, t_cal is significant hence the means in each group A1, B2, C3 and D4 may be equal.

We reject H0 if t_cal>2.0860 (Cut off point at 5% level of significance). However, all calculated values are less than 2.0860 in absolute terms, hence we accept H0.

Suggestions and conclusions:

Form the above research activity it's clear that the surcharge paid by the association of person does not statistically create any difference as compared to the taxes paid by the association of persons. Hence. Let there be no pressure on the government to waive the concept of surcharge.

The partnership firm pays no less tax as compared to the association of persons however, a partnership firm can avail a benefit under section 40b towards remuneration. So, a partnership firm can save more tax. There is a disadvantage of partnership over the association of person which is a regarding the raising of capital. So, to start a partnership or association of persons is based on the merits of each case.

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Precarious Borders! An account of unending border disputes between the People's Republic of China and India

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Abstract:

India's foreign relations with the People's Republic of China have a gigantic potential to accommodate the legitimate national interest of both the states. Overall the bilateral and multilateral relations between the two states are characterized by the cooperation, competition and containment. Even though, the trade and economic relations are improving, of course with trade deficit for India but the political relations always remained a source of tension due to unresolved borders between the two states. The precarious borders between India and the People's Republic of China not resolved yet due to variety of factors such as different claims due to colonial legacies, strategic importance of the disputed territories, lack of political will characterized by the sentiments of the people, mutual distrust, systemic reasons and host of other complexities. What is a way forward? There are possible benefits and unavoidable risks associated with each alternative approaches to the meaningful border management between the two states.

Keywords: National Interest, Diplomacy, Skirmishes, Strategic Partnership, Multilateralism, Confidence Building Measures, National Power, Diplomacy

Introduction:

India gut-wrenchingly remembers how the People's Republic of China wrestled 23,200 square kilometers of territory in the Aksai Chin region in 1962 which India always claimed as an integral part of India and eying 92,000 square kilometers of land in the Arunachal Pradesh considering the former North Eastern Frontier Province now Indian State of Arunachal Pradesh as an extension of Tibet. The Line of Actual Control (LAC) was never demarcated that can be agreed by both the sates.(Tharoor, 2012) In the age of weapons of mass destruction and specifically both the India and China are in possession of nuclear weapons dismantles the possibilities of conventional inter-state war but recently both the states have experienced border skirmishes like Chumar (2014), Burtse (2015), Doklam standoff (2017) and Galwan Valley clash (2020) lead to not only deaths and destructions at the borders but affected the political relations between the two states. (Subrata K. Mitra, 2023)

India was among the first states to recognize the People's Republic of China soon after the proclamation of it at the Peking. Initially, both the states attempted to materialize the principles of peaceful co-existence during the course of formative years of foreign policy but soon that euphoria got hit hard by the systemic, domestic and leadership level developments. There was a phase of freezing of bilateral level interactions and eventual normalization of relations characterized by the trade and economic relations after the demise of Mao-Zedong and economic reforms of China. Currently, both the states are not only cooperating at the bilateral level but also expanding close ties with at various multilateral forums such as the Shanghai Cooperation Organization (SCO), BRICS and many more. (Khanna, 2018) Since the days of formulation of India's foreign policy to till today there is one drudgery aspect of India's foreign relations with the People's Republic of China is the unsettled border disputes between the two states. The bilateral relationship between India and the People's Republic of China represents a unique example of cooperation and containment. Two massive civilizations could have changed the fate of humanity at substantial way ended up heated political relations after initial phase of cordiality. (Pant, 2016)

India and the People's Republic of China share an estimated 2200 mile land boundary which is the second largest land boundary after India and Bangladesh borders. (Khanna, 2018) There are three sectors in which there is a boundary dispute between India and the Republic of China namely Eastern, Middle and the Western Sector. The disputes lie in the interpretations of previous demarcations, administrative arrangements and based on local traditional areas of influence and natural barriers. The latest edition of the Working Mechanism for Consultation and Coordination on India-China Border Affairs attempted to narrow down the differences at the borders and attempted to find a relative solution of the unresolved border issues and further agreed for the intensification of the contact through diplomatic and military channels by maintaining peace and tranquility at the borders. (Affairs, 2024)

The Nature of Border Disputes:

Geographical variables are key components in the determining foreign policy of any state and in the case of India's foreign relations with the People's Republic of China is not an exception. In fact, geographical factors dominated the course of

the bilateral foreign relations between these two states characterized by border disputes and potential water disputes in near future. Indo-China borders are disputed mainly to McMahon Line east of the Bhutan and Aksai Chin in the western sector at the border separating Ladakh union territory of India from Chinese territory of Sinkiang and Tibet. The Middle sector covering Indian states like Himachal Pradesh and Uttarakhand have least dispute. (David M. Malone, 2015)

At the western sector, the Ladakh and the People's Republic of China boundary was never demarcated through any treaty in the past but both the states have accepted boundary based on natural barriers and traditional areas of influence. India always projected Aksai Chin as an integral part in political maps of India. The tourists who visited India and also Jammu and Kashmir revenue records of the past centuries are in confirmation with the Aksai Chin being part of Ladakh province of Jammu and Kashmir. (Joshi, 2022) The origin of the dispute somewhere lies in the Indian state detecting the construction of road connecting Xinjing to Tibet via Aksai Chin. India objected these developments and series developments specifically Lhasa uprising and India providing shelter to Tibetans under the spiritual and political leadership of Dalai Lama on humanitarian grounds created misunderstandings in the bilateral relations. The resolution of the border disputes further attempted through the high level exchange of visits by the apex political leadership but eventually the forward policy of 1960 by India cited as an act of aggression by the People's Republic of China and invaded India in 1962. (Gaever, 2001) It may be said that the People's Republic of China declared unilateral ceasefire after broadly achieving the objectives but both the states suffered a huge blow in the form of freezing of relationship in the wake of the People's Republic of China being not serious in acknowledging the terms of the Colombo Proposals. By the end of the war India lost a land of an estimated 23,200 square kilometers and unsettled border line at the western sector as well. (Khanna, 2018)

The border dispute over Kasai Chin somewhere rooted in the British Empire managing the non-clear border line between China and British Indian colony. There are mainly two British lines that are cited to project claims of both the parties namely the Johnson Line and McDonald Line. The Johnson Line which was proposed on 1865 which placed Aksai Chin in the former Indian state of Jammu-Kashmir while the McDonald Line proposed in 1893 kept the Aksai Chin under the Chinese control. For obvious reasons India claiming the Johnson Line to be considered the legitimate one while the People's Republic of China claiming McDonald Line is the rightful demarcation of borders between two states at the western sector. Today the Line of Actual Control (LAC) distinguishes the Indian administered area of Ladakh from the Aksai Chin. (Menon, 2016)

The nature of the dispute at the eastern front is rooted in the history specifically with the legal status of the Tibet. Following the Chinese Revolution and concentration of political decision-making in the hands of KMT (Kau-Min-Tang) a nationalist political fraction along with the Tibetan and British Indian representatives met at Shimla in 1914 and worked out the convention which eventually demarcated a rough border under the leadership of Sir Henry McMahon came to be known as a McMahon Line which divided Tibet into two parts passes between outer Tibet and independent Indian administered NEFA province which is claimed by the Communists after coming to the power in mainland China as an imperial line and considered the today's Arunachal Pradesh as an extension of Tibet in the form of South Tibet after the People's Liberation Army entered Tibet and eventually Tibetan political and spiritual leaders signing the Seventeenth Point Agreement which recognized Tibet Autonomous Region within the sovereign control of the People's Republic of China. Indian in fact, to ensure cordial relations with the China relinquished the rights over Tibet which was exercised during the British Indian time. (Khanna, 2018)

Border Resolution Mechanisms:

The Sino-Indian conflict of 1962 created a sort of permanent hostility and freezing of relations at least till 1988. It leads to massive militarization and even considering nuclear military programme to be materialized. The wind of change was experienced mainly after the death of the Mao-Zedong and cautious economic reforms and subsequent Chinese leadership agreed to exchange ambassadors in 1976 and following the visit of Atal Bihari Vajpayee, the then minister of overseas affairs under the Janta Government in 1979. There were rounds of talks took place between the two states characterized by skirmishes at the border and accusations and so on. The formal visit of the then Prime Minister of India, Rajiv Gandhi in 1988 proven to be turning point in the restoration of bilateral relations and subsequent visits by the Chinese Premier Li Peng in 1991 and Indian Prime Minister Narasimha Rao visiting China in 1993 made normalization of relation relatively possible. Following the neo-liberal economic reforms also played an important role in the normalization process. (Tharoor, 2012)

Both the India and China were reluctant to manage the border disputes and this search lead to the formation of 'Joint Working Group for the Confidence Building Measures' in 1989 which confirmed that boundaries are to managed through the bilateral efforts only without involvement of any

their party. The visit of Narasimha Rao in 1993 also produced the 'Agreement for the Maintenance of Peace and Tranquility along the Line of Actual Control' which was supplemented by the 'Agreement on Confidence Building Measures in Military Field along the Line of Actual Control in 1996. (Menon, 2016)

The year 2003 is an important year in the bilateral relations between the two states where the People's Republic of China recognized the incorporation of Sikkim into the Union of India and also concluded the 'Declaration on Principles for Relations and Comprehensive Cooperation and also the mutually agreed appointment of 'Special Representatives' to find the possible solutions of borders. In 2005, both the states agreed on a 'Protocol on Modalities for the Implementation of Confidence Building Measures in Military Filed along the Line of Actual Control'. One of the effective initiatives was taken by both the states in 2012 when they agreed to establish a 'Working Mechanism for Consultation and Coordination along the boundary of the People's Republic of China and India which recently concluded sixteenth edition of meeting in August 2024.

Conclusion:

Land is usually associated with the sentiments of the people. It takes strong political will and risk taking ability of the state to negotiate borders because it has severe psychological, political, economic and cultural implications. India and the People's Republic of China experienced precarious borders since the beginning of their statehood journeys. From a realist perspective, it is utopian to think of complete resolution of such a complex issue but what is desirable in this case is relative management of the disputes. Apart from the high level diplomatic efforts and resolution mechanisms in place there are few other instruments through which the precarious borders between the two states can be managed in the mutual benefits of everyone. Firstly, Confidence Building Measures of both the military and non military types are essential. People to people contact, deepening education cooperation, and cultural exchanges have a mighty potential to reduce political tensions. Secondly, intense engagements in the key non-political areas such as trade and economic relations, cooperation in the field of science and technology and space collaborations and so on could possibly reduce the political tensions in the long run. (Pande, 2017) Thirdly, mutual recognition of the Line of Actual Control in terms of exact location and length of it which will for a time being reduce the possibilities of the skirmishes and clashes at the borders. Fourthly, instead of attempting to resolve it at the bilateral level, using regional or multilateral forums might be useful such as the Shanghai Cooperation of Organization, BRICS or even the United Nations. Fifthly, if comprehensive border resolution is difficult then sector by sector approach can be realistically beneficial with phase by phase implementations and could be politically less risky for both the states. Such an alternative approaches require political will, diplomatic skills, and a strong commitment to make compromise and consensus, mutual respect for the respective claims and sustained efforts to provide meaningful momentum with enormous patience through the communication could bring realistic possibilities of better border management between the two states. (Sikri, 2024)

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Artificial Intelligence Changing Perspectives towards Sustainable Development

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Abstract:
Artificial intelligence is a potent instrument for the promotion of sustainable development. It provides a range of answers to the most urgent global issues, including as social inequality, resource scarcity, and climate change. Artificial Intelligence has a significant impact on solving environmental problems. AI is used in climate modelling and prediction to comprehend the intricate processes of climate change. Artificial intelligence (AI)-powered systems maximise renewable energy sources, improving the energy sector's sustainability and efficiency. Additionally, AI controls energy use in smart buildings, cutting expenses and emissions. Precision agriculture is a farming technique that maximises crop production while saving resources by utilising sensors and data analytics. While AI can monitor threatened species and protect habitats in the field of wildlife conservation. In a similar vein, AI-enabled marine ecosystem monitoring protects the health of the ocean and the hazards involved. Artificial intelligence (AI)-powered sensor networks safeguard ecosystems and public health by improving the quality of air and water. Furthermore, recycling and trash management have been transformed, decreasing landfill waste and boosting resource efficiency. AI helps carbon capture and sequestration (CCS) by optimising conditions and materials, which lowers carbon emissions and improves environmental sustainability. Not to add, early warning systems powered by AI help with disaster preparedness and reaction. Hiring the best staff to support this is crucial since artificial intelligence technology is ultimately at the forefront of efforts to create a greener, more sustainable future.
Keywords: Artificial Intelligence and Sustainable Development Sustainable, Development and Technology, Technology Adoption, Sustainable Development Goals

Introduction:

Artificial Intelligence (AI) has taken on a more significant role in the pursuit of a more sustainable future. Artificial Intelligence (AI) has the potential to completely transform our understanding of sustainability, from protecting the environment to helping us achieve the Sustainable Development Goals (SDGs). This blog examines the various ways that artificial intelligence (AI) is assisting in sustainable development and solving some of the most important environmental issues of our day.

AI and Environmental Protection: The use of AI to environmental protection is the first uncharted territory in this journey. Artificial intelligence (AI) technologies can forecast environmental trends and provide risk-reduction solutions by assessing large information. For example, AI-enabled environmental monitoring is essential for tracking pollution levels, rates of deforestation, and wildlife activity, allowing for pre-emptive solutions to ecological risks.

AI and Sustainable Development Goals: The Sustainable Development Goals (SDGs) of the United Nations provide a roadmap for a more sustainable future. AI plays a key role in accomplishing these objectives by offering creative solutions in a variety of fields, from high-quality education to the reduction of poverty. AI-driven data analysis facilitates the comprehension of complicated global issues and the development of practical solutions.

AI Solutions for Climate Change: AI has enormous potential to address climate change, which is arguably the biggest challenge of our time. Predicting weather patterns and natural disasters is one-way artificial intelligence (AI) is addressing climate change and enabling improved preparedness and reaction. Another important area is using AI to help businesses and individuals lessen their environmental impact and lower their carbon footprint.

Artificial Intelligence in Renewable Energy: AI in renewable energy is transforming how we generate and distribute sustainable power. Artificial intelligence-driven smart grids maximise energy flow while cutting waste and raising efficiency. AI algorithms also improve renewable energy sources' upkeep and performance, such as wind and solar energy.

AI and Sustainable Agriculture: AI for sustainable agriculture is revolutionising farming practices in the agricultural sector. With the incorporation of AI, farming is becoming more sustainable and productive, from AI-driven pest management that uses less pesticides to precision agriculture that maximises resource utilisation.

AI in Water Conservation and Waste Management: AI in waste management has produced more intelligent recycling procedures and waste minimisation techniques. In a similar vein, artificial intelligence plays a critical role in water conservation by helping to manage global water

supplies, forecast shortages, and locate leaks and inefficiencies in water distribution networks.

Eco-Friendly AI Innovations: The idea of green AI technologies goes beyond particular applications and concentrates on improving the eco-friendliness of AI itself. This involves lowering the carbon footprint of AI activities and creating data centres with energy-efficient designs.

AI in Urban and Biodiversity Planning: AI helps with sustainable urban planning by optimising energy use, transportation control, and infrastructure development. AI is essential to the protection of biodiversity because it helps monitor and safeguard threatened species and habitats.

Transportation and Sustainable Supply Chains: AI for sustainable supply chains guarantees less resource-intensive and more effective logistics. Smarter, cleaner public transportation systems and the development of electric vehicles are being facilitated by artificial intelligence and sustainable mobility solutions.

AI-Driven Environmental Policy: Lastly, this approach has the potential to produce more sensible and useful policies. Artificial intelligence (AI) helps policymakers create policies that more effectively handle environmental challenges by giving them reliable facts and predictions.

Objective:

- Artificial Intelligence (AI) has become a potent instrument in promoting the Sustainable Development Goals (SDGs), which are an international initiative to eradicate poverty, save the environment, and guarantee that everyone lives in peace and prosperity by 2030.
- The nexus between artificial intelligence (AI) and sustainable development presents a hopeful image in an era of constant change, one that has the potential to transform how we as a society respond to pressing global issues. The need to move faster towards sustainable development is growing as environmental concerns rise. We see AI at this pivotal time not just as a technological marvel but also as a potent force driving positive change.
- AI has the potential to become a vital cornerstone in our shared pursuit for global prosperity because of its capacity to collect data, optimise processes, and spark creativity. At the intersection of innovation and sustainability, there is a growing sense of urgency to take action in order to transition towards a future characterised by shared prosperity, sustainability, and resilience.

Result and Discussion:

"Our world and our lives are changing due to artificial intelligence, which can also accelerate sustainable growth. From helping farmers increase their crop yields to providing health and education services to isolated communities. Providing early warning for natural disasters to constructing sustainable housing and transport systems, UN Secretary General Antonio Guterres stated in his video address to the Summit. "AI has the potential to revolutionise the SDGs."

Ten ways that artificial intelligence (AI) supports sustainability include:

1. Prediction and modelling of climate:

Since 1880, the Earth's temperature has risen by 0.08 degrees Celsius on average every ten years, and since 1981, the rate of warming has more than doubled, posing a serious climatic problem. One important tool in the fight against climate change may be artificial intelligence (AI) modelling and prediction. Large-scale datasets are analysed by machine learning algorithms to find trends and produce climate models that are more precise. Additionally, it may make use of a variety of data points, such as temperature, greenhouse gas emissions, and ocean currents, which are too complex for humans to handle alone. As a result, this aids in our comprehension of the effects of climate change and our ability to adapt.

2. Sustainable energy:

AI is essential to renewable energy and the energy industry overall, helping to advance and shift towards more sustainable energy production. For example, weather-driven energy production necessitates precise weather forecasting so that renewable energy facilities may forecast high energy production periods and make appropriate plans. Grid balancing is another example. Artificial intelligence (AI) technologies play a key role in grid management and renewable energy supply and demand balance. They are able to forecast changes in energy demand and modify supply accordingly. on learn more, see our comprehensive guide on AI in the energy industry.

3. Building energy efficiency

AI-powered smart building solutions use information from a network of sensors to transform the energy efficiency of both residential and commercial buildings. These systems automatically regulate lighting, heating, and cooling to make sure resources are used as efficiently as possible. They do this by continuously monitoring occupancy patterns and ambient conditions. By consuming less energy, real-time adaptation lowers operating expenses and greenhouse gas emissions.

4. Precision agriculture:

Artificial intelligence (AI) is transforming the agricultural industry by enabling farmers to make data-driven decisions, which optimises crop management and boosts sustainability and production. A more accurate and effective method of cultivation is made possible by the incorporation of sensors and data analytics into farming processes. For instance, sensors on equipment and in fields gather a variety of data, such as crop health,

temperature, nutrient levels, and soil moisture. Following the processing of this real-time data, machine learning algorithms provide farmers with profound insights on the state of their soil and crops. Farmers are therefore able to maximise agricultural yield while utilising the fewest resources possible.

Nonetheless, one of the biggest advantages is the early identification of pests and crop diseases. Artificial intelligence (AI) can detect disease or pest indicators in plants long before they become noticeable to the human eye. By enabling prompt action, this early warning system lowers the need for chemical pesticides and stops crop loss. This development is going to change people's lives because pesticides cause 385 million cases of poisoning, an estimated 11,000 human fatalities, and a significant decline in biodiversity annually.

5. Monitoring and conservation of wildlife

Protection of the creatures and the ecosystems they live in, which are disappearing at an alarming rate, is one of the many reasons that wildlife conservation is so important. With the use of AI-enabled cameras and sensors, AI is becoming increasingly important to the preservation of wildlife and their environments. These instruments offer vital information on wildlife numbers and behaviours, which is used to monitor, track, and protect endangered species.

The ability of AI to continuously and non-intrusively gather data is one of its most important contributions to animal protection. In addition to minimising human damage in natural ecosystems, this gives conservationists access to a large and comprehensive dataset that was previously unattainable. The information gathered aids in evidence-based conservation initiatives and facilitates the formulation of well-informed judgements about protected area designations, land management, and the application of laws protecting biodiversity on Earth.

6. Monitoring the quality of the air and water

Although emissions of air pollution have decreased recently, it is still the biggest environmental health concern in Europe, resulting in an estimated 238,000 fatalities in 2020 alone. A number of variables significantly affect water quality, most notably agricultural runoff that contains chemical pesticides and fertilisers that are hazardous to humans and eutrophicate water sources.

A key component of the continuous endeavour to monitor and enhance the quality of the air and water is the use of AI-driven sensor networks. These advanced systems provide a data-driven, real-time approach to environmental protection that has numerous positive effects on ecological sustainability and public health.

Networks of sensors continuously analyse pollutants such particulate matter, nitrogen dioxide, and volatile organic compounds in metropolitan areas where air pollution is a major concern. With the use of AI algorithms, this data is processed to produce real-time maps of the air quality, which allow authorities to modify industrial operations and traffic patterns in order to reduce pollution and offer timely warnings.

7. Recycle and waste management

Waste management is being revolutionised by AI-powered systems that offer more intelligent and effective solutions. These systems use real-time inputs such as traffic conditions and bin fill levels, as well as previous data to maximise waste collection routes. As a result, collecting vehicles consume less fuel and emit less greenhouse gases, saving a substantial amount of money.

AI facilitates the reduction of trash sent to landfills by locating potential sites for composting and recycling. Large volumes of data can be sorted through by machine learning algorithms to enhance the separation of recyclables from non-recyclables, hence decreasing the quantity of garbage that is dumped in landfills.

Artificial Intelligence (AI) has the potential to boost recycling rates by optimising the sorting of materials at recycling plants. Sorting is possible with sophisticated robotics and AI vision systems.

8. Protection of marine ecosystems:

Marine ecosystems are currently at danger of decline due to a variety of factors, including increasing sea levels, acidification, and marine heatwaves. AI is becoming a potent ally in the fight against these problems and for the monitoring and preservation of marine ecosystems. Advanced artificial intelligence (AI)-enabled autonomous underwater vehicles (AUVs) are being used to monitor and record the condition of our seas, supporting vital conservation initiatives.

These AI-powered AUVs are capable of carrying out in-depth investigations of marine ecosystems, gathering copious quantities of data and taking high-resolution photos. Their ability to recognise minute alterations in coral reefs is essential for keeping an eye on the condition of these delicate ecosystems. Artificial intelligence (AI) assists conservationists in taking timely action to save these vital habitats by detecting indicators of bleaching, sickness, or destruction.

9. Being ready for and responding to disasters

The number of natural disasters worldwide has increased fivefold in the previous 50 years due to climate change. The World Meteorological Organisation (WMO) claims that early warning systems and detection systems for extreme weather events and disasters can help save lives, and artificial intelligence (AI) is essential to achieving this.

Artificial intelligence (AI) is revolutionising how we anticipate and handle

natural disasters like hurricanes and wildfires. AI can assess past data, present situations, and real-time data streams to provide early warnings and enable quick, well-informed actions by utilising sophisticated algorithms. This talent is essential to minimising harm to the environment and protecting human life. For example, AI-driven systems can keep an eye on environmental conditions in the event of wildfires.

10. Carbon capture and sequestration (CCS)

Artificial intelligence (AI) plays a key role in the CCS procedures, which collect CO2 emissions and store them underground to avoid their release into the atmosphere. AI enhances carbon capture and storage (CCS) operations by helping with material selection and process condition optimisation. To identify the best CCS strategy for any particular situation, machine learning algorithms assess a broad variety of variables, including the kind of industrial emissions, the geology of the storage location, and operational parameters.

By optimising the solvent or adsorbent used to absorb CO2, AI's predictive capabilities improve the efficiency of carbon capture and guarantee that the greatest quantity of carbon is removed from industrial emissions. By improving resource utilisation, this minimises the environmental impact of CCS in addition to lowering carbon emissions.

In order to guarantee the long-term integrity of the CO2 stored underground, AI also helps with ongoing monitoring of storage facilities. Artificial Intelligence (AI) has the potential to stop leaks and guarantee the secure, long-term storage of captured carbon by assessing sensor data and forecasting possible problems.

Conclusion:

The nexus between artificial intelligence and sustainable development presents a glimmer of hope for tackling the world's environmental problems. AI has the ability to significantly contribute to the creation of a more sustainable society, from climate change solutions to its involvement in renewable energy and sustainable agriculture. It is imperative that we create and apply AI judiciously as we move forward, guaranteeing that AI in and of itself stays morally and sustainably sound.

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Dimensions of Women in Politics

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Abstract:
This analytical study provides an overview of women in politics, focusing on their representation, challenges faced, and the impact of their involvement. It examines the historical background, highlighting key figures and milestones in women's political empowerment. The study explores the current state of women's representation in Indian politics, identifying factors contributing to their underrepresentation. It delves into the challenges and barriers faced by women in Indian politics, including gender biases, stereotypes, and violence. Furthermore, the study suggests measures to empower women in politics, such as internal party reforms, education, training, programs, and legal reforms. The study concludes by emphasizing the need for comprehensive efforts to address gender disparities and create an inclusive and empowering environment for women in Indian politics.
Keywords: Political Empowerment, Gender Disparities, Inclusive Reforms, Proxy Participation.

Objectives:

1. Women participation in politics brings viewpoints which are essential for a holistic development of the society.
2. The quantitative data on women participation is easy to measure and India has a long history of recording gender statistics for political participation.
3. The challenge is to measure the actual participation of women and to filter out the problem of proxy participation which may be prevalent at the grass root level.
4. Efforts are being undertaken to devise measures which would give a truer picture of women's participation in local level politics.

Methodology:

The methodologies utilized for the study are Descriptive, Analytical, Exploratory, Explanatory

Various Dimensions:

Women in politics navigate a range of dimensions that influence their roles and experiences. Here are some key aspects:

Representation and Participation: This involves the number of women in various political positions, from local offices to national leadership roles. Representation can impact policy outcomes and the inclusiveness of political processes.

Policy Impact: Women in politics often champion issues related to gender equality, health care, education, and family leave. Their presence can shape the focus and direction of policy discussions and legislation.

Barriers and Challenges: Women face various obstacles, including gender bias, stereotyping, and systemic discrimination. These barriers can affect their ability to run for office, secure funding, and gain political influence.

Intersectionality: Women's experiences in politics can differ based on factors such as race, ethnicity, socioeconomic status, and sexual orientation. Intersectional analysis helps to understand how these factors compound or alleviate challenges.

Leadership Styles: Women may bring different leadership styles and approaches to governance, which can influence decision-making processes and political culture.

Global Perspectives: The experiences of women in politics vary greatly around the world. Cultural, social, and legal contexts shape how women engage in politics and the degree of their participation.

Historical and Social Context: The historical background of women's political participation, including milestones and setbacks, influences the current landscape and ongoing efforts for advancement.

Networking and Support Systems: Women often build networks and support systems to navigate political careers, which can include mentorship programs, advocacy groups, and women's political organizations.

These dimensions highlight both the progress made and the work still needed to ensure equal and effective participation of women in political spheres.

Study Analysis:

The attention seeking results were found regarding while analyzing the data as; at the outskirts of the scope of the study the results were mesmerizing to see In New Zealand the women participation in politics is 51% (out of 120 members 61 are Women) where as In Indian Parliament only 14.7% can be seen, to draw an average percentage of all the State Legislative Assemblies of India could be seen only 9% of women participation, where as in Karnataka Legislative Assembly only 4.5% Women Participation.

Challenges before Women:

Women in Indian politics face several challenges that can hinder their full participation and effectiveness. Some of these challenges include:

1. **Cultural and Social Norms**: Traditional gender roles and societal expectations often place women in subordinate positions, which can limit their opportunities and influence in politics. Cultural attitudes might discourage women from pursuing leadership roles or participating in public life.
2. **Political Representation**: Despite significant progress, women remain underrepresented in political positions. Quotas and reservations have been implemented in various contexts, but women still occupy a relatively small percentage of elected and appointed positions.
3. **Violence and Harassment**: Female politicians often face threats, harassment, and violence, both physical and verbal. This can range from intimidation and assault to more subtle forms of harassment, creating a hostile environment for women in politics.
4. **Funding and Resources**: Campaign financing and access to resources can be more challenging for women, especially in a political landscape where financial backing plays a crucial role. Women may struggle to raise funds or gain the support needed to run effective campaigns.
5. **Party Dynamics**: Political parties may have entrenched male-dominated structures that can marginalize women or limit their advancement within the party. Women often have less access to key decision-making roles within parties.
6. **Work-Life Balance**: The demanding nature of political life, combined with traditional expectations regarding women's roles in the family, can make it difficult for women to balance their professional and personal lives.
7. **Lack of Support Networks**: Women may lack mentorship and support networks that are crucial for career advancement in politics. The absence of role models and guidance can be a significant barrier.
8. **Legal and Institutional Barriers**: Although there have been legal reforms aimed at increasing women's participation, institutional barriers and inadequate implementation of these reforms can still pose challenges.

The other Challenges are Illiteracy, Unemployment, Ignorance, Social Disparities, Growing Crime, Mistrust Political Institutions, Violence against women, Religious Fundamentalism, etc. Addressing these challenges requires a multifaceted approach, including reforms in policies, support systems, and cultural attitudes to create a more inclusive and equitable political environment for women.

Conclusion:

The study suggests measures to empower women in politics, such as internal party reforms, education, training, programs, and legal reforms. It highlights success stories of women leaders who have broken barriers and served as role models.The study concludes by emphasizing the need for comprehensive efforts to address gender disparities and create an inclusive and empowering environment for women in Indian politics.

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Impact of Oyster Mushroom Cultivation and Value Addition Trainings among the Umemployed Youth of Buldhana District, Maharashtra, India

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Abstract:
Mushroom cultivation has been acknowledged by researchers and farmers as a technically viable agricultural practice, serving as a key source of income, employment and rural development. These initiatives for employment generation and poverty reduction play a crucial role in improving the socio- economic status of marginalized groups, particularly rural women. Various agricultural universities have organized numerous training programs and workshops. Women have shown a favourable attitude towards mushroom cultivation. It was noted that mushroom cultivation training for positive attitude, contributing to income generation and providing financial support to families.
Keywords: medicinal mushrooms, traditional medicine, pest and disease.

Introduction:

Edible fungi known as mushrooms were deemed suitable for a wide range of age groups of foods with a high biological value when grown on various substrates. A high protein in diet was supplied by mushrooms and a lower calorific value, making it suitable for heart patients with all the necessary amino acids required by the human body included (Nongthombam et al., 2021).

Mushroom played a significant role in traditional medicine across various cultures for centuries, In India, medicinal mushrooms were utilized since ancient times, valued for their healing properties. These fungi were not only appreciated for their nutritional benefits but also recognized for their potential in treating various health conditions. For centuries, they served as important components of traditional medicine in many cultures.

Oyster mushroom played a significant role in supporting human health by providing bioactive compounds and therapeutic benefits, which helped the body infection and disease. (Aditya et al.,2023).

Mushroom cultivation has been acknowledged by researchers and farmers as a technically viable and lucrative agricultural practice, serving as a key source of income, employment and rural development. (Kala et al, 2021). Mushrooms gained attention from researchers for their capacity to convert waste into nutrients. However, a significant amount of byproduct was generated during the industrial processing of mushrooms. Traditional waste management which cantered on the use and disposal of mushroom by products attracted the interest of researchers. (Guo et al., 2022).

Buldana district being in West Vidarbh zone of Maharashtra state receives 21 to 29 degrees Celsius in rainy season, and 5 to 20 degrees Celsius in winter season and 25 to 44 degrees Celsius in summer season. The highest maximum temperature in may reaches 44 degrees Celsius a wide range of temperature prevails in this zone hence a wide range of oyster mushroom species can be cultivated in this zone during the rainy and winter season. Oyster mushroom is suitable for cultivation in this zone. these region us famous for soyabean production, so plenty of soyabean substrate is available to grow mushrooms which is either waste or burned by the farmers. It is also used as food for all cattle like cows, buffaloes, etc (Huchchannanavar et al.,2020).

Materials and Methods:

The training programs on mushroom production focused on unemployment of youths and self-help group of women. They were easily not interested in these programs but they are convinced to attend the training programs. It was help Krishi Vigyan Kendra Buldhana District Buldana Maharashtra state. There were 88 participants took part in this program there were 22 Gents and 11 Girls as well as 55 women of self-help group through training. They were asked importance of mushroom production and how it is beneficial to a vast community who were forbidden to eat meat and fish. They were also asked the techniques of mushroom production and cultivation techniques. They were trained how to substrate preparation, marketing of fresh product preservation and products made by mushroom powders. During the training programs a test was taken to know the knowledge gained by the trainees and effectiveness of training, they were also trained about species, pest and disease infection in mushrooms as well as their storage process and value addition. Change of knowledge was tested through the formula given below (Shahi et al., 2018).

Deviation/change of Knowledge = $\frac{\text{After training – Before training X 100}}{\text{Total respondents}}$

No.	Particulars	Pre-test Knowledge before training (Respondents in Number)	Pre-test Knowledge before training (Respondents in %)	Pre-test Knowledge after training (Respondents in Number)	Post-test Knowledge after training (respondents in %)	Change in perception level (%)
1	Knowledge of Species of Mushroom and Identification of edible mushroom	51	62.5	65	73.86	79.54
2	Nutritive and medicinal value of mushrooms	5	5.6	60	68.18	80.68
3	Materials and techniques used for different types of mushroom production	15	17.04	21	23.86	28.4
4	Profitability in mushroom cultivation	8	0.9	72	81.81	65.22
5	Profitability in Mushroom cultivation	30	34.09	60	68.18	93.18
6	Harvesting and storage process	10	11.36	80	90.9	93.12
7	Value added products of mushrooms	20	22.72	45	51.13	56.81

Result and Discussion:

The training helps to the unemployed youths and self-Help group women to incorporate the latest scientific advances and technology tools in their daily operations. They knew totally new things during the training and they were got ready to cultivate the mushrooms. They also wanted to know the various species of mushrooms as well as they were also warned that the all mushrooms are not edible, some of them have poisonous features. The positive attitude was developed for mushroom cultivation among the trainee after the training. Two types of tests were held during the training. One is pre-test and second one is post-test.

Questions were asked regarding:

1. Knowledge of species of mushroom and identification of edible mushroom
2. Nutritive and medicinal value of mushrooms.
3. Material and techniques used for different types of mushroom production.
4. Pest and disease infestation in mushroom.
5. Profitability in mushroom cultivation.
6. Harvesting and storage process.
7. Value added products of mushroom.
8. Awareness of loans, scheme and subsides provided by public or private institutions

After the test we found pre and post knowledge level developed during the training in regarding knowledge of species and identification of edible mushrooms.

1. 1.The percent is 62.5 in pre-test knowledge and 73.86 after the test knowledge change in perception level is 79.55%.
2. 2.We found that they were not known about the nutritional and medicinal properties only. The percent is 5.6 in pre-test knowledge and 68.18 after the test knowledge change in perception level is 80.68%.
3. Materials and techniques used for different types of mushroom production. 5.6% trainees were found in pre-test knowledge but after post taste the trainees were found 68.18% and above.

4. They were not aware of the new technologies and material to grow mushrooms. They were also not aware of profitability of mushroom cultivation, harvesting storage practices and value-added technologies were known to only 17.4% but after it increased 23.86% only 2.27% trainees were known about loans, subsidies and facilities. The result of post knowledge scores increases significantly over the pre- test scores.

They were very pleased to know the mushrooms is substitute food for meat and fish because a wide range of women and group of Pius do not like to eat fish and meat to our knowledge. They have to eat it youth from Chikhli, Buldana were interested to grow mushrooms. Mushrooms contain high moisture and are delight texture, these cannot be stored for more than 24 hours at the ambient conditions of these regions this leads to weight loss, veil opening, browning, and microbial spoilage of the product making it unstable effective processing technique will not only prevent the post-harvest remuneration to the growers as well as to the process. Mushrooms are nutritious, medicinal and functional food it contains low calorie high protein, dietary fibre, vitamins and minerals. For marketing we used various tools i.e. Print, Pamphlets. Market survey was done on availability of mushrooms product it showed very small number of mushroom products were in the market. The reason may be lack of awareness of mushroom consumption and its value addition. The trainee was inspired to know the mushroom consumption and its value addition. The trainee was also inspired to know the mushroom qualities and its nutritional value. They were also asked that it is possible to grow mushroom on various substrate that could be fetching additional income.

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Following food items has been made from Oyster Mushrooms:

1. Gulab jamun

2. Bittya

3.Dashmya

4. Karanjya, Papad

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Water Quality Assessment of Bandra Talao, Mumbai Maharashtra

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Abstract:
The study of water features in Mumbai, particularly focusing on Bandra Talao, reveals significant environmental concerns. Bandra Talao, a lake in Mumbai, has been found to be heavily polluted, primarily due to domestic sewage from its urbanized catchment area. The water quality was analyzed over several months, from November to August, assessing various Physico-chemical parameters. Key findings indicate that the lake suffers from excess nutrients due to its use for washing, bathing, and religious activities such as idol immersion. This has resulted in increased organic pollution which pose risk to both the ecosystem and public health. The study emphasizes the human impact on this vital water resource and suggests measures for its restoration, highlighting the need for improved waste management and pollution control strategies to preserve Bandra Talao's ecological integrity and utility for the community.
Keywords: Water quality, Domestic sewage, pollution, Natural water resources.

Introduction:

Water is the vital element for life and is thought to be a necessary medium for the genesis and maintenance of life [1].Considering how quickly the population is growing, there is a increasing demand for water [2].A growing emphasis among policymakers is on sustainable development, which satisfies human needs without going over the planet's long-term carrying capacity [3].Water bodies get polluted and cause environmental deterioration when pollutants are thrown into them, either directly or indirectly, without being sufficiently treated to remove potentialy harmful substances [4].Water quality degradation is a major problem worldwide. This results from the enormous volume of raw sewage that combines with surface water [5].One of the main concerns throughout the years has been the quality of the water[6].

About the Lake:

Mumbai city ,the capital of Maharashtra and commercial capital of India is located along the western coast of India , spreading over an area of 437.71 sq.km having population about 20.7 million [11].

The 'talao' is significant for culture and environment in addition to its utilitarian use. The area's active use of rainwater gathering systems supports sustainable approaches for managing water resources. Due to its handy position near Bandra Station, it is also popular with those seeking a respite from the bustle of the city [8].

Although the pond's main road is tidy generally, there seems to be a lot of litter at the margins. Furthermore, preventing the accumulation of waste is still the primary goal despite the implementation of regular cleaning activities. To revitalize Talao's attractiveness, local officials have so made consistent efforts. Another move in the direction of cleanliness has been the dispatch of cleaning marshals, whose job it is to do sporadic inspections and penalize litterbugs [8].

The lake is a Grade II historic structure that was formerly known as Lotus Tank. "Motha Sarovar" was another name for the lake. It is 7.5 acres in size. In the 1990s, fishing and paddle boat rentals were available on this lake. It has been around for 200 years & was built by a rich Muslim Konkani from the adjacent town of Navpada, the lake was also called "Motha Sarovar"[7,8].

Material and methods:

The current study centres around study of the water quality in Bandra Talao from November 2023 to August 2024.Surface water samples were collected and placed in clean plastic cans. At the sample locations, some physicochemical characteristics of the water were measured (pH and temperature) Others had 4–8 hours of laboratory analysis[9], in accordance with the accepted practices [10].

Seasonal collection:

Collected the sample in five different seasons in the clean plastic bottle at the six different places, 10 meter deep from the surface. In each season all sample collected at a time were thoroughly mixed to get a homogenous sample. This was used for analysis.

Physicochemical Analysis:

The lake water samples collected were taken to the laboratory covered with black paper and were analysed with respect to different physical and chemical parameters like pH,Temperature ,Hardness, Electrical conductivity, Biological Oxygen Demand (BOD),Calcium and Total dissolved solid in order to get an idea of the Water Quality Index [21].

1. Temperature:

Temperature plays a crucial role in the study of water quality since it directly affects pH and dissolved oxygen (DO), as well as controlling the river's ability to purify itself [18]. The biological and metabolic processes of organisms are influenced by the temperature of the water; greater

temperatures cause an increase in these processes, which in turn requires more oxygen for respiration [19].

2. Colour:

The sample's color is visually evaluated. Water is translucent by nature. To compare the color of the water, a sample of distilled or pure water is utilized [24].

3. Odour:

Odour is an indication of the level of Pollutants present in water. All though the odour cannot be studied quantitatively, it gives and indication of the level of harmful substances present in water.

4. pH:

An essential component needed for the up keep, management, and development of both biotic and a biotic ecological systems is pH. pH is a measure of how corrosive water is, and it is inversely related to pH. Every water body's pH fluctuates throughout the year owing to a number of variables that affect the pH value either directly or indirectly as the season's change [16,17] .

5. Conductance:

The quantity of ions in water may be directly measured using the electrical conductivity (EC). More conductance indicates a greater concentration of ions, and vice versa. There are cations and anions among the ions.TDS and EC have a correlation and are complimentary to one another [12].

6. Total dissolved solid:

Total dissolved solids (TDS) is a measurement of all the soluble materials, organic compounds, and inorganic salts that are present in a body of water [13,14]. Generally speaking, the main elements of TDS are Ca^{2+}, Mg^{2+}, Na^{+}, and K^{+}, SO_4^{2-}, Cl^{-}, HCO_3^{-}, and so on .The range that is acceptable is 500 mg/L [20].

7. Turbidity:

It measures the transparency and cleanness of any water body [12].turbidity of water plays a key role in controlling the light penetration and regulating rate of photosynthesis by plants in water [26].

8. Calcium:

In both freshwater and saltwater, calcium is one of the main inorganic cations, or positive ions, in the form of the Ca^{2+} ion[22]. The concentration of calcium in the sample is determined by comparing the volume of titrate (EDTA solution) with the known volume of the sample [23].

9. Biological Oxygen Demand (BOD):

Similar to DO, BOD is a crucial metric used to examine water contamination. Any body of water that has a higher BOD value has more organic contaminants in it [15].
The water quality has been categorized as follows based on a five-day BOD test.
1. Extremely clean if BOD level is less than 1 mg/L; 2. Clean if BOD level is between 1.1 and 1.9 mg/L; 3. Moderately polluted if BOD level is between 2 and 2.9 mg/L; 4. Polluted if BOD level is between 3 and 3.9 mg/L; 5. Very polluted if BOD level is between 4 and 10 mg/L; 6. Extremely polluted if BOD level is greater than 10 mg/L.

10. Total Hardness of water:

"Water hardness" refers to the concentration of calcium and magnesium salts in the water. A typical freshwater typically contains extremely minor amounts of other cations, which also contribute to the overall hardness of the water. Hardness is commonly determined by measuring the amount of calcium carbonate ($CaCO_3$) in the water using commercially available test kits. The phrases parts per million (ppm) or milligrams per liter (mg/liter) are typically used in water quality reports to describe the hardness levels [27].

Results and Discussion:

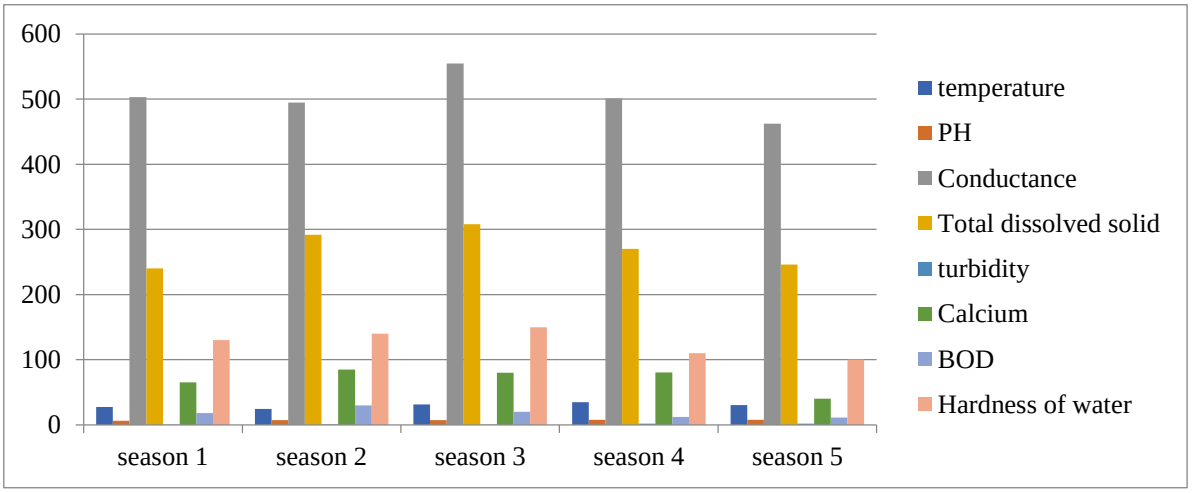
The results obtained for the study are summarized in table no 1.

Table 1: Physico chemical parameters of water samples:

Sr. no	Parameters	Instrument used	November 2023 Season1	January 2024 Season 2	March 2024 Season 3	May 2024 Season 4	August 2024 Season 5
1.	Temperature	Mercury thermometer	27.4 ^{o}C	24.7 ^{o}C	31.3 ^{o}C	34.7 ^{o}C	30. 2 ^{o}C
2.	Colour	Visual Appearance	Light green	Light green	Light green	Light green	Light green
3.	Odour	Physiological sense	Bad odour unpleasant	Bad odour unpleasant	Bad odour unpleasant	Bad odour unpleasant	Bad odour unpleasant
4.	pH	Digital pH Meter (EQUIPTRONICS MODEL NO.EQ-610A)	6.35	7.37	7.28	7.65	7.60

5.	**Conductance (µs)**	Digital Conductivity Meter (EQUIP-TRONICS MODEL NO.EQ-667)	**503.1**	**494.5**	**554.7**	**500.95**	**462.25**
6.	**Total dissolved solid (ppm)**	Gravimetric method	**240**	**292**	**308**	**270**	**246**
7.	**Turbidity(NTU)**	Nephelometric using digital turbidity meter	**0.35**	**1.08**	**0.63**	**1.89**	**1.84**
8.	**Calcium(mg/lit)**	Complexometric titration	**65.05**	**85.09**	**80.07**	**80.7**	**40.03**
9.	**BOD (mg/lit)**	Incubation followed by titration	**18**	**30**	**20**	**12**	**11**
10.	**Total hardness of water (mg/lit)**	Complexometric titration	**130**	**140**	**150**	**110**	**100**

Figure no 1: Graphical representation of the Physico chemical parameters.



Temperature:

Most of the physical and chemical property of the water bodies are affected by the changes in temperature.The sample Temperature varied from 34.7 ^{o}C in summer, 30. 2 ^{o}C in monsoon and 24.7 ^{o}C in winter this temperature changes are observed due to the change in ambient temperature.

Color:

Lake water had an almost green tint to it. This is because of the significant algal bloom that has taken place. Water loses oxygen as a result of the hue. It has an immediate impact on aquatic life. Another possible cause of the hue shift might be too much rubbish that was thrown into the lake. The three main elements that influence the color of water are suspended materials, green aquatic vegetation, and industrial pollution. The color found in the prior investigation was light green [25].

PH:

The sample PH varied from in 7.65 summer, 7.60 in monsoon and 8 in winter this temperature changes are observed due to the change in temperature. The pH change may be correlated to the temperature variation

Conductance:

The sample of conductance varied from 500.95 µs in summer, 462.25 µs in monsoon and 494.5 µs in winter this conductance changes are observed due to the change in dissolved solids. The electric conductance changes can be attributed to the similar changes in the total dissolve solid.

Total dissolved solid (TDS):

The sample of dissolved solid varied from 270ppm in summer, 246ppm in monsoon and 292ppm in winter this dissolved solid changes are observed due to the change in dissolved solids. These changes are observed due to change in the no. of impurities present in the water samples and also due to temperature change.

Biological Oxygen Demand (BOD):

The sample Biological Oxygen Demand of varied from 12mg/lit in summer, 11mg/lit in monsoon and 30mg/lit in winter. These values suggest that in monsoon the water is comparatively better than in summer and winter .In winter it worst

to all the three seasons. In winter the water body has maximum organic containments and in monsoon the least

Total hardness of water:

The sample hardness of varied from 110mg/lit in summer, 100mg/lit in monsoon and 140mg/lit in winter this hardness changes are observed due to the change in water hardness. It is observed that the total hardness value of water body is maximum in winter, minimum in monsoon and moderate in summer.

Conclusion:

In this study the following five parameters were studied by taken from Bandra Talao pH , Conductance, BOD, Total Hardness and TDS .the sample are taken over different seasons . This lake is ecologically suitable for growth of living organism. It is generally utilized for dumping the waste from home, home industries and other industries. These activities will lead to immense Pollution rendering the water present unsuitable for human used .the water quality parameters show a variation according to seasons as expected .The present study opens up a new vista to study the remedial work for the contents.

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Human-Wildlife Conflicts in a Changing Climate

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Abstract:
Climate change is altering ecosystems worldwide, leading to complex interactions between wildlife and human populations. Wild animals and humans have increasingly led to conflicts and attacking humans becoming more prevalent. We seek to deepen our understanding of the root causes of human-animal conflict in the context of climate change and explore innovative approaches to fostering harmonious relationships between humans and wildlife in a changing environment. This study highlights the impacts of climate change on human-wildlife interactions, explores the underlying drivers of conflict and evaluates current strategies for conflict mitigation. Through this research, we aim to raise awareness of the urgent need for collaborative and proactive measures to address human-animal conflict in the era of climate change. We can strive towards a more sustainable and resilient future for all species by promoting coexistence strategies that prioritize the needs of both humans and animals.
Keywords: Animal-Human Conflict, Climate Change, Mitigation, Sustainable Coexistence

Introduction:

Human-animal conflict has become an increasingly critical issue worldwide as a result of climate change and its cascading effects on ecosystems and wildlife habitats. The delicate balance between humans and animals has been disrupted, leading to escalating conflicts with severe implications for both parties involved. Climate change has altered the distribution of habitats and food sources for many animal species, pushing them into closer proximity to human settlements in search of resources. This proximity has intensified the potential for conflicts, resulting in increased instances of property damage, crop raiding, livestock predation and even human injuries and fatalities. The consequences of human-animal conflict are far-reaching, impacting not only the livelihoods of communities dependent on agriculture and natural resources but also the conservation efforts aimed at protecting endangered species. As human populations continue to grow and climate change accelerates, the frequency and intensity of conflicts between humans and animals are expected to rise, posing significant challenges for sustainable coexistence.

Negative Impact of Animal-Human Conflict

When wild animals and human activities intersect, resulting in negative consequences for both parties. Sometimes when people pass by on the road, wild animals slowly emerged from the nearby forest and confidently made its way across the road. It can be very dangerous and deadly for both. When muscular creatures roam the streets and come in close contact with people, these powerful beasts can pose a serious threat to humans, if they feel threatened or cornered. They are known to attack when they feel threatened or when they perceive a human as a potential source of food. The clash between civilization and nature is a huge number of terrifying moments. The scene is terrifying for us when a ferocious wild predator wandering through the streets of village, but it can become a regular occurrence for the residents of the community. Such wild animals have been known to make themselves home in the outskirts, sometimes staying too close to human habitation, it may seem dangerous. Climate change-induced shifts in habitat distribution and availability can force wildlife species to adapt to changing conditions by moving into human-dominated landscapes. The villagers trying to learn to coexist with these animals and taking precautions to stay safe. We live in the world where danger lurks around every corner, where the line between civilization and wilderness is blurred. As wildlife habitats become more fragmented and degraded, conflicts with humans over resources, space and safety may intensify, particularly in regions experiencing rapid environmental changes.

As humans continue to encroach upon wildlife habitats, competition for limited resources such as water sources, grazing lands and prey species intensifies. This competition can lead to aggressive behaviours from both humans and wildlife, culminating in conflict situations. The most prevalent reasons is the encroachment of human settlements into natural habitats. It has disrupted the natural balance between wildlife and human populations, resulting in heightened instances of animal-human conflict. Factors such as urbanization, deforestation and climate change have forced wild animals to adapt to changing environments, often leading to conflicts with nearby human communities. Human activity of agricultural encroachment have considerably reduced the natural habitats of many wild animals. The loss of habitat forces these animals to move closer to human

settlements in search of food and shelter, increasing the likelihood of encounters and conflicts. One of the biggest concern is the Lion's tendency to steal cattle from the local herd, for villagers losing a cow or goat can be devastating blow but they understand that these wild animals are simply following their instincts as a result villagers try to learn to live with this risk and take measures to protect their livestock as best they can.

Climate change aggravates human-wildlife interactions. Shifts in rainfall patterns, temperature fluctuations and habitat degradation, can disrupt the natural behaviours and movements of wild animals. It is associated with an increase in the frequency and intensity of extreme weather events such as storms, droughts and wildfires. These events can disrupt wildlife habitats and force animals to seek refuge in human-inhabited areas. Many wildlife species rely on specific migration routes that may be disrupted by climate change. This can result in increased encounters with human infrastructure such as roads, leading to higher risks of road accidents involving animals and humans. As a result, they may come into closer contact with human settlements, leading to increased conflicts. Addressing the reasons for tigers coming out of core jungle areas requires a holistic approach. Thorny trees, such as acacias, may indeed be found in the core of some jungle habitats and disrupt wildlife habitats and force animals to come out from the dense forest. These trees can have long, sharp thorns as a defence mechanism against browsing animals. While it is unlikely that thorny trees alone would compel a tiger to actively seek to rescue itself by leaving the jungle, they could potentially influence the movement and behaviour of tigers. In dense thickets of thorny vegetation, tigers may find it challenging to navigate efficiently, especially when hunting or patrolling their territories. This could potentially lead tigers to seek alternative routes or areas with less dense vegetation. The sharp thorns of certain tree species can pose a risk of injury to animals moving through such habitats. Tigers, being powerful predators, can potentially navigate through thorny vegetation without sustaining significant injuries. However, if the density of thorny trees is extreme or if tigers are already weakened or injured, they may try to avoid such areas to prevent harm. However, if the density of thorny trees becomes excessive or limits the tiger's mobility, they may choose to move to more open or accessible areas for better visibility. Overall, while thorny trees in the core of jungle habitats can influence the movements and behaviour of tigers to some extent, these factors are unlikely to be the primary reason for tigers actively seeking to rescue themselves by leaving the jungle. The broader factors such as habitat degradation, prey availability and territorial considerations are more influential in shaping tiger movements and their interactions with their surrounding environment. By safeguarding tiger habitats, protecting their prey base, reducing human-wildlife conflicts and addressing the drivers of tiger movement, we can help ensure the long-term survival and coexistence of tigers in the wild.

These wild creatures are deadly, attacks by wild animals on humans can result in injuries and fatalities, posing a significant threat to human safety. The fear and uncertainty associated with animal-human conflicts can have lasting psychological effects on affected communities. Children and vulnerable populations, in particular, may experience trauma and living in constant fear of wild animal attacks. India has witnessed several alarming incidents of human-animal conflict. These confrontations have resulted in property damage, crop losses and even loss of human lives, highlighting the urgent need for effective strategies to mitigate and manage such conflicts. One of the most immediate and tragic consequences of human-animal conflict is the loss of human lives and injuries.

Some incidences that have happened in recent years in different states

Wild animals attacked sleeping villagers late at night in Chandauli and another wild animal attacked two men and a buffalo in Rampur village, UP.

Between 2019-20 and 2023-2024, 486 people were killed in wild animal attacks in Kerala, in 2023-24, 22 people were killed by elephants, one person was mauled to death by a tiger and 71 people were killed by other wild animals.

68 people killed in wild animal attacks in Odisha this year 2024, and 1,087 houses and crops over 2315.79 acres were also damaged in incidents of the human-wildlife conflict in different forest division of the state during the current year.

Maharashtra reported one human kill by wild animals every week on average in 6 years. In Chandrapur and Gadchiroli district, 38 people died after being attacked by wild animals last year. These two districts alone accounted for almost 3,800 livestock loss caused by wild animals apart from damage to crops.

One notable example of human-animal conflict in India is the growing conflict between farmers and elephants in states like West Bengal, Assam, and Odisha. Wild animals such as elephants, wild boars and deer can cause extensive damage to crops, leading to reduced yields and food insecurity for farmers. As climate change alters the traditional migratory routes of elephants and reduces their natural habitats, these majestic creatures are increasingly venturing into agricultural areas in search of sustenance. The resulting crop raids by elephants have caused significant economic losses for farmers and heightened tensions between

humans and wildlife. You must have heard such news that an elephant was electrocuted when it tried to enter farm. Elephants died of electrocution in wayanad, Goa, Kochi, Raigrarh and the list is long. Too many animals are being killed because of electrocution. In addition to elephants, other wildlife species such as leopards, wolves and bears have also been involved in conflict situations across different regions of India. The state of Jharkhand, for instance, has faced recurring conflicts between humans and leopards due to the loss of forest cover. The increase in incidents of animals straying into residential areas has raised concerns about the safety of both humans and wildlife.

In some cases, human-animal conflict can force communities to abandon or relocate from their traditional habitats. It can have ripple effects on ecosystems and biodiversity. For example, when predators are killed in retaliation for livestock depredation, it can disrupt the natural balance of ecosystems and lead to cascading impacts on other species. Moreover, habitat fragmentation and degradation caused by human activities can isolate populations and reduce genetic diversity, threatening the long-term survival of wildlife species. Human-animal conflict can fuel negative attitudes and perceptions towards wildlife, leading to retaliatory killings, poaching or illegal wildlife trade. Fear and anger towards animals involved in conflict can result in intolerance and hostility towards certain species, jeopardizing conservation efforts and perpetuating a cycle of conflict. As human populations expand and natural habitats shrink, competition for resources such as water, food and space intensifies between humans and wildlife. These incidents of human-animal conflict in India serve as stark reminders of the complex challenges posed by climate change on the delicate balance between humans and wildlife. As temperatures rise, habitats shrink and natural resources dwindle, the interactions between humans and animals are likely to become more frequent and intense, necessitating proactive measures to prevent conflicts and protect both biodiversity and human well-being. Addressing human-animal conflict in the context of climate change requires a multi-faceted approach that combines scientific research, community engagement, policy interventions, and conservation efforts. By promoting sustainable land use practices, restoring wildlife habitats, implementing early warning systems and fostering coexistence between humans and wildlife, India can work towards mitigating the impacts of climate change on human-animal interactions and fostering a more harmonious relationship between people and wildlife. By implementing innovative strategies for coexistence, India can pave the way for a more sustainable future where humans and animals thrive together in a changing climate.

Steps to Curb Man-Animal Conflict

- Regular patrols by officials and staff in forest areas to monitor wild animal movements.
- Capturing wild animals that pose a threat to human life according to the Wildlife Protection Act, 1972.
- Creating artificial water sources and grazing areas in forests to prevent wild animals from leaving the forest in search of food and waters.
- Public awareness campaigns and information boards about precautions to take in areas with a high presence of wild animals.
- Emergency rescue teams established for critical situations.
- Development of grazing areas to ensure that natural prey for carnivorous wild animals is available in the forest.

Strategies for Mitigating Animal-Human Conflict

***Land-Use Planning and Habitat Conservation*:** Implement land-use planning strategies that take into account wildlife corridors, buffer zones and protected areas to maintain connectivity in changing landscapes. Prioritize habitat conservation efforts to protect critical ecosystems, reduce habitat fragmentation and create safe spaces for wildlife to thrive and migrate.

***Community-Based Conservation*:** Engage local communities in conservation initiatives through education, awareness-raising and capacity-building programs. Involve communities in decision-making processes related to natural resource management, wildlife protection, and sustainable livelihoods to foster a sense of ownership and stewardship over shared resources.

Innovative Technologies: Adopt innovative technologies, such as wildlife-friendly fencing. Wildlife behaviour can improve the overall performance of wildlife-friendly fencing systems. By incorporating these wildlife-friendly fencing options into conservation plans contribute to the conservation of biodiversity and ecosystem health. Early warning systems, deterrents and monitoring tools, to prevent conflicts and reduce human-wildlife interactions. Explore non-lethal methods of wildlife control, such as sound devices, lights, scents and barriers.

Technology plays a crucial role in improving wildlife monitoring and mitigation efforts in human-wildlife conflict zones by providing real-time data. Enabling early detection of conflicts and facilitating the implementation of targeted interventions. Camera traps are widely used in wildlife monitoring to capture images and videos of wildlife species in their natural habitats. Placing camera traps strategically in conflict zones helps researchers and conservationists gather valuable data on the movements and behaviours of wildlife, enabling them to assess population dynamics, monitor species

at risk and identify potential conflict hotspots. Geographic Information Systems and Remote Sensing Technologies allow for the mapping and analysis of habitat use, land cover changes and wildlife distributions in conflict-prone areas. Satellite Tracking, Drones, Sensor Networks, Machine Learning and AI, Mobile Apps & Citizen Science and Block chain Technology can be leveraged to enhance conservation efforts in these areas. By implementing a combination of these strategies and tailoring interventions to specific contexts, it is possible to reduce human-wildlife conflicts and promote harmonious coexistence between humans and animals. By implementing these recommendations in a holistic and integrated manner to reduce conflicts between wildlife and humans in regions vulnerable to climate change impacts, promote sustainable coexistence.

Conclusion:

Animal-human conflict poses a complex challenge that requires holistic and collaborative solutions to address. By understanding the underlying causes of conflict, implementing proactive mitigation measures and fostering coexistence between wildlife and human communities, it is possible to reduce conflict incidents and promote sustainable conservation practices. We can strive towards a future where wildlife and humans coexist harmoniously in shared landscapes through targeted research, policy interventions and community engagement.

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Role of Massive Open Online Course (MOOCs) on Sustainable Development

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Abstract:
The integration of Massive Open Online Courses (MOOCs) with sustainable education models has emerged as a critical area of research in the pursuit of a more effective and sustainable educational landscape. This study examines the symbiotic relationship between technology and sustainable education approaches, with a particular emphasis on how MOOCs enhance learning outcomes. The study explores tangible examples of this synergy, including the fusion of MOOCs with Education for Sustainable Development (ESD) principles and the facilitation of immersive Place-Based Learning through virtual exploration of local ecosystems. Additionally, the study explains how MOOCs enable dynamic Skills-Based Learning through interactive simulations and collaborative problem-solving exercises. This research extends beyond content delivery to analyze the broader advantages offered by MOOC platforms and strategies to address challenges in long-term learning engagement. By unravelling the complex interplay between MOOCs and sustainable education, this study aims to identify solutions to existing obstacles and pave the way for a more efficient, environmentally conscious, and inclusive educational paradigm. The findings of this research have significant implications for policymakers, educators, and technologists working towards sustainable development goals in education.
Keywords: Massive Open Online Courses (MOOCs), Sustainability, Models

Introduction:

Improving education in the quickly evolving world of today requires fusing modern technologies with environmentally friendly practices. It's obvious that we need to modernize our approaches to teaching and learning as we tackle the problems of the twenty-first century. Better approaches to teach people can be created by combining eco-friendly practices with the newest technological tools. Using computers in the classroom is only one aspect of this strategy; another is redesigning education to make it more efficient and ecologically friendly. The intention is to equip students with the information and abilities necessary to solve problems in the real world in an environmentally friendly manner.

At the forefront of this educational evolution are Massive Open Online Courses (MOOCs), which have emerged as catalysts for transformative learning models. These innovative approaches represent a convergence of advanced pedagogical methods, sustainability principles, and technological integration. The global push for inclusive, equitable, and environmentally conscious learning environments underscores the urgent need for sustainable education models. This imperative stems from the recognition that traditional educational paradigms may no longer suffice in addressing contemporary challenges and preparing learners for an increasingly complex world.

This introduction explores the landscape of sustainable education models and examines the pivotal role that MOOCs are poised to play in shaping a more diverse, engaging, and ecologically mindful educational future. By leveraging the power of digital platforms and embracing sustainability concepts, MOOCs offer unprecedented opportunities to democratize knowledge, foster global collaboration, and instill a sense of environmental stewardship in learners worldwide. As this study delve into this topic, uncover how the synergy between MOOCs and sustainable education practices is not just reshaping the way we learn, but also contributing to broader societal goals of sustainable development and global citizenship.

MOOCs and Sustainable Development

MOOCs have become an effective instrument for promoting sustainability practices and education. These internet resources provide previously unheard-of access to information, connecting with a worldwide audience and democratizing the teaching of sustainability-related subjects (Zhan et al., 2015). MOOCs' scalability makes it possible to quickly and widely disseminate sustainability principles to millions of students at once, much beyond the capacity of conventional teaching techniques (Hew & Cheung, 2014). Numerous MOOCs include courses that are especially targeted at different facets of sustainability, such as renewable energy, environmental science, and sustainable business practices (Leal Filho et al., 2018). According to Velitsianos and Shepherdson (2016), this varied content, which is frequently delivered via an interdisciplinary perspective, encourages a comprehensive grasp of sustainability concerns and solutions. Because MOOCs are online, they lessen the environmental impact of traditional education,

which further contributes to sustainability. According to Caird and Lane (2015), because online learning does not require physical infrastructure or travel, it dramatically reduces carbon emissions. Moreover, MOOCs facilitate lifelong learning by enabling professionals to stay up to date on the newest technologies and sustainability practices (Milligan & Littlejohn, 2017). This continuous learning is very important in the quickly developing field of sustainability. Though MOOCs have a lot of promise to advance sustainability education, it's crucial to remember that their effectiveness is best when combined with other instructional strategies and the real-world application of sustainable practices (Otto et al., 2019).

Sustainable Education Models

Sustainable education models offer frameworks for integrating the environmental, social, and economic foundations of sustainability into all aspects of education. Beyond simply dispensing sustainability knowledge, they work to cultivate critical thinkers, problem solvers, and active participants in building a more sustainable future (UNESCO, 2014). In addition to imparting the necessary knowledge, these models assist teachers in cultivating the values and skills required for responsible citizenship in a world full of complex concerns.

Sustainable Education Models and Massive Open Online Courses for Improved Education

Sustainable education models and Massive Open Online Courses (MOOCs) have the potential to work together to provide education that goes beyond knowledge acquisition, goes beyond simple knowledge acquisition, and equips citizens to create a prosperous future (UNESCO, 2014). This conceptual research explores this rich field, revealing how MOOC platforms' wide reach and dynamic nature can be used to reimaging and magnify sustainable education frameworks such as Place-Based Learning and Education for Sustainable Development (ESD) (Barth & Filho, 2012; Sobel, 2004).

With the democratizing influence of MOOCs, picture classrooms without walls that transcend locational limits and socioeconomic divides (Bates, 2015). Now, bring the transformative principles of sustainability into these digital environments / virtual spaces. Through collaborative projects and community engagement, courses will not only teach environmental consciousness but also provide learners with the tools they need to become change agents (Sterling, 2014). Imagine social justice platforms that celebrate the diversity of cultures in the virtual classroom and guarantee that all students have equal access to high-quality education (Adams, 2014).

This represents the unrealized potential of MOOCs and sustainable education models working together. In this future, education will go beyond dry lectures and textbooks to include collaborative problem-solving and real-world experiences, bringing education in line with the opportunities and challenges of a sustainable future (Sterling, 2010). According to this vision, students take an active role in creating a world that is more fair, just, and environmentally conscious rather than merely being passive consumers of knowledge (Biesta, 2012). So come along on this journey to explore this dynamic synergy's unexplored territory. We open the door to a future where education inspires, empowers, and equips everyone to create a better, more sustainable tomorrow by recognizing the mutually reinforcing potential of MOOCs and sustainable education models.

Concrete instances to demonstrate this synergy:

- **ESD and MOOCs:** Picture a MOOC devoted to renewable energy sources, where participants from all over the world can access state-of-the-art information and work together virtually to design and implement renewable energy solutions in their local communities (Barth & Filho, 2012).
- **Place-Based Learning and MOOCs:** Imagine a MOOC that explores local ecosystems. Students will learn about the distinctive biodiversity of their areas, make connections with local experts, and collaborate to co-create virtual nature trails or conservation projects. This will instill a sense of stewardship and responsibility for their surroundings (Sobel, 2004).
- **Skills-Based Learning and MOOCs:** Envision a MOOC where students improve their critical thinking and problem-solving abilities for sustainability through interactive simulations, real-world sustainability challenges, and cooperative solution development.

  MOOCs and Skills-Based Learning: Imagine a massively open online course (MOOC) that focuses on critical thinking and problem-solving techniques for sustainability. Students take part in interactive simulations, address actual sustainability issues, and work together to find solutions, all while refining the abilities necessary to deal with the complexity of a changing world (Sterling, 2010).
- Delivery of content is just one aspect of this synergy. MOOC platforms provide certain benefits.
- **Scalability:** MOOCs can offer learners, regardless of location or socioeconomic background, sustainable education opportunities that go far beyond traditional classroom walls (Bates, 2015).

- **Interactivity:** In the virtual classroom, lively discussion boards, group projects, and peer-to-peer learning environments encourage involvement and a feeling of belonging.
- **Accessibility:** By removing obstacles to education, open-source materials and adaptable scheduling techniques foster inclusivity and guarantee that no one is left behind.

In order to reveal this synergy, obstacles must be overcome:

- Digital divide: Inclusivity and equitable participation are severely hampered by unequal access to technology and internet connectivity.
- Quality assurance: Careful planning and continuous assessment are necessary to maintain excellent instructional materials and captivating learning opportunities within the MOOC format.
- Accreditation and assessment: Including genuine and significant assessment procedures in MOOCs while acknowledging prior knowledge and learning is still a challenging but essential component.
- The possibilities for sustainable education models and MOOCs to collaborate are enormous, despite these obstacles.
- By combining the advantages of both, we can design adaptable, stimulating, and powerful learning environments that enable people to develop into critical thinkers, responsible citizens, and change agents in a society that faces many difficult issues. This is about more than just education; it's about revealing a future in which knowledge creates the foundation for a prosperous and sustainable society.

Conclusion:

In conclusion, a promising route to improved learning in the twenty-first century is revealed by the investigation of the synergy between Sustainable Education Models and the integration of technology, particularly through Massive Open Online Courses (MOOCs). Educational institutions can create a comprehensive and lasting learning experience by implementing well-known sustainable education models that incorporate the five fundamental pillars of environmental sustainability, social equity and inclusivity, economic viability, cultural relevance and understanding, and technology as an accelerator. Empirical examples of this synergy's transformative potential include the combination of MOOCs and Education for Sustainable Development (ESD), Place-Based Learning, and Skills-Based Learning. Furthermore, MOOC platforms' scalability, interactivity, and accessibility help to break down barriers to education by providing learners all over the world with access to sustainable education opportunities. The blending of technology and sustainable education models, particularly through MOOCs, appears as a ray of hope and innovation for the future of education as we work to create a more equitable, ecologically responsible, and successful educational paradigm.

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Green Synthesis, Characterization of Nanoparticles Using Plant Extracts and Evalution of Antiviral, Antioxidant and Antimicrobial Activity

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Abstract:
The development of environmentally friendly methods for the synthesis of nanoparticles has proven to be a significant step forward in the field of nanotechnology. Nanotechnology is a scientific field that structures materials at the atomic level to achieve unique properties that can be manipulated for required applications. Among all metal nanoparticles, silver nanoparticles have attracted the most attention due to their unique physical, chemical and biological properties. To overcome the limitations of traditional methods for synthesizing nanoparticles, green chemistry has emerged as an alternative. The synthesis of nanoparticles using plants is considered the most suitable of all available environmentally friendly methods due to the large diversity of biomolecules present in plants, which act not only as reducing agents but also as stabilizers/limiting agents etc. to enhance the reaction speed. Moreover, unlike microbial cultures, they are easy to handle, widely used, and readily available.In this review, we consider different plants that can be used for rapid and one-step protocols for the synthesis of silver nanoparticles and also discuss their antiviral, antibacterial, and antioxidant properties.
Keywords: Green synthesis, Natural plant extracts, Nanoparticles, Antiviral, Antioxidant, Antimicrobial Activity.

Introduction:

Nanotechnology is the technological innovation of the 21st century. Research and development in this field is rapidly increasing worldwide [1]. New and sustainable methods within the framework of "green nanotechnology" have been recently developed for nanoparticle synthesis. Chemical, physical and biological (natural precursors) factors have been analytically studied to design and synthesize nanoparticles with desired size, shape and functionality [2]. The use of microorganisms (fungi and bacteria) and natural products rich in hydrogen atoms (fruit juices, polysaccharides, plant extracts) for the biosynthesis of nanoparticles has advantages over traditional synthesis methods in terms of biocompatibility, low production costs, natural materials and reduced chemical atmosphere [3]. No toxic solvents, chemical precursors or additional reducing agents are used in these synthesis routes [4]. Amino acids, phytochemicals, polysaccharides, polyphenols, and vitamins have also been used for green synthesis of nanoparticles [5]. There is a great need to develop better methods/approaches using green nanotechnology to improve the efficacy of available drugs and antiviral/antibacterial materials. As shown in Figure 1, top-down and bottom-up methods are two exclusive approaches to synthesize nanoparticles. In top-down methods, various methods such as ion or ball milling and laser ablation are used to break down suitable bulk materials into smaller particles. On the other hand, in bottom-up methods, chemical and biological routes are commonly used to synthesize nanoparticles through the self-assembly of atoms to form new nuclei that grow into nanoparticles [6]. In addition, the development of nanoparticles using sacrificial templates and other coblock polymers has also been reported [7]. Green synthesis of nanomaterials using biomolecules such as DNA [8], proteins [9], phase transfer catalysts [10], and enzymes has been reported [11].

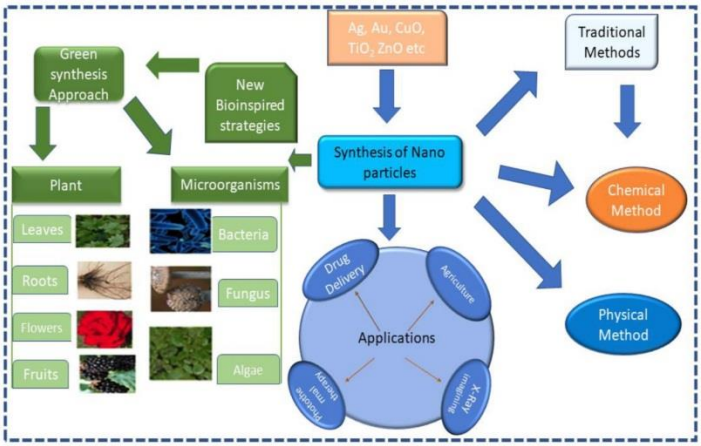

Fig. 1 Represents flow chart of general synthesis of green Nanoparticles and their applications

Meanwhile, new viruses are constantly being developed, creating new challenges around the world. Therefore, it is necessary not only to discover new antiviral drugs to control viruses, but also to develop innovative ways to maximize the benefits of existing drugs and other approaches to control the spread of viruses [12]. One of the most cost-effective approaches is vaccines, which have contributed greatly to reducing viral diseases [13]. Therefore, new strategies are widely used to improve vaccines and their effectiveness [14]. Recently, nanotechnology-based approaches have been investigated for their promising antibacterial and antiviral properties [15]. These could include antiviral face masks, textiles, and other coatings that may kill the virus when in contact with surfaces. Many studies have confirmed that nanoparticles are promising agents to enhance the effect of antigens by boosting cell-mediated immunity [16]. Among various nanoparticles, silver nanoparticles (AgNPs) prepared from plant extracts are particularly suitable as novel antiviral candidates due to their mechanism of action that targets multiple targets. These nanoparticles have been shown to have antiviral activity against viruses such as HIV [17], Hepatitis B virus [18], Herpes simplex virus type 1 [19], Chikungunya virus (CHIKV) [20], and influenza virus [21]. Similarly, garlic extract was used to synthesize gold nanoparticles (AuNPs-As). These acted as a reducing agent and showed antiviral activity against the measles virus [22]. Additionally, CuO nanoparticles have been synthesized using Syzygium alternifolium fruit extracts to act as antiviral agents against Newcastle disease virus (NDV) [23]. Nanoparticles, due to their important biophysicochemical properties, protect antigens from degradation and target them for transport to antigen-transduced cells and desired intracellular compartments [24]. Currently, nanomaterial approaches are being integrated with biomimetic methods to advance the synthesis of bioinspired nanoparticles with potential antiviral properties. These bioinspired nanoparticles have many advantages, including suitability, diversity and reproducibility, complexity, and biocompatibility in synthesis [25]. The synthesis of nanoparticles based on plant extracts uses a variety of natural products that can produce nanoparticles with higher purity. Polymer-coated nanoparticles [26] Cu nanoparticles [27] Au nanoparticles [28] Ni and Pt, Pd, Si nanoparticles [29] Ag nanoparticles, CuO nanoparticles, ZnO nanoparticles [30] TiO2 nanoparticles [31] ZrO2 nanoparticles [32] and FeO nanoparticles based on simple plant extracts. Hence, this report is an attempt to present the recent advances on bio-inspired green synthesis nanoparticles for exploring antibacterial and especially antiviral activity. Various nanoparticles based on microorganisms, fruit juices, polysaccharides and plant extracts have been discussed. Moreover, here we have highlighted the application of various bio-inspired green synthesis of nanoparticles as antiviral and antibacterial agents. This report provides insights into various recent reports on the synthesis of advanced nanomaterials using green and simple approaches instead of using complicated procedures and dangerous and toxic chemicals for the synthesis of nanomaterials.

Methods for synthesis of nanoparticles:

Currently, many techniques are available for the synthesis of metal nanoparticles. Nanoparticle synthesis is generally either top-down or bottom-up. In top-down synthesis methods, nanoparticles are produced by reducing the size of nanoparticles from suitable starting materials. To reduce the size, various physical and chemical processes are used. Physical methods include techniques such as evaporation-condensation and laser ablation, while chemical methods include chemical reduction through the use of organic and inorganic reducing agents. Top-down manufacturing methods introduce imperfections in the surface structure of the product, which is a major drawback since the surface chemistry and other physical properties of nanoparticles are highly dependent on the surface structure [33]. In bottom-up synthesis methods, nanoparticles are built up from smaller units, such as by the fusion of atoms, molecules, and small particles. In bottom-up synthesis, the nanostructural building blocks of nanoparticles are first generated and then assembled to form the final particle [33]. Bottom-up synthesis is mainly achieved by chemical and biological methods. Biological methods allow the synthesis of nanoparticles without the use of aggressive, toxic and expensive chemicals. Among all biological methods used to synthesize nanoparticles, microbial-based methods were mentioned most frequently [34]. The advantages of microbial synthesis include being easily scalable, environmentally friendly and compatible with the use of products in medical applications, although microbial production is often more expensive than the production of plant extracts. Synthesis of nanoparticles by plants using whole plant extracts or by living plants has also been reported in the literature [35]. Different methods for synthesizing metal nanoparticles are shown in Figure 2.

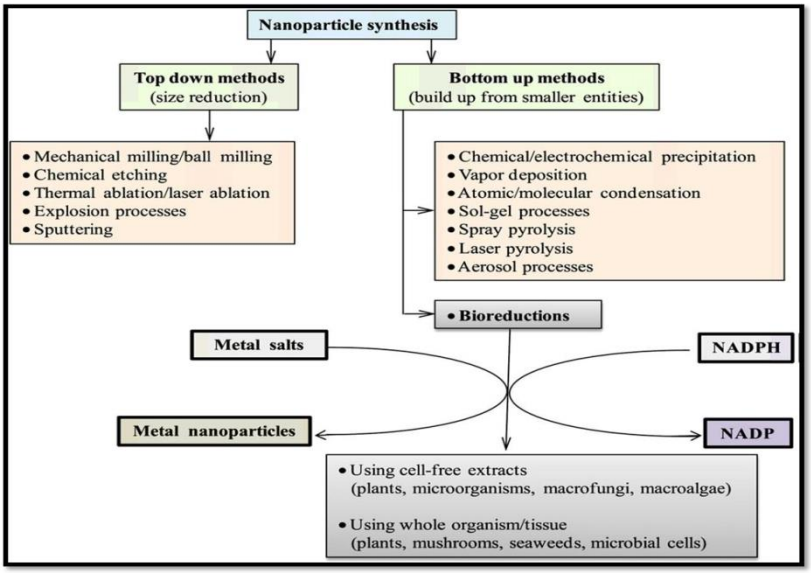

Fig. 2: Different Approaches for Nanoparticle Synthesis

Green synthesis is a biological method to synthesize nanoparticles. Green synthesis of AgNPs is the most widely used method as it has several advantages over traditional techniques (chemical and physical methods). The technique is environmentally friendly, simple and does not require sophisticated equipment or chemicals. No toxic chemicals are used as reducing agents and the stabilizers are of plant origin. Plants provide reducing agents, stabilizing agents and coating agents free of charge and the costs of microorganisms and media are also reduced. This ultimately reduces the overall cost of the formulation. This method is a good alternative to traditional nanoparticle synthesis methods. The products made this way are more stable and have the desired shape and size. Naturally occurring plant components consist of numerous primary and secondary metabolites such as proteins, amino acids, vitamins, nucleic acids, alkaloids, terpenoids, favonoids, saponins, and phenols [36]. These primary and secondary metabolites in the plant extracts act as reducing agents for silver ions by oxidizing them and coating the newly developed particles. In the presence of oxygen, such as silver nitrate (AgNO3), these metabolites lose electrons and are oxidized by common cellular processes, acting as reducing agents [37] (Figure 3).

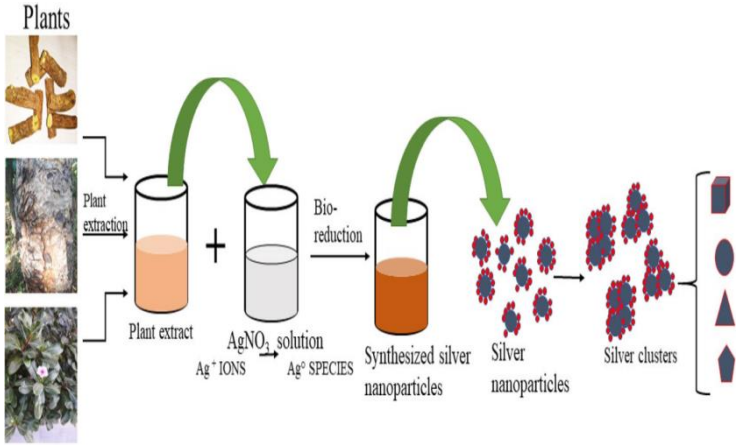

Fig.3. Synthesis of AgNPs through Green synthesis method

The process of green synthesis begins when plant extracts are mixed with a silver nitrate solution. After a certain time, a color change indicates the formation of nanoparticles. When a plant extract or active plant ingredient acting as a reducing agent is added to the silver nitrate solution, which contains cations (Ag+), it is transformed into a zero-valent state (Ag° species). Then, the embryogenesis process begins, which is quickly followed by a growth phase, which allows smaller particles to combine to form larger nanoparticles that are more thermodynamically stable. Finally, nanoparticles are formed into various shapes such as cubes, spheres, triangles, hexagons, pentagons, rods, wires, etc. Some factors that affect the synthesis and formation of nanoparticles include pH, temperature, concentration of plant extracts, reaction time, concentration of silver nitrate, pressure, etc. [38]. Phytoconstituents of plants act as good reducing and stabilizing agents. Honeysuckle flower extract acts

as a reducing and blocking agent in the synthesis of AgNPs and has anticancer effects. Artocarpus integer leaf extract was used to synthesize AgNPs and formed spherical NPs ranging from 5.76 nm to 19.1 nm. Catharanthus roseus extract used for the synthesis of AgNPs showed the presence of indole-type alkaloids acting as reducing and stabilizing agents. AgNPs synthesized in green using Clitoria ternatea and Solanum nigrum leaf extracts showed antibacterial activity against nosocomial pathogens. The synthesis of nanoparticles was confirmed by UV, FTIR, SEM, and XRD. Abelmoschus esculentus (L.) pulp extract was used to form AgNPs of 3–11 nm, which showed anticancer and antibacterial activity [39]. Moreover, several other research papers have shown well-developed nanoparticles using green synthesis methods and their potential role in medicine.

Different types of natural extracts used for the synthesis of nanoparticles:

Various techniques are used to synthesize nanoparticles from plant extracts, as shown in Figure 4. These techniques are cost-effective, environmentally friendly, and avoid complicated procedures. Recently, researchers have extensively studied metal nanoparticles derived from plant extracts and found them to be not only biocompatible but also non-toxic. These nanoparticles have great potential for targeted drug delivery and may exhibit antiviral, antibacterial, and anticancer properties [40]. Table 1 below lists the various plant species and other organisms used to grow novel nanoparticles.

Table: 1 Summary of the synthesis of nanoparticles utilizing plant extracts

Sr. No.	Plant Extract	Nanoparticles (NPs)	Reference
1	*Acacia gum, Tree gum*	Sc NPs	[41]
2	*Cinnamomum cassia (Lauraceae)*	Ag NPs	[42]
3	*Alternaria species, F. oxysporum,*	Ag NPs	[43]
4	*Aspergillus species (Trichocomaceae)*	Ag NPs	[44]
5	*Tragacanth gum*	Ni–Mg ferrite NPs, Ni–Cu–Mg ferrite NPs, Ni–Cu–Zn ferrite NPs, ZnO NPs, carbon nanodots	[45]
6	*karaya gum*	CuO NPs	[46]
7	*Rhamnogalacturonan gum*	Ag NPs	[47]
8	*Ghatti gum*	Pd NPs	[48]
9	*Croton Caudatus Geisel leaf*	Au NPs	[49]
10	*Arabic gum*	MgO NPs, ZnO NPs	[50]
11	*Aloe vera*	Au and Ag NPs, In_2O_3 NPs	[51]
12	*Sedum alf redii*	ZnO NPs	[52]
13	*Pear fruit extract*	Au NPs	[47]
14	*Ocimum sanctum*	Ag NPs	[47]
15	*Mulberry leaves extract*	Ag NPs	[47]
16	*Bombyx mori silkworm*	Ag NPs	[47]
17	*Zea mays L. (Poaceae))*	Ag NPs	[47]
18	*Zea mays lea plant*	NiO NPss	[45]
19	*Bombyx mori silk cocoon*	Au NPs	[49]
20	*Tea stem*	Ag NPs	[47]
21	*Eucalyptus globulus leaf*	Ag NPs	[47]
22	*Quercus brantii oak*	Ag NPs	[47]
23	*Withania coagulans*	Ag NPs	[47]
24	*Bauhinia purpurea leaf*	Au NPs	[49]
25	*Camellia sinensis leaf*	Ag NPs	[47]

Different types of nanoparticles synthesized using plant extract:

There are various physical and biochemical approaches to generate single or hybrid nanoparticles using plant extracts [53]. These include top-bottom and bottom-top approaches. Figure 5 provides an overview of the synthetic strategies and general growth mechanisms for nanoparticle generation using plant extracts.

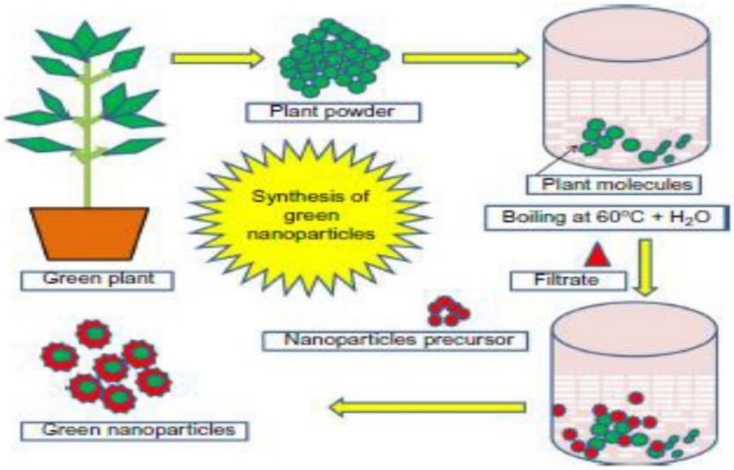

Fig. 4 Represents typical synthesis strategy of Green Nanoparticles

Synthesis of Au nanoparticles utilizing citrus fruit extract:

The detailed procedure for synthesis of Au nanoparticles using citrus fruits such as lemon and reticulate is shown in Figure 5. First, the lemon was crushed to obtain the extract, which was poured onto a fine-pore nylon mesh. The squeezed juice was centrifuged at 10,000 rpm for 10 min. After a while, 50 mL of a solution of 1 mM hydrogen tetrachloroaurate trihydrate was boiled and mixed vigorously and uniformly. Varying amounts of the extracted juice, 1-6 mL, were mixed with the host solution. A color change from colorless to dark purple to ruby red was observed. After 20 minutes, the colloidal solution was mixed further and then cooled to room temperature. It was then transferred to a separate container for storage. Surface plasmon resonance peaks were observed in the region of 530-550 nm. Detailed TEM studies to understand the structural properties of AuNPs. [54]. In this type of synthesis, the presence of carboxylic acids provides excellent reduction reaction conditions to suppress oxidation and tune the morphology of the nanoparticles.

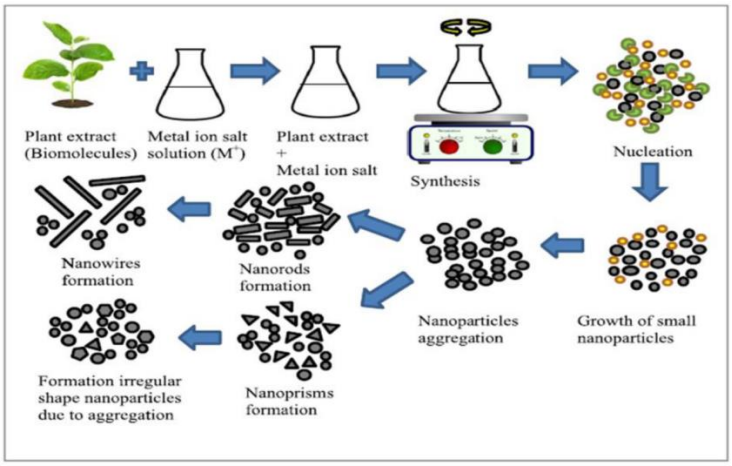

Fig. 5 The general mechanism for synthesis of nanoparticles utilizing plant extract reproduced with permission.

Synthesis of Ag nanoparticles utilizing plant extract:

Metal nanoparticles have attracted great interest due to their large surface area, high electrical conductivity, excellent chemical properties and special properties. Ag nanoparticles have attracted the attention of researchers due to their unique properties such as thermal and large electrical conductivity, Raman scattering, high catalytic activity, chemical stability, promising antibacterial activity, etc. Ag nanoparticles are of great importance as antibacterial agents compared to other precious metals. The synthesis of Ag nanoparticles with desired shape, size, and antibacterial activity has been discussed in the literature. These excellent properties of Ag

nanoparticles make them unique for cancer therapy with minimal systemic toxicity [55]. Currently, various researchers are working on nanoparticle-based therapeutics aimed at fighting cancer. Her research is mainly focused on the practical synthesis of silver nanoparticles using plant extracts.

Synthesis of ZnO nanoparticles utilizing plant extract:

ZnO nanoparticles have been clearly used in ceramic resistors, catalysts, gas sensors, photonic devices, energy harvesting, and biomedical applications due to their excellent semiconducting properties and biocompatible nature. Moreover, the US FDA has registered ZnO nanoparticles as GRAS metal oxides (generally classified as benign) [38]. ZnO nanoparticles are used in the field of drug delivery systems and cancer treatment and have antibacterial properties. Various studies have reported the synthesis of ZnO nanoparticles using plant extracts. Iqbal et al. synthesized ZnO nanoparticles by extract of green plant (Rhamnus virgate) [56].

Synthesis of SnO_2 nanoparticles utilizing plant extract:

SnO2 nanoparticles also have many applications, such as: B. They have antifungal, antibacterial, photocatalytic, antioxidant properties, and are also used in developing sensors. Plant parts such as buds, leaves, flowers, fruits, bark, and seeds are mainly used to produce SnO2 nanoparticles. The development procedure for SnO2 nanoparticles includes harvesting the plant, separating the required parts, washing and drying, grinding, dispersing, and heating in distilled water. It is then filtered to remove the fibers and produce a clear extract. Various precursors are added to the plant extract to produce SnO2, which is then calcined at a temperature of 600-800°C. Various plant species used for SnO2 synthesis have been described in the literature. Plant parts have been used successfully to produce SnO2 nanoparticles [57].

Metal nanoparticles reduction using plant extract as reducing agents:

Nanoparticles derived from plants were used as stabilizers and to mitigate common mechanisms of metal ions (e.g., Ag+ to Ago or Au+ to Auo). Acacia gum and gum carbohydrates are widely used to prepare plant extracts as biostabilizers and bioreductants for the synthesis of zero-valent metal nanoparticles. Gold nanoparticles were synthesized using acacia gum. These nanorods are less harmful when made with cetyltrimethylammonium bromide. Gold nanorods were also synthesized using gara gum to improve biocompatibility. Other gums such as okra gum, xanthan gum, and tragacanth gum have also been used for surface functionalization of metal nanoparticles. Proteins are also used as bioreductants for metal ions, but they have many advantages and disadvantages. They have proven effective in controlling the shape and size of nanoparticles. The use of water as a solvent reduces the harmful effects of chemical solvents. The disadvantages of using these properties are the high sensitivity of proteins, changes in protein structure, and reduced protein performance. Proteins are also sensitive to temperature, so they are resistant at high temperatures. There are many studies on the natural active ingredients found in Aloe vera leaves. These include pectin, hemicellulose, and lignin, which can be used to reduce silver ions [58]. Aloe vera leaves contain polyphenolic groups, which reduce silver salts to silver nanoparticles. Currently, Ag nanoparticles have also been prepared to utilize Aloe vera leaf extract as a potential reducing agent. The strategy of producing silver nanoparticles using environmentally friendly reducing agents is also interesting. Extracts of Azadirachta indica (neem), Ocimum tenuiflorum (black tulsi), Citrus limon (lemon), Solanum lycopersicum (tomato), Cucumis sativas (cucumber), and Capsicum annum (green chili) were prepared to form a 1 mM AgNO3 aqueous solution. Ag nanoparticles were synthesized.

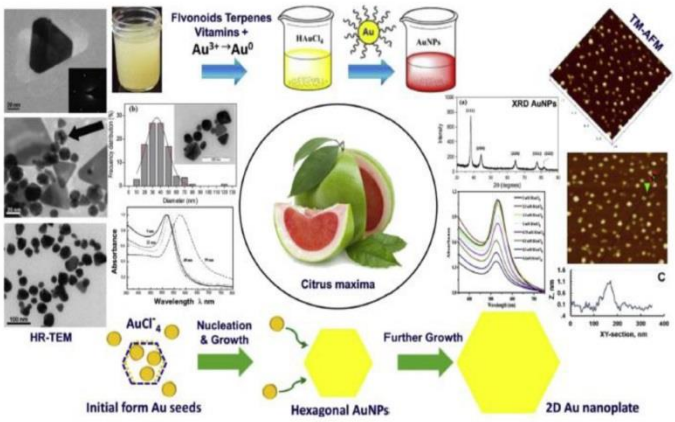

Fig. 6 The synthesis of Au nanoparticles utilizing citrus fruits having lemons, sickness, and reticulate extract reproduced with permission

Role of plant extracts as template/surfactant in nucleation and shape-controlled growth of nanoparticles:

Shape-specific generation of metal nanoparticles is important to stimulate their electronic, optical, and chemical properties. Various templates such as polymers, dendrimers, thiolate ligands, proteins, plant extracts, and surfactants have been used as capping molecules to control the shape of nanoparticles. Surfactant-based molecules have been of great interest due to their role as soft templates. They provide a microenvironment of shape and size below and above the critical micelle concentration, inducing the growth and stability of nanoparticles. [59] Due to their unique surface properties, the functionality and chemical reactivity of nanoparticles are influenced by the type of surfactant molecules. In the past two decades, much attention has been paid to producing nanoparticles of desired shapes and sizes, mainly Au and Ag nanoparticles, using various reducing agents under different experimental conditions. Murphy et al. reported variable ratio Au nanorods using cetyltrimethylammonium bromide (CTAB) as a template via a three-step seeding protocol procedure using different Au seeds. They observed that the seed size increased by decreasing the aspect ratio of the nanorods. The authors explain that the surface charge of the seeds plays an important role in the formation of nanoparticles. Wang et al. described the surface reconstruction of electrochemically developed rugged Au nanorods in the presence of micelles as templates. Recently, Jenkins et al. described the shape and size of properly formed seed-mediated preparation of Au nanoparticles and nanorods to illustrate the effect of size on the optical properties. They demonstrated the growth mechanism. These nanoparticles showed various applications such as catalysis, optical device fabrication, bioimaging, biological labeling, and antibacterial agents. It has also been reported that the shape of Ag nanoparticles changes. reported surfactant-assisted bioconjugated silver nanoparticles in the presence of lemon extract as a reducing agent and CTAB as a shape-controlling mediator [60]. Pietrobon et al. described the shape-selective photochemical conversion of Ag nanoparticle precursors to decahedral Ag nanoparticles. They explained that by changing the irradiation light and spectroscopic properties, the size of Ag nanoparticles also changes. reported that the optical properties of nanoparticles used in various bio-based applications are controlled by their shape. This is especially prevalent for noble metal nanoparticles such as Au and Ag. To avoid the additional toxicity of surfactants acting as shape control agents, bio-inspired synthesis of nanoparticles can be performed instead [198]. In another study in the related field, Geng et al. reported the synthesis of Ag nanoprisms in the presence of bovine serum albumin (BSA) protein using iterative CTPR [61].

Shape specific preparation of metal nanoparticles is significant for stimulating electronic, optical, and chemical possessions. A diversity of templates like polymer, dendrimers, thiolate ligands, proteins, plant extracts, and surfactants has been used as covering molecules to control the shape of the nanoparticles. Surfactant based molecules express significant interest due to their soft template role. It delivers shape and size microenvironment under and above the vital micellar concentration, inducing the nanoparticles' growth and stability. [59].

Characterization of nanoparticles:

Nanoparticles are generally characterized by their size, shape, surface area, and dispersity. The uniformity of these properties of nanoparticles is important for many applications. Accumulating evidence indicates that physicochemical properties such as size and surface chemistry have a significant effect on the behavior of nanoparticles in biological systems and may determine to some extent the biodistribution, safety, and efficacy of the particles. Nanoparticles are generally characterized by the techniques of UV-Vis spectrophotometry, scanning electron microscopy (SEM), dynamic light scattering (DLS), transmission electron microscopy (TEM), Fourier transform infrared spectroscopy (FTIR), energy dispersive spectroscopy (EDS), and powder X-ray diffraction (XRD) [62]. Nanoparticles are primarily characterized by UV-Vis spectroscopy, which is the most commonly used technique. Generally, wavelengths of light between 300 and 800 nm are used to characterize various metal nanoparticles in the size range of 2 to 100 nm. Silver nanoparticles are characterized by spectrophotometric absorption measurements in the wavelength range of 400-450 nm. Characterization based on surface charge and size distribution of particles suspended in liquid can be done using dynamic light scattering (DLS).

Another method commonly used to characterize nanoparticles is electron microscopy. Morphological characterization in the nanometer to micrometer range can be done using scanning electron microscopes and transmission electron microscopes. Transmission electron microscopes have a resolution 1000 times higher than scanning electron microscopes due to the use of a more powerful electron beam. TEM provides more details at the atomic level, including information about the crystal structure and grain size of the sample. FTIR spectroscopy is useful for characterizing surface chemistry [63]. Organic functional groups (e.g. hydroxyl, carbonyl) attached to the surface of nanoparticles and other chemical residues on the surface can be detected using FTIR spectroscopy. It is based on the fact that elementary particles in

molecules do not stay in place, but move to different positions through vibrations. If there is a periodic change in the dipole moment, this vibrational mode becomes infrared active (IR) through molecular vibrations. Each functional group has a wide range of vibrational frequencies and is sensitive to the physicochemical environment, providing valuable information about the presence of a particular functional group in a particular sample. Phase identification and characterization of the crystalline structure of nanoparticles can be performed using XRD techniques: X-rays penetrate deep into the nanomaterial and the resulting diffraction pattern is compared with standards to obtain structural information. For characterization of metal nanoparticles based on their elemental composition, the well-established technique of energy dispersive spectroscopy (EDS) is used [64].

Antiviral activities of green synthesis of nanoparticles:

Various researchers reported that Ag nanoparticles showed antiviral activity against Yellow Mosaic Virus (BYMV), Potato Virus Y (PVY), Sun Temp Rosette Virus (SHRV), and Tomato Mosaic Virus (ToMV). They proposed that silver nanoparticles interfere with the replication of viral nucleic acids in plant cells by binding to the virus particles. They also observed that the induction of systemic acquired resistance (SAR) increases the release of reactive oxygen species (ROS) [65].

In another similar study, Cai et al. on the synthesis of ZnO nanoparticles and their antiviral effect against PVY and TMV in tobacco plants. Abdelkhalek et al. also developed a green synthesis of ZnO nanoparticles using Mentha spicata plant leaf extract. They described the protective and healing activity of ZnO nanoparticles against TMV. In another similar study, Melendez-Villanueva and his team studied the production of gold nanoparticles using garlic extract and their antiviral effect against measles virus (MeV). They suggested that Au nanoparticles could act as an antiviral system due to their promising antiviral activity [66]. Figure 7 shows the mechanism of Au nanoparticles and their antiviral effect against measles virus.

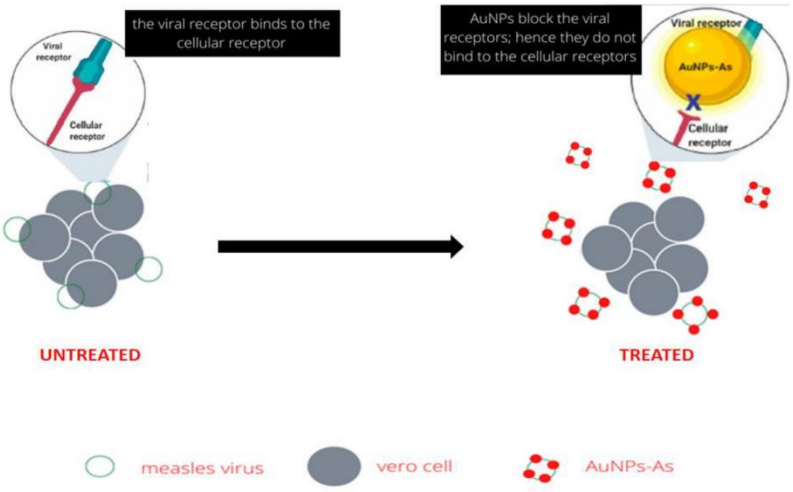

Fig. 7 Representation of a suggested of virucidal influence of AuNPs-As on Measles

This was also demonstrated in a study by Haggag et al. who described the development of Ag nanoparticles using extracts of Lampranthus occinus and Malephora lutea F. Aizoaceae. They then examined their antiviral activity. In another study, Avilala et al. investigated the generation of Ag nanoparticles by marine actinomycetes and examined their antiviral activity against Newcastle virus disease (NDV) [67]. Sharma and his team also studied the synthesis of silver nanoparticles using Andrographis paniculata and Tinospora cordifolia and evaluated their antiviral activity against Chikungunya virus. Their antiviral activity was confirmed by a cell transparency test dye called 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT). Sreekanth et al. reported the synthesis of Ag nanoparticles using ginseng root extract as shown in Figure 8 and investigated their antiviral activity by sulforhodamine B (SRB) assay against influenza virus.

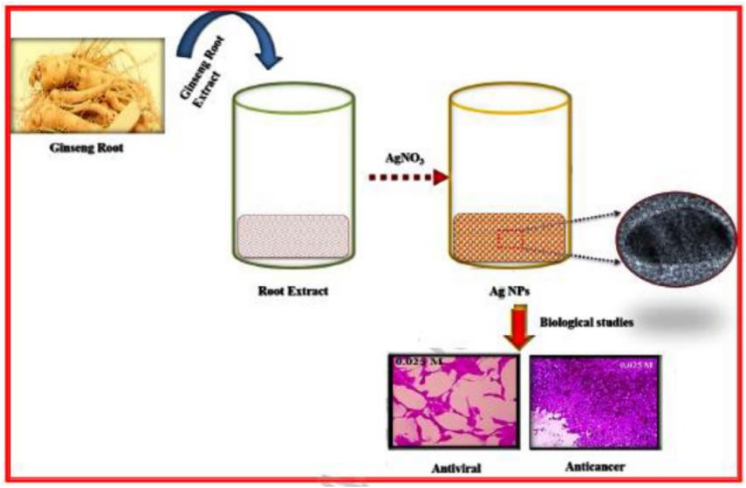

Fig. 8 Scheme of synthesis of Ag nanoparticles by means of extract of Panax ginseng roots and their antiviral activity reproduced with permission

Also studied the production of CuO nanoparticles using Syzygium alternifolium fruit extract and described their antiviral activity against Newcastle Disease Virus (NDV). Another study reported the antiviral properties and general mechanism of Ag nanoparticles as shown in Table 2 [68]. The antiviral mechanism of Ag nanoparticles is shown in Figure 9.

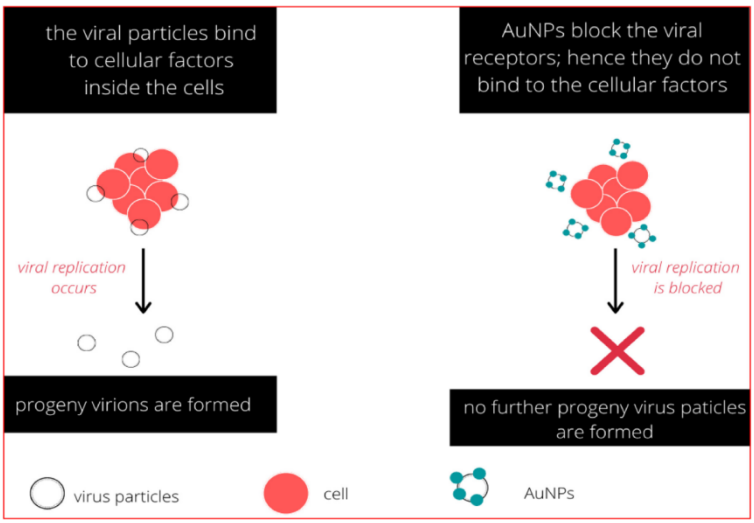

Fig. 9 The antiviral activities of the Au nanoparticles.

Table 2 The antiviral properties of the Ag nanoparticles

Sr. No.	Virus	Composition of Silver Nanoparticles	Way of Action	Reference
1	Herpes simplex virus type 2 (HSV-2)	Tannic acid-modifified silver nanoparticles (13 nm)	Act together with viral glycoproteins thus prevent with cell attachment	[69]
2	Bacteriophage MS2, Murine novovirus	Magnetic hybrid colloid silver nanoparticles (15 nm)	Damage proteins of the viral coat	[70]
3	Herpes simplex virus type 1 and type 2 (HSV-1 & HSV-2)	Mycosynthsized silver nanoparticles (4–31 nm)	Block interaction of virus and Cells	[71]
4	Human immunodefificiency virus(HIV)	PVP-coated silver nanoparticles (30–50 nm)	Prohibit the interface between gp120 and cell membrane receptors	[72]
5	H1N1 inflfluenza A	Silver nanoparticles coated with	Prohibit the viral interaction with host cells and interface of silver	[73]

		Chitosan(3.5, 6.5, and 12.9 nm)	nanoparticles with viral glycoproteins	
6	Poliovirus	Pure silver nanoparticles (7.1 nm)	Fix with the viral particles thus avoid binding with host receptor and reserve of viral proteins	[74]
7	Respiratory syncytial virus (RSV)	PVP-coated silver nanoparticles (10 nm)	Interfere with virus attachment by binding with gp120 glycoprotein	[75]
8	Hepatitis B virus (HBV)	Silver nanoparticles (10 and 50 nm)	Decrease the development of HBV DNA by binding with the HBV dsDNA and virions	[76]
9	Adenovirus type 3 (Ad3)	Silver nanoparticles (11.4 nm)	Destructive the viral particles and fifix to the viral DNA	[77]

Antimicrobial activities of green synthesis of nanoparticles:

In recent years, the synthesis of nanoparticles from natural extracts has become a popular method due to their various antibacterial properties. They have proven to be a good alternative to antibiotics as they have the potential to develop multiple drugs against pathogens. The process of green synthesis can be carried out through 12 major systems of green chemistry. A frequently used system is the biogenic system of nanoparticles. This system has unique properties for the further development of nanoparticles. The size of nanoparticles also influences the physicochemical reactions of antibacterial effects. Classically, smaller nanoparticles exhibit stronger stability and enhanced antibacterial effects. More importantly, to be effective antibacterial agents, the size of nanoparticles should be less than 50 nm [78].

Antibacterial activities of green synthesis nanoparticles:

Silver nanoparticles have fascinated scientists due to their broad range of antibacterial properties. Recent advances in antibacterial agents have led to the need for resistance of microorganisms to antibiotics. Iqbal and his colleagues described the antibacterial properties of ZnO nanoparticles extracted from plants. They described the antibacterial effect using bacterial strains such as Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumoniae, and Escherichia coli. Fig. 10 demonstrates the antibacterial ability of ZnO nanoparticles against various bacterial strains.

Antifungal activities green synthesis of nanoparticles:

Ahmad et al. described the antifungal effect of TiO2 nanoparticles synthesized by green synthesis using selected pathogens such as Aspergillus fumigatus, Arthroghrafis cuboides, and Aspergillus niger. The green synthesis of TiO2 nanoparticles showed the significance of antifungal activity against Aspergillus niger. The antifungal action mechanism of TiO2 nanoparticles is shown in Figure 11. Djebril and his team carried out the synthesis of silver nanoparticles using Melia azedarach leaf extract. They studied its antifungal effect and reported that the disease persisted even after 60 days, which was significantly reduced by 87% and 97%, respectively, compared to the raw control shown in Figure 12. Silver nanoparticles significantly prevented the development of Verticillium dahliae in eggplant, which represents pathogen control by silver nanoparticles [79].

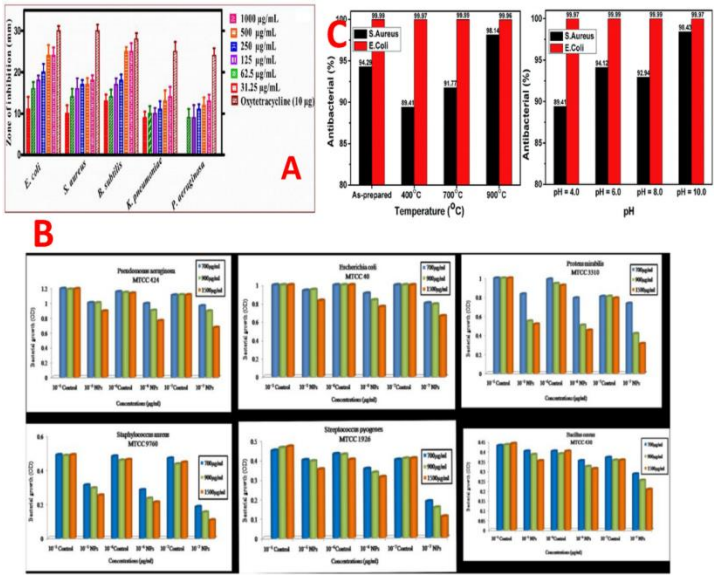

Fig. 10 (A) Antibacterial activities of ZnO nanoparticles reproduced with permission, (B) The bactericidal rates of the ZnO NPs toward E. coli and S. aureus for the as-prepared samples at various annealing temperatures and at different pH values, (C) Optical density vs. Concentration of zinc oxide nanoparticles using Catharanthus roseus leaf extract against six pathogens.

Copper (II) oxide and iron(III) oxide nanoparticles were also synthesized from Euphorbia heliscopia leaves using microwave. These green synthesized nanoparticles were spherical in shape. The antifungal activity of these oxide nanoparticles was tested using Cladosporium herbarum. Iron (III) oxide has stronger antifungal activity against Cladosporium herbarum than copper(II) oxide nanoparticles. Silver (Ag) nanoparticles were synthesized using peanut shell extract and their antifungal activity was investigated. These nanoparticles showed a zone of inhibition of 5–6 nm against the fungi Phytophthora capsici and Phytophthora infestans [80]. Xylan was extracted from corncob and used to synthesize green silver (Ag) nanoparticles.

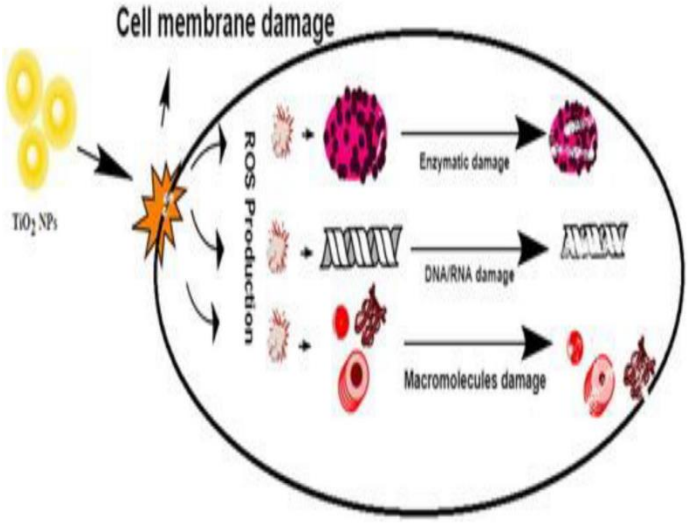

Fig. 11 Mechanism of antifungal action of Green synthesis of TiO_2 nanoparticles

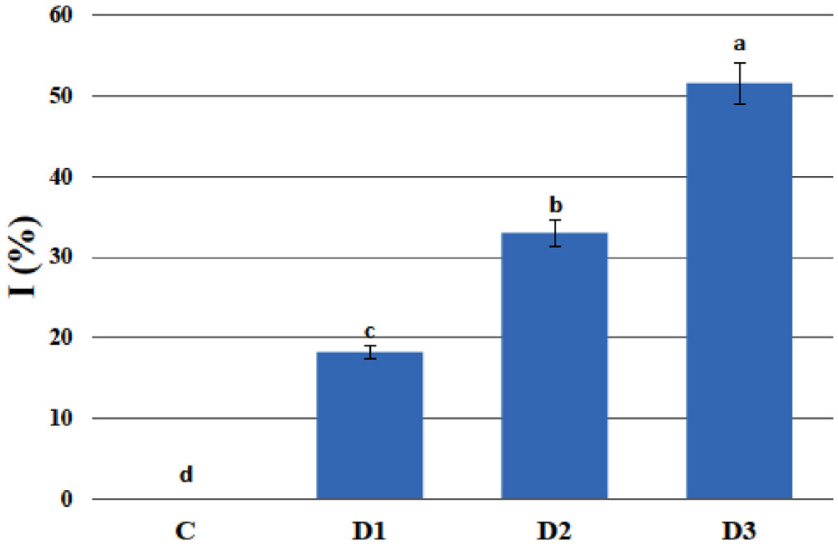

Fig. 12 Effects of the biosynthesized AgNPs solution on development of Verticillium dahlia in eggplants. I (%): Inhibition (%); D1: AgNPs at 20 ppm; D2: AgNPs at 40 ppm; D3: AgNPs, C: Control; at 60 ppm reproduced with permission.

These silver nanoparticles containing (nanoxylan) have been used for antifungal activity. Antifungal activity against C. parapsilosis (MIC = 7.5 mg/ml), Candida albicans (MIC = 7.5 mg/ml) and Cryptococcus neoformans (MIC = 7.5 mg/ml) showed that nanoxylan possesses antifungal activity of these nanoparticles compared to silver. Nitrates are generated during synthesis. Tin doped indium oxide nanoparticles were also synthesized using different concentrations of tin (Sn). These synthesized nanoparticles were further used for antifungal activity study. According to the antifungal results, the lowest inhibitory/fungicidal concentrations were 8 and >8 mg/mL for pure In2O3 NPs, 4 and 8 mg/mL for 5%, 2 and 8 mg/mL for 10%, and 1 and 8 mg/mL for 15% Sn-doped

In2O3 NPs >4 mg /ml. Lehmann, S. et al. investigated the antifungal activity of SnO2 nanoparticles. They stated that for C. albicans, a minimal fungicidal effect was observed at a concentration of >16 mg/ml. Maximum activity was also achieved against bacteria [81].

Antioxidant activities of green synthesis nanoparticles:

Many scientists at different times have studied the antioxidant activity of synthetic silver nanoparticles obtained from plant extracts. Concentrate of Syzygiumcumini (Jambul) seeds was used to synthesize silver nanoparticles. Seed extracts showed antioxidant properties in vitro. Nanoparticles formed with the extracts showed higher antioxidant effect compared to seed extracts. This may be due to the fact that antioxidants from the extracts are better absorbed on the surface of the nanoparticles. When silver nanoparticles were prepared using extracts from ornamental plants such as Hyacinthus orientalis and Dianthus caryophyllus, it was reported that the nanoparticles formed had higher antioxidant activity than ordinary plant extracts. An in vitro evaluation of the antioxidant and anticancer activity of silver nanoparticles synthesized from Morinda pubescens was carried out, revealing that the nanoparticles have high antioxidant capacity and can therefore be used as potential radical scavengers against harmful free radical damage. Silver nanoparticles were synthesized using Chenopodium album leaf extract, and the antioxidant and antibacterial activities of the formed nanoparticles were evaluated in vitro, revealing that AgNPs with leaf extract exhibited higher antioxidant activity than C. murrare leaf extract alone or silver nitrate. Piper longum fruit extract was used for the synthesis of silver nanoparticles. Nanoparticles with an average size of 46 nm were formed and showed strong antioxidant properties in in vitro antioxidant tests [82]

Many scientists studied the antioxidant activity of plant extract mediated synthesized

Advantages and disadvantages of NP synthesis methods:

Various methods such as gamma radiation, microemulsion, autoclave sterilization, electrochemical methods, laser ablation, chemical reduction, photochemical reduction, hydrothermal methods, co-precipitation and sonochemistry have been used to synthesize nanoparticles [83]. These methods have limitations such as low yields, high operational costs, use of toxic chemicals and high energy requirements. Most of the synthesis methods used to explore advanced nanoparticles often involve the use of hazardous chemicals. However, the hazardous nature of these synthesis methods may limit their large-scale production and therefore their applications. To overcome the limitations of hazardous synthesis methods, alternative low-cost techniques such as plant extracts, microorganisms and natural polymers have been used to synthesize advanced nanoparticles for various promising potential applications. The combination of nanotechnology and green chemistry has expanded the range of biologically compatible metal nanoparticles. The synthesis of nanoparticles by plant extracts has many advantages over traditional methods, such as simple procedures, no pollution, no toxicity, possibility of large-scale production of nanoparticles, and cost-effectiveness. These green approaches have ample potential to develop well-defined nanoparticles of specific sizes and shapes for various promising potential applications at a commercial level.

Conclusion:

As discussed in this review, many nanoparticles can be created using various biological systems. Among the many nanoparticles discussed and discovered in the literature, bioinspired precious metals have attracted the most attention from scientists.

This is due to their antibacterial and antiviral properties against various antigens. More research needs to be done to develop nanoparticles that can be used in nanomachines to fight specific groups of pathogens. However, it is only possible to study specific biomolecules within the plants used for nanoparticle synthesis and target them to achieve similar results elsewhere. The term "bioinspiration" is associated with the process of using biological design for useful technologies such as antiviral, antibacterial, antifungal and antioxidant activities. In recent decades, great efforts have been made to further develop materials for green synthesis. In the present report, we review the recent advances in green synthesis using plant extracts to synthesize nanoparticles for applications such as anticancer, antiviral, antibacterial and antifungal. Plant-derived nanoparticles can be widely used in the medical field, antibacterial, therapeutic, antiviral, dressings and consumer products. Thus, green chemistry offers an innovative new technology in advanced research to design and develop antiviral, antibacterial, antioxidant and antifungal activities. Green chemistry has paved the way for developing chemical processes that do not use harmful substances or reduce dependency on such elements. With widespread availability of plant extracts and biologically active biomolecules, nanoparticle biosynthesis has proven to be a much more reliable route compared to its contemporaries. Many studies have lauded its effectiveness against antibiotic resistance drugs, cancer, and other serious diseases. Hence, biologically derived medicines are a much better option compared to chemical medicines.

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Science College Kannad Dist. Chhatrapati Sambhajinagar Maharashtra India accomplish this work successfully.

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The POSH Act Revisited: A Review of Its Impact on Sexual Violence in India

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Abstract:
The Protection of Women from Sexual Harassment at the Workplace (POSH) Act of 2013 is a significant legislative milestone in India, aiming to combat sexual harassment in professional environments and foster a more equitable workplace. Established in response to growing public concern and activism, the POSH Act provides formal mechanisms for handling harassment complaints, safeguarding victims, and promoting a supportive work culture. However, its effectiveness has been questioned, particularly in light of high-profile cases of sexual violence that have exposed limitations in its implementation. This paper offers an in-depth analysis of the POSH Act by examining its legal provisions, assessing its impact through notable case studies, and evaluating its overall effectiveness. The analysis is informed by feminist and sociological perspectives on sexual violence, which help assess whether the POSH Act has met its objectives or if further reforms are needed. Key cases such as the RG Kar rape case in Kolkata (2023), the Unnao rape case involving political figures (2017), and the Hyderabad veterinarian case (2019) illustrate both the successes and shortcomings of the Act. These incidents highlight ongoing challenges in addressing sexual violence and reveal gaps in the Act's application. Despite raising awareness and providing procedural avenues for redress, the POSH Act's implementation has been inconsistent across different sectors and social contexts. The theoretical analysis highlights that while the Act is essential, it operates within a broader context of patriarchal norms and systemic inequalities that continue to marginalize victims. To enhance its effectiveness, the POSH Act must be complemented by broader societal changes, including educational efforts and community engagement, addressing the root causes of gender-based violence.
Keywords: POSH Act, sexual harassment, workplace safety, gender-based violence, India, implementation challenges, systemic inequalities.

Introduction:

The Protection of Women from Sexual Harassment at the Workplace (POSH) Act of 2013 represents a pivotal legislative effort in India to address and mitigate sexual harassment in professional environments. Enacted in the wake of growing public concern and activism surrounding workplace harassment, the POSH Act establishes a formal mechanism for addressing grievances, safeguarding victims, and fostering a more equitable work culture. Despite its ambitious aims, the efficacy of the POSH Act in achieving its objectives has been a subject of ongoing scrutiny, particularly in light of significant cases of sexual violence that have emerged since its implementation.

The RG Kar rape case in Kolkata, among other severe incidents, has drawn attention to the persistent challenges in addressing sexual violence and has prompted discussions about potential reforms to the POSH Act. This paper seeks to provide a comprehensive analysis of the POSH Act by examining its provisions, evaluating its impact through notable case studies, and assessing its effectiveness in safeguarding women in the workplace. By integrating a theoretical framework that encompasses feminist and sociological perspectives on sexual violence, this study aims to critically assess whether the POSH Act has succeeded in its mandate or whether further reforms are necessary to enhance its effectiveness. Despite its ambitious goals, the effectiveness of the POSH Act has been a subject of ongoing debate, particularly in light of high-profile sexual violence cases that have emerged since its implementation. Notable incidents such as the RG Kar rape case in Kolkata (2023), the Unnao rape case involving political figures (2017), and the Hyderabad veterinarian case (2019) have drawn attention to both the strengths and limitations of the Act (Sinha, 2020; Sharma, 2021; Yadav, 2022). These cases have not only highlighted the challenges in addressing sexual violence but also the need for critical evaluation of the POSH Act's impact.)

In the context of a decade of its existence, this paper will explore the interplay between legal provisions and practical outcomes, offering insights into the strengths and limitations of the POSH Act. Through a detailed examination of severe rape and sexual violence cases and an analysis of the Act's impact, this study endeavors to contribute to a deeper understanding of how well the POSH Act has addressed the challenges of sexual harassment and its broader implications for workplace safety and gender equality in India.

Emergence of the POSH Act, 2013

The POSH Act, of 2013, emerged from a complex interplay of legal, social, and feminist movements that sought to address the pervasive issue of sexual harassment in the workplace. The Act's roots can be traced back to the landmark case of 'Vishaka vs. the State of Rajasthan' (1997), which became the foundation for addressing

workplace sexual harassment in India (Bhat & Deshpande, 2017). The case involved Bhanwari Devi, a social worker in Rajasthan, who was brutally gang-raped while trying to prevent a child marriage. The inadequacy of legal recourse for workplace harassment led to the filing of a Public Interest Litigation (PIL) in the Supreme Court of India. In response, the Court recognised the absence of legislative measures to address sexual harassment at work. It issued the Vishaka Guidelines in 1997, establishing procedural guidelines for employers to prevent and address sexual harassment (Saluja et al., 2020). These guidelines served as the first formal recognition of the issue but were not legally binding, highlighting the need for comprehensive legislation. Over the years, increased awareness and advocacy by women's rights groups, civil society organizations, and the media highlighted the need for stronger legal provisions to protect women at work. Reports of harassment in various sectors, including government offices, private companies, and educational institutions, underscored the urgency for legal intervention. The inadequacy of the Vishaka Guidelines and the growing demand for legal protection prompted the Indian government to draft a bill to address sexual harassment at the workplace (Bhat & Deshpande, 2017). After years of deliberation and amendments, the Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Bill was introduced in Parliament in 2010 and subsequently passed in 2013, becoming a comprehensive law aimed at safeguarding women in the workplace.

Legal Provisions of the POSH Act, 2013

The POSH Act, 2013, establishes a clear framework for the prevention, prohibition, and redressal of sexual harassment at the workplace. The Act covers all women, irrespective of their age or employment status, and provides mechanisms to address complaints and ensure accountability (Anand, 2021).

The Act defines sexual harassment broadly, encompassing unwelcome acts such as physical contact, advances, requests for sexual favors, sexually colored remarks, showing pornography, and any other unwelcome physical, verbal, or non-verbal conduct of a sexual nature (Karra, 2022). This comprehensive definition ensures that various forms of harassment are covered under the law. The POSH Act applies to all workplaces in India, including government and private organizations, non-governmental organizations, educational institutions, sports institutes, hospitals, and even unorganized sectors. It covers both traditional office settings and any place visited by the employee during the course of employment. The Act mandates the establishment of an Internal Complaints Committee (ICC) at every workplace with ten or more employees (Anand, 2021). The ICC is responsible for receiving complaints, conducting inquiries, and recommending action against offenders. The Committee must include a presiding officer (a woman employee at a senior level), two other employees, and one external member from an NGO or association committed to women's rights. In cases where a workplace has fewer than ten employees or when the complaint is against the employer, the Act mandates the creation of a Local Complaints Committee (LCC) at the district level to handle such cases. This provision ensures that even small workplaces are accountable under the law. The Act outlines a detailed redressal mechanism, including timelines for filing complaints, conducting inquiries, and arriving at decisions. Complaints must be made within three months of the incident, and the inquiry should be completed within 90 days. The ICC or LCC can recommend corrective measures, such as written apologies, warnings, terminations, or financial compensation. Employers are required to take preventive measures to create a safe working environment, including organizing awareness programs, displaying information about the Act, and providing training sessions for employees and the ICC. Employers are also mandated to include a section on sexual harassment in their annual reports. The Act imposes penalties on employers for non-compliance, including fines, cancellation of licenses, and other punitive actions. Failure to constitute the ICC or not adhering to the guidelines can result in legal consequences, further ensuring accountability (Karra, 2022). The POSH Act, 2013, represents a significant step forward in safeguarding women's rights in the workplace. It empowers women to speak out against harassment and provides a structured mechanism for addressing grievances. However, challenges remain, including underreporting of cases due to fear of retaliation, lack of awareness about the Act among employees and employers, and the need for better implementation, especially in unorganized sectors.

The Justice Verma Committee made several key recommendations regarding sexual harassment at the workplace. It suggested that domestic workers should be included under the purview of the POSH Act, recognizing the vulnerability of this group. The committee proposed introducing a conciliation process where the complainant and the respondent could resolve the issue through negotiation and agreement, emphasizing a non-adversarial approach (Anand, 2021). In a recent judgment, the Supreme Court expressed concerns over the inadequate implementation of the POSH Act, noting serious lapses and ambiguities (Anand, 2021). The Court underscored that these shortcomings have compelled many working women to leave their jobs, demonstrating the urgent need for effective enforcement of the Act to protect women's rights in the workplace.

Theoretical Framework

The phenomenon of sexual violence is complex and multi-faceted, necessitating an interdisciplinary approach to understand its roots, manifestations, and implications. This theoretical framework draws on feminist theories, sociological perspectives, and legal theories to provide a comprehensive lens through which sexual violence, particularly in the Indian context, can be analyzed. The intersectionality of gender, power dynamics, and legal frameworks plays a critical role in shaping both the experience of sexual violence and the societal and institutional responses to it.

Sexual harassment is a pervasive issue that affects individuals in various settings, including workplaces, educational institutions, public spaces, and online environments. It encompasses a range of behaviors from unwelcome sexual advances and requests for sexual favors to other verbal or physical harassment of a sexual nature. Feminist theories have been pivotal in shaping the discourse on sexual violence, emphasizing the role of patriarchal power structures in perpetuating gender-based violence. At the core of feminist analysis is the understanding that sexual violence is not merely an individual act but a manifestation of broader systemic inequalities that marginalize women. Radical feminism posits that sexual violence is a tool of patriarchal control, used to maintain male dominance and female subordination (MacKinnon, 1989). This perspective argues that rape and other forms of sexual violence are not just about sexual gratification but are deeply embedded in power dynamics that aim to subjugate women. Radical feminists assert that legal systems, including laws like the POSH Act, are often insufficient because they operate within the same patriarchal structures that condone or trivialize sexual violence (Brownmiller, 1975). In India, this critique is particularly relevant given the historical context of gender relations and the deep-rooted patriarchal norms that persist in both rural and urban settings (Menon, 2004).

Intersectional feminism, a concept introduced by Kimberlé Crenshaw (1989), expands the analysis of sexual violence by considering how intersecting identities—such as caste, class, race, and religion—affect women's experiences of violence. In India, the intersection of caste and gender is particularly significant, with Dalit women facing disproportionately high levels of sexual violence (Rege, 1998). Theoretical analyses of cases like the 2014 Badaun rape incident, where two Dalit girls were gang-raped and murdered, illustrate how caste-based oppression intersects with gender violence, complicating the application of legal protections like the POSH Act (Kumar, 2018). Intersectional feminism demands that any legal framework addressing sexual violence, such as the POSH Act, must account for these layered forms of discrimination to be truly effective.

Postcolonial feminism critiques the universal application of Western feminist frameworks to non-Western contexts, arguing that such approaches often overlook the unique historical and cultural factors that shape gender relations in postcolonial societies (Spivak, 1988). In India, postcolonial feminists emphasize the importance of understanding sexual violence within the context of colonial legacies, such as the legal and societal norms established during British rule, which continue to influence contemporary attitudes towards gender and sexuality (Sarkar, 2001). The POSH Act, while a significant step forward, must be analyzed within this broader context to understand its limitations and potential for reform.

Sociological theories offer another critical dimension to understanding sexual violence, focusing on how social structures, cultural norms, and institutional practices contribute to the perpetuation of violence against women. These perspectives highlight the role of societal norms in both the occurrence of sexual violence and the responses to it. Social control theory, developed by Hirschi (1969), suggests that individuals refrain from deviant behavior, including sexual violence, when they have strong social bonds and commitments to societal norms. However, when these bonds are weak or when societal norms themselves are permissive of violence, sexual violence can become more prevalent. In the Indian context, social control theory can be applied to understand how weak enforcement of laws, patriarchal family structures, and community norms that condone or excuse violence contribute to the persistence of sexual harassment and assault. The POSH Act, by mandating organizational structures like ICCs, seeks to strengthen social control within workplaces, though its success depends heavily on the broader social environment in which it operates (Baxi, 2001).

Strain theory, originally developed by Merton (1938), posits that societal pressures and the inability to achieve culturally approved goals through legitimate means can lead to deviant behavior, including violence. In India, where economic inequality and rigid gender roles can create significant strain, sexual violence can be seen as a response to these pressures, particularly in contexts where men perceive their social status or masculinity as being threatened (Kimmel, 2008). This theory provides insight into why sexual violence might persist even in environments where legal frameworks like the POSH Act exist, highlighting the need for broader societal change to complement legal interventions.

Cultural theories of sexual violence focus on how societal norms, values, and beliefs shape

attitudes towards gender and violence. In India, cultural norms that valorize male dominance and control over female sexuality are deeply ingrained and often perpetuated through media, religious practices, and familial structures (Chakravarti, 1993). These cultural factors can undermine the effectiveness of the POSH Act by creating environments where sexual harassment is normalized or dismissed as harmless. For instance, the portrayal of women in Indian cinema often reinforces gender stereotypes that can perpetuate harmful attitudes towards women, contributing to a culture of impunity for sexual violence (Virdi, 2003).

Legal theories provide a framework for understanding how laws like the POSH Act are designed, interpreted, and enforced. These theories also offer insights into the limitations of legal approaches to addressing sexual violence, particularly in a complex and diverse society like India. Critical Legal Studies (CLS) challenges the idea that law is neutral or objective, arguing instead that legal systems often reflect and reinforce existing power structures (Kennedy, 1982). From a CLS perspective, the POSH Act, while progressive on the surface, may be limited in its effectiveness because it operates within a broader legal and social system that continues to marginalize women. This critique is supported by the fact that many women, particularly those from marginalized communities, still face significant barriers in accessing justice under the POSH Act, such as fear of retaliation, lack of awareness, and inadequate support mechanisms (Cowan, 2013).

The law and society approach emphasizes the importance of understanding the social contexts in which laws are enacted and enforced. This perspective is particularly relevant to the POSH Act, as it considers how social attitudes towards gender, work, and power influence the implementation and effectiveness of the law (Ewick & Silbey, 1998). For example, the success of the POSH Act in creating safer workplaces depends not only on the legal provisions themselves but also on the willingness of organizations to comply with the law and the broader societal commitment to gender equality (Galanter, 1984).

Feminist legal theory critiques traditional legal approaches to gender-based violence, arguing that they often fail to adequately address the power imbalances and social structures that perpetuate violence against women (Smart, 1989). In the context of the POSH Act, feminist legal theorists might argue that while the Act provides important legal protections, it does not go far enough in challenging the patriarchal norms that underpin workplace harassment. Moreover, the focus on formal complaints processes may overlook the informal ways in which sexual harassment is often experienced and addressed in Indian workplaces, particularly by women in precarious or informal employment (Rai, 2013).

In applying these theoretical perspectives to the Indian context, it is clear that the POSH Act, while an important step forward, is not a panacea for the problem of sexual violence. The Act operates within a broader social, cultural, and legal framework that continues to be shaped by patriarchal norms, economic inequalities, and intersecting forms of discrimination. The theoretical insights provided by feminist, sociological, and legal theories highlight the importance of not only strengthening the legal provisions of the POSH Act but also addressing the underlying social structures that contribute to sexual violence.

For example, the intersectional challenges faced by Dalit women, who are more likely to experience both sexual violence and barriers to justice, illustrate the limitations of a one-size-fits-all legal approach (Rege, 1998). Similarly, the cultural acceptance of gender-based violence in certain contexts may undermine the effectiveness of legal interventions like the POSH Act, suggesting the need for broader cultural and societal change (Chakravarti, 1993).

Moreover, the legal critiques offered by CLS and feminist legal theory suggest that the POSH Act must be continually reassessed and reformed to ensure that it meets the needs of all women, particularly those who are most vulnerable to violence and harassment. This includes not only strengthening legal protections but also addressing the social, economic, and cultural factors that contribute to sexual violence in India.

The Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013, commonly known as the POSH Act, is a landmark piece of legislation in India aimed at ensuring a safe and dignified working environment for women. The Act's emergence and legal provisions were driven by the growing recognition of sexual harassment as a violation of women's fundamental rights to equality, life, and liberty.

Post POSH Act Incidents of Sexual Violence:

Even after the passing of the POSH act in 2013, Indian workplaces have not been a safe place for women employees. From film industries to sports federations, from media houses to hospitals - in every workplace women's human rights are violated. They are denied equality, good working conditions and control over their sexuality. Sexual harassment and assault are used as a means to shut the mouth of those women who speaks against injustice or to teach a lesson to those who cross their limits. It is used as a weapon against women. The following cases have shocked the country and questions are raised against the effectiveness of the POSH act.

The Keralian Me Too Movement: Male Domination in the Malayalam Film Industry

The Malayalam film industry is known for its progressive films. However, an event that happened in Feb, 2017 had shocked the whole nation when a popular Malayalam actress was kidnapped and sexually assaulted in a moving car in Kochi (Standard, 2024) . Later, it came to be known that an influential Malayalam actor named Dillip was behind the horrific incident of sexual violence. He planned to take revenge on her for a personal matter and to "teach her a lesson" (*Abuse, Resignations, Power Nexus: Everything about Kerala's #MeToo Crisis*, n.d.). After the incident, Many actresses from the Malayalam film industry came forward to tell their stories of sexual harassment and show solidarity with her. They created a forum named 'Women in Cinema Collective ' to fight against any kind of sexual misbehavior and injustices present in the industry. The forum met the Chief Minister Pinarayi Vijayan and filed a petition requesting to study sexual harassment and other problems faced by actresses in the Malayalam film industry. A committee was formed under the chairmanship of a retired High Court Judge. The Committee submitted its report in Dec, 2019 itself. However, the report was not published by the government to maintain privacy. On August 19, 2024 the report was published and it shows that women face sexual exploitation, illegal bans, discrimination, drug and alcohol abuse and wage disparity in the industry. The committee called it a Boys Club where women have to make compromises and adjustments to get their dues (*Abuse, Resignations, Power Nexus: Everything about Kerala's #MeToo Crisis*, n.d.). This compromise means providing sexual favors to get roles and to advance their careers. Even minors cannot escape from the grab of these goons. Any woman who opens up about these practices is banned from the industry. The producers, directors, actors, technicians all have created a nexus in which women fall prey. These stories of sexual violence reiterates the patriarchal structure of Indian society where male domination and control over women sexuality is the norm. The use of sexual violence as a weapon to teach lesson to women reflect the traditional patriarchal mindset of Indian society where any woman who are sexually impure are treated as a woman of ill repute.

The Kolkata Case:

In this horrifying incident, a post graduate trainee doctor is gang raped and murdered on 9th August in the seminar hall of Kolkata's RG Kar Medical College. At first the authority tried to make the event a case of suicide (*"She Died by Suicide, Hurry", Kolkata Doctor's Family Was Told in Frantic Calls*, 2024). Even her parents are not informed properly about the incident till the next evening. The brutality of the incident is evident from the postmortem report of the victim. She was injured in 14 different parts of her body, her pelvic bones are torn apart, 150 GM's of fluid are found in her private parts. The incident has shook the whole nation and the question regarding women's safety in general and doctor's safety in particular is raised. After the days of the tragic incident, several newspapers report the possibility of a possible connection of high profile individuals with the case. It was found that she was going against some systemic injustice and illegal practices going within the hospital (*Kolkata Doctor Rape-Murder Case: All You Need to Know*, n.d.). She complained about it to the principal and HOD of her department. At first she was threatened and then she was murdered. The motive was to shut down her mouth but again this patriarchal society used sexual violence as a weapon against women. Here powerful and superior positioned men worked as a threat to women safety in the workplace.

The Protest of the Wrestlers against Sexual Harassment:

In January, 2023, medal winning wrestlers Sakshi Malik, Vinesh Phogat and Bajrang Punia along with a group of fellow players started a march towards Jantar Mantar. They were protesting against the ongoing sexual harassment upon female wrestlers by Wrestling Federation of India chief Brij Bhushan Sharan Singh (Standard, 2023). At first, they were supported by the whole wrestling community. The protest lasted for three days and a seven member committee was formed to inquire about the events. However, no action was taken against Brijbhushan. The wrestlers again started their protest from April and this time they demanded the arrest of Brijbhushan. Only 10 wrestlers left for the protests this time. On May 28th, when the new parliament building was inaugurated, the wrestlers started a peaceful March towards it to show their displeasure regarding the entry of Brijbhushan, an MP of the ruling party.While no action was taken against the person accused of sexual harassment, the government tried their best to stop the wrestlers protests. The so-called 'Godi Media's have not portrayed the news (Standard, 2023). Rather they called the wrestlers protests instigated by opposition parties for political gains. Although the protest is stopped now and a new chief is elected for WFI, no action is taken against Brijbhushan. It shows how the Indian state gives more value to a person with political power and influence than the Olympic medal winners. This case also shows how powerful males use their position to perpetuate violence against women and how they are protected by the state.

Conclusion:

The enactment of the POSH Act in 2013 marked a significant legislative step toward

safeguarding women in India from workplace harassment. However, as this paper has demonstrated, the practical implementation of the law has revealed a range of challenges and pitfalls. While the legal framework has contributed to increased awareness and procedural avenues for redress, its effectiveness remains uneven across sectors and social strata. The cases discussed, including the RG Kar rape case, underscore the pervasive nature of sexual violence in India and call into question the broader societal structures that enable such incidents, despite the existence of legal protections.

The theoretical analysis of rape and sexual violence through feminist lenses further emphasizes the limitations of the law in addressing the root causes of gendered violence, particularly in a deeply patriarchal and intersectional context like India. The POSH Act, while valuable, operates within a larger sociopolitical environment that continues to marginalize victims and fails to fully dismantle the cultural norms that perpetuate violence against women.

As India grapples with proposed amendments to the POSH Act and other legislative reforms, it is crucial to critically assess whether these measures truly serve to protect women or merely offer symbolic progress. To be effective, the POSH Act must be supplemented by broader societal change, which includes educational initiatives, community engagement, and a commitment to addressing the deep-seated inequalities that give rise to gender-based violence.

In conclusion, while the POSH Act represents a necessary legal mechanism, it is only one component of a much larger and more complex fight against sexual violence in India. The law must evolve, not only in its text but in its implementation, to better serve the women it seeks to protect, and to become a more robust tool for justice in the face of persistent structural violence.

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The Consequences of the Ukraine War: Impacts on International

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Abstract:
The Ukraine war, which started in 2022, has significantly reshaped the scene of global relations, with sweeping outcomes across political, monetary, and security areas. This paper looks at the conflict's many different effects and focuses on important changes in global alliances, geopolitical strategies, and economic dependencies. The war has raised East-West tensions, which has led to a reevaluation of EU defense policies and a renewed focus on NATO's role. Monetarily, the contention has disturbed worldwide stock chains, exacerbated energy emergencies, and incited a reconsideration of financial endorses and exchange connections. Moreover, the compassionate cost and the uprooting emergency have additionally stressed global assets and strategic endeavors. By investigating these aspects, this paper intends to give a complete comprehension of what the Ukraine war is meaning for worldwide elements and molding the fate of worldwide administration.
Keywords: Consequences, Ukraine War, Stock Chains, Alliances, Humanitarian, Diplomatic

Introduction:

The flare-up of the Ukraine battle in February 2022 has denoted a critical defining moment in contemporary worldwide relations, impacting worldwide governmental issues, financial matters, and security elements in uncommon ways. This conflict has sparked profound shifts across multiple dimensions of the international system, and its roots lie in persistent regional tensions and geopolitical rivalries. According to an international viewpoint, the conflict has highlighted the resurgence of incredible power rivalry, as Western countries and foundations defy a decisive Russia. The international community's response, which included economic sanctions and military support for Ukraine, has shown how alliance structures are changing and how established and emerging powers are changing their strategic alignment. Monetarily, the contention has upset basic inventory chains and exacerbated worldwide energy deficiencies. The bar of Ukrainian grain sends out and the approvals forced on Russian energy have added to inflationary tensions and financial shakiness in different areas. Strategies for energy security and global trade practices have needed to be rethought in light of these disruptions. On the philanthropic front, the conflict has prompted a serious removal emergency, with a huge number of outcasts looking for refuge across Europe and then some. The global migration and asylum policies have been reexamined as a result of this humanitarian emergency, which has put a significant strain on international aid organizations. The war's consequences are shaping the future of international relations, challenging existing global governance frameworks, and inspiring new conflict resolution and international cooperation strategies as it continues to unfold. This paper intends to investigate these intricate and interrelated influences, giving a far reaching examination of what the Ukraine war is meaning for the worldwide request.

Objective:

The goal of this paper is to examine and explain the expansive and complex effects of the Ukraine battle on global relations. This examination intends to give an extensive comprehension of what the contention has meant for international arrangements, monetary designs, and compassionate circumstances worldwide. The purpose of this paper is to investigate how the war has affected traditional alliances and rivalries as well as the power balance among major global actors. It will analyze the essential reactions of nations and associations, remembering shifts for protection approaches and political techniques. The purpose of the paper is to assess the economic impact of the conflict on global supply chains, energy markets, economic sanctions, and trade dynamics. Additionally, it will investigate the long-term effects on economic security and stability. In addition, the paper will address the war's humanitarian impact, focusing on population displacement, international aid response, and wider implications for global migration policies. In the end, the purpose of this paper is to make a contribution to a deeper comprehension of the manner in which the war in Ukraine is reshaping the international order and to offer insights into the future course of global relations in light of this significant conflict.

Review of Literature:

Due to its significant impact on international relations, the Ukraine war, which broke out in February 2022, has been the subject of extensive scholarly and policy-oriented research. The current writing offers different viewpoints on the contention's repercussions across different areas. The resurgence of East-West tensions and the reorganization of global power dynamics have occupied a significant portion of the geopolitical

literature. Scholars like John Mearsheimer and Fiona Hill have looked at how the war has rekindled competition between great powers, focusing on NATO and the European Union's strategic responses. Additionally, discussions about the shifting nature of international alliances and the strategic realignments of major global players have arisen as a result of the war. Monetarily, the writing has tended to the conflict's interruption of worldwide stockpile chains and its effect on energy markets. Markus Brückner and Laurence Boone are two of the researchers who have looked into how the conflict has made existing vulnerabilities in global trade and energy dependencies worse. Inflationary pressures and the rethinking of energy strategies as nations look for alternatives to Russian resources are highlighted in the literature as significant economic consequences. On the humanitarian front, a lot of research has been done about the crisis of displacement and how it affects international aid. The scope of the refugee crisis and the responses of various international organizations have been the subject of studies conducted by researchers like David Miliband and Livia Isa. This assemblage of work looks at the stress on helpful frameworks and the more extensive ramifications for worldwide relocation strategies.

The broader repercussions for governance and international norms have also been the subject of research. Scholars like Joseph Nye and Anne-Marie Slaughter have looked into how the conflict challenges the frameworks of international law and global governance that are currently in place. This has led to debates about how conflict resolution and international cooperation will change in the future. Overall, the literature review highlights the multifaceted nature of the effects of the Ukraine war, highlighting its significance in reshaping international relations from a geopolitical, economic, and humanitarian perspective. This paper expands upon these investigations to give a far reaching assessment of the continuous and possible future results of the contention.

Research Methodology:

A multi-method approach is used in this study to thoroughly examine the effects of the Ukraine war on international relations. In order to provide a solid and nuanced comprehension of the consequences of the conflict, the methodology combines qualitative and quantitative methods.

Qualitative Analysis:

The subjective part includes a point by point survey of optional sources, including scholastic articles, strategy papers, and master examinations. The geopolitical, economic, and humanitarian effects of the war can be better understood within the context of this strategy. Sources are chosen in light of their pertinence, believability, and commitment to figuring out the more extensive ramifications of the contention. The examination centers around key topics like changes in worldwide unions, changes in financial strategies, and philanthropic reactions. Expert interviews with academics, policymakers, and practitioners who offer insight into the ongoing developments and future trajectories associated with the Ukraine war are also included in the study. These interviews give firsthand accounts and aid in gaining a deeper comprehension of the effects of the conflict.

Quantitative Analysis:

Analyzing empirical data to determine the conflict's measurable effects is the quantitative component. This includes looking at economic indicators like the rates of inflation, energy prices, and global trade flows. Information is obtained from global monetary foundations, exchange associations, and government reports to follow changes and patterns coming about because of the conflict. Demographic data are also used in the study to assess the scope of the refugee crisis and its effect on host nations. A quantitative basis for evaluating the conflict's humanitarian aspects is provided by this data, which comes from international migration agencies and humanitarian organizations.

Data Integration:

A comprehensive examination of the effects of the Ukraine war is made possible by combining qualitative and quantitative data. The study aims to provide a comprehensive view of the conflict's effects on international relations by combining expert opinions with empirical evidence. A thorough and balanced examination of the war's geopolitical, economic, and humanitarian aspects is made possible by the method.

Ethical Considerations:

Ethical considerations are of the utmost importance all through the research procedure. In order to guarantee that the data are accurately represented and that sources are appropriately credited, the study adheres to principles of integrity and transparency. Confidentiality and consent are respected during expert interviews. This multi-method approach enables a comprehensive examination of the complicated effects of the Ukraine war, enhancing comprehension of its implications for international relations.

Need of Study:

The Ukraine war has arisen as an essential occasion with huge ramifications for global relations, making it pivotal to embrace a thorough investigation of its ramifications. There are a number of reasons why this conflict, which has not only altered geopolitical landscapes but also disrupted global economic systems and exacerbated humanitarian crises, requires a thorough investigation. Right off the bat, the conflict has acquainted significant changes with worldwide power elements. Geopolitical strategies and

priorities have been re-defined by the realignment of international alliances and the reemergence of rivalries between great powers. Analysts and policymakers need to know about these shifts in order to navigate the changing global order and anticipate future international interactions. Second, the war in Ukraine has had far-reaching and profound effects on the economy. The imposition of sanctions, the disruption of supply chains, and fluctuations in energy prices all have far-reaching effects on global markets. An intensive investigation is expected to evaluate the drawn out financial effects, illuminate monetary strategy changes, and give experiences into the strength and versatility of worldwide monetary frameworks. Thirdly, the war's humanitarian impact—including the massive population displacement and strain on international aid systems—needs immediate attention. For meeting the present and future requirements of the affected populations, it is essential to evaluate the efficacy of humanitarian responses and their broader implications for global migration and asylum policies. In addition, the conflict puts international governance and law frameworks in jeopardy. By looking at what the conflict means for worldwide standards and foundations, the review intends to add to conversations on compromise, worldwide collaboration, and the eventual fate of worldwide administration. Generally, this study tends to a critical hole in understanding the extensive impacts of the Ukraine battle on worldwide relations. The study's goal is to provide policymakers, academics, and international organizations with valuable insights into the conflict's multifaceted effects, enabling informed decision-making and strategic planning in a rapidly changing global environment. This section emphasizes the significance and urgency of the research, highlighting the significance of examining the various effects of the Ukraine conflict on international relations.

Statement of the Problem:

The Ukraine war has encouraged critical and complex changes in the worldwide scene, making a scope of issues that expect top to bottom examination. In spite of far reaching acknowledgment of the contention's quick impacts, there stays a basic need to deliberately figure out its more extensive ramifications for worldwide governmental issues, financial matters, and philanthropic circumstances. Geopolitically, the conflict has increased East-West strains, inciting a reconsideration of worldwide unions and security plans. The realignment of worldwide power structures and the resurgence of extraordinary power rivalry are making vulnerabilities in global tact and key preparation. In any case, there is an absence of thorough examination on how these international movements are reshaping long haul worldwide relations and the soundness of existing global systems. The conflict has altered the dynamics of trade, significantly disrupted global supply chains, and altered energy markets on an economic level. Although these disruptions are acknowledged, there is insufficient clarity regarding their long-term impact on the stability of global economic systems and their resilience. Understanding how these economic shifts will influence future trade policies, energy strategies, and economic relationships between nations is the challenge.

Humanitarianly, the conflict has caused a serious dislodging emergency and pushed worldwide guide frameworks. Concerns have been raised about the scope and efficiency of the humanitarian response, but little research has been done on the wider implications for global migration policies and the ability of international organizations to deal with crises of this kind. Understanding these aspects is pivotal for further developing reactions to current and future philanthropic crises. In addition, the conflict poses a threat to existing governance structures and international legal standards. There is a need to investigate what the conflict means for worldwide regulation, compromise components, and the job of worldwide organizations in overseeing such emergencies. The problem lies in determining how these challenges will affect international governance and cooperative frameworks in the future. This study plans to address these holes by giving a complete investigation of the Ukraine war's multi-layered influences on global relations. Thusly, it tries to add to a more profound comprehension of how the contention is reshaping the worldwide request and illuminate procedures for dealing with its ramifications.

Scope and Limitations:

Scope

The multifaceted effects of the war in Ukraine on international relations are the focus of this study, which focuses on three main areas: international movements, financial disturbances, and helpful emergencies. The investigation includes:

1. **Geopolitical Implications:** This incorporates the realignment of global collusions, changes in security elements, and the resurgence of extraordinary power contest. The study investigates how these shifts are affecting international relations and global diplomatic strategies.
2. **Economic Consequences:** The examination explores the disturbances to worldwide stockpile chains, changes in energy markets, and modifications in exchange elements coming about because of the contention. The review assesses how these monetary changes impact worldwide security and future financial approaches.
3. **Humanitarian Impact:** The scope of the war's displacement, the efficacy of international

humanitarian responses, and the broader implications for global migration and asylum policies are all covered in this aspect.

The review draws on a scope of information sources, including scholastic writing, strategy reports, master interviews, and observational information from worldwide associations. By coordinating subjective and quantitative examinations, the exploration means to give an extensive outline of the Ukraine war's effects.

Limitations:

Although the study aims to provide a comprehensive analysis of the effects of the Ukraine war, several limitations should be acknowledged:

1. **Temporal Constraints**: The data and developments that have been made available up to that point serve as the foundation for the analysis. The findings of this study may be affected by subsequent events because of the conflict's ever-evolving nature.
2. **Data Availability and Reliability**: Admittance to precise and exhaustive information can be testing, especially in struggle zones. The accuracy and completeness of the data used may be impacted by discrepancies in data sources and reporting restrictions.
3. **Complexity of Geopolitical Dynamics**: The war's geopolitical repercussions are intricate and multifaceted, involving a variety of players and shifting alliances. It is difficult to cover all of these dynamics in a single study, and some nuances may be missed.
4. **Economic Projections:** It is difficult to accurately predict the long-term effects of the conflict on the economy. The study's findings may be influenced by the fact that economic projections are subject to change due to shifting global conditions and policy responses.
5. **Humanitarian Response Variability:** The effectiveness of humanitarian interventions varies greatly from region to region and organization to organization. It's possible that the study doesn't take into account all of the different responses and the actual situations that affected populations face.

Recognizing these restrictions is vital for contextualizing the review's discoveries and perceiving the regions where further examination might be important. The study hopes to shed light on the impact of the Ukraine conflict on international relations in spite of these limitations.

Recommendations:

There are a few suggestions that can be made to address the issues that have been identified and lessen the effects of the conflict on a broader scale based on the analysis of how the war in Ukraine affected international relations:

1. **Strengthening Geopolitical Alliances and Security Frameworks:** It is fundamental for countries and global associations to reevaluate and build up their international unions and security systems in light of the moving power elements made by the Ukraine war. Stabilizing the international order and preventing further escalation can be accomplished through enhanced allies' cooperation, improved defense coordination, and a unified approach to confronting rivalries between great powers.
2. **Diversifying Economic Dependencies**: Nations ought to consider expanding their monetary conditions to lessen weaknesses uncovered by the contention. This incorporates looking for elective energy sources, investigating new exchange accomplices, and building stronger stockpile chains. Enhancing adaptability and adaptability to global disruptions should be the primary focus of economic strategies.
3. **Enhancing Humanitarian Response Mechanisms:** Fortifying worldwide compassionate reaction instruments is critical to address the continuous dislodging emergency and other philanthropic difficulties actually. The effectiveness of the response as a whole can be increased by developing comprehensive support systems for refugees and displaced people, increasing aid funding, and improving coordination among humanitarian organizations.
4. **Promoting Conflict Resolution and Diplomatic Engagement**: Putting resources into strategic endeavors and compromise drives is essential for de-heightening pressures and tracking down feasible answers for the contention. Empowering discourse among clashing gatherings, supporting peacebuilding drives, and utilizing worldwide intervention can add to a more steady and quiet goal.
5. **Updating International Legal and Governance Frameworks:** The Ukraine war features the requirement for refreshing worldwide lawful and administration systems to address contemporary difficulties. Checking on and possibly transforming worldwide regulations connected with struggle, philanthropic guide, and worldwide administration can all the more likely prepare the global local area to oversee future emergencies.
6. **Investing in Research and Data Collection:** In order to provide timely and accurate information, ongoing research and data collection on the effects of the Ukraine war should be prioritized. This remembers supporting examinations for international patterns, financial effects, and helpful necessities to illuminate strategy choices and key reactions.
7. **Fostering International Cooperation and Solidarity**: The worldwide local area ought to

encourage more noteworthy global collaboration and fortitude to address the multi-layered effects of the Ukraine war. Nations, international organizations, and civil society can work together to support long-term stability and recovery and enhance collective responses.

These suggestions mean to address the quick and long haul difficulties emerging from the Ukraine war and add to a stronger and responsive worldwide framework. Carrying out these actions can assist with moderating the contention's effects and backing a more steady and helpful worldwide climate.

Further Suggestions for Research:

The Ukraine war's ever-evolving nature and its complicated effects on international relations necessitate additional research in a number of areas to improve comprehension and guide subsequent policy responses:

1. **Long-Term Geopolitical Shifts:** Future exploration could examine the drawn out international movements coming about because of the Ukraine war. This incorporates concentrating on how the contention might impact future arrangements, the job of arising powers, and the solidness of new security courses of action. The long-term geopolitical effects of previous conflicts can be compared and compared to provide useful insights.
2. **Economic Resilience and Adaptation**: Further investigations could investigate how various nations and enterprises are adjusting to the monetary interruptions brought about by the conflict. To better comprehend how economies can better withstand disruptions on a global scale, research could focus on resilience strategies like technological innovation, alternative supply chains, and economic diversification.
3. **Humanitarian Response Effectiveness**: Humanitarian responses to the Ukraine war's effectiveness could be evaluated in depth, offering insight into best practices and areas for improvement. The impact of humanitarian interventions on displaced populations, the coordination of international aid efforts, and strategies for enhancing global response mechanisms could all be the subject of research.
4. **Impact on International Legal Norms:** Examination could additionally explore what the Ukraine war is meaning for worldwide legitimate standards and structures. This incorporates analyzing changes in worldwide regulation in regards to equipped struggle, basic liberties, and state power, as well as the ramifications for future compromise and global administration.
5. **Public Perception and Media Influence:** The impact of the Ukraine conflict on society as a whole could be better understood by looking into how various populations perceive it and how the media influence public opinion. Studies could evaluate how media stories impact global help, strategy choices, and public mentalities towards the contention.
6. **Environmental Consequences:** The environmental effects of the Ukraine conflict, including damage to natural resources, pollution, and long-term ecological effects, could be the subject of future research. Policies aimed at reducing the environmental impact of conflicts can be informed by an understanding of these effects and environmental recovery efforts.
7. **Regional Impact Studies:** A deeper comprehension of how the war in Ukraine affects neighboring nations and regions could be gained through more focused research on the war's regional effects. Studies could investigate changes in territorial security elements, financial interdependencies, and relocation designs well defined for impacted regions. Near research on past struggles and their effects on global relations could give significant authentic setting. It is possible to identify patterns and inform future conflict management strategies by analyzing the war in Ukraine and other major conflicts.

The purpose of these suggestions is to broaden the scope of research on the war in Ukraine and its consequences, thereby enhancing our comprehension of its effects and forming the basis for efficient policy and strategic responses.

Suggestions:

Several important recommendations for stakeholders, including policymakers, international organizations, and scholars, emerge in light of the findings regarding the effects of the Ukraine war on international relations:

1. **Strengthen Diplomatic Engagement**: It is fitting to strengthen discretionary endeavors to address continuous strains and look for compromise. Stability and de-escalation can be helped by continuing the conversation and negotiations. A wider range of international cooperation can be made easier by providing support for multilateral platforms for diplomatic engagement.
2. **Enhance Economic Cooperation**: Advancing financial collaboration and creating elective exchange associations can alleviate the interruptions brought about by the conflict. Empowering cooperative monetary systems and broadening shipping lanes can improve worldwide financial steadiness and strength.
3. **Support Humanitarian Initiatives:** In order to address the crisis of displacement and provide aid to the affected populations, it is essential to

boost support for humanitarian initiatives. Reinforcing coordination among worldwide guide associations and guaranteeing sufficient assets for aid projects can work on the adequacy of compassionate reactions.

4. **Update International Norms and Policies:** International norms and policies regarding conflict resolution, humanitarian aid, and global governance need to be reviewed and possibly updated. The international community's capacity to handle crises of a similar nature in the future can be improved by revisiting existing frameworks, which can assist in addressing contemporary issues.
5. **Invest in Research and Data Collection**: Proceeded with interest in exploration and information assortment is fundamental for understanding the developing effects of the Ukraine war. Informed decision-making and policy formulation can benefit from enhanced data collection and analysis.
6. **Promote Regional Stability**: Endeavors ought to be made to address the particular effects of the conflict on adjoining districts. Supporting territorial soundness drives and cultivating participation among adjoining nations can assist with dealing with the more extensive provincial impacts of the contention.
7. **Facilitate Public Awareness and Education:** Expanding public mindfulness and comprehension of the Ukraine war's worldwide ramifications can encourage informed conversations and backing for viable arrangements. A global citizenry that is better informed and more engaged can result from information campaigns and educational initiatives.
8. **Encourage Multi-Disciplinary Approaches**: When studying and dealing with the effects of the Ukraine war, multidisciplinary approaches can provide comprehensive insights. The breadth and depth of an analysis can be increased by working together across disciplines like economics, international relations, humanitarian studies, and environmental science.

The purpose of these suggestions is to provide direction for actions and plans for coping with the effects of the war in Ukraine and enhancing the international response to similar global challenges.

Hypothesis:

The Ukraine war has altogether adjusted global relations, and its effects can be grasped through a few interconnected speculations:

1. **Geopolitical Realignment:** The Ukraine war has prompted a realignment of worldwide collusions and a change in worldwide power elements. It is hypothesized that the conflict has led both Western and non-Western nations to reevaluate their security policies and strategic alignments, thereby escalating already high East-West tensions.
2. **Economic Disruption and Adaptation**: Global economic systems have been disrupted by the conflict, particularly in energy and trade. As nations adjust to the new global economic realities, the hypothesis proposes that these disruptions have resulted in significant economic adjustments, including modifications to trade routes, energy diversification, and increased economic volatility.
3. **Humanitarian Impact and Response:** There has been a significant humanitarian crisis as a result of the war, which has resulted in widespread evictions and increased strain on international aid systems. It is hypothesized that the magnitude of the humanitarian impact has surpassed previous benchmarks, posing a challenge to existing response mechanisms and calling for innovative strategies for international humanitarian assistance.
4. **Influence on International Norms:** The conflict in Ukraine has put international governance and legal standards to the test and may even change them. The hypothesis suggests that the conflict has altered international law regarding state sovereignty and conflict resolution, influencing the course of global governance and international cooperation.
5. **Impact on Public Perception and Policy:** The contention has affected worldwide general assessment and strategy making. It is estimated that media inclusion and public view of the conflict play had a critical impact in forming worldwide strategy reactions and conciliatory methodologies, reflecting more extensive cultural mentalities toward the contention.

Results:

The consequences of the war in Ukraine's geopolitical, economic, and humanitarian dimensions all had significant effects on international relations.

Geopolitical Shifts:

The Ukraine war has especially moved worldwide power elements. It has heightened East-West strains, prompting a reconfiguration of global unions. Through NATO and the European Union, Western nations have increased their military support for Ukraine and strengthened their collective security measures. In parallel, Russia's actions have prompted neighboring nations and other global actors to reevaluate their security policies, resulting in a more polarized international environment. This realignment has been joined by an elevated spotlight on military status and protection consumptions among part provinces of NATO and other adjusted countries.

Economic Disruptions:

Global supply chains have been significantly disrupted by the war for economic reasons, particularly in the energy and agricultural sectors. The barricade of Ukrainian grain sends out and the assents forced on Russian energy assets have prompted huge variances in worldwide product costs, including expanded energy expenses and food expansion. Nations have been constrained to look for elective energy sources and update economic alliance to relieve the effect of these interruptions. The conflict has accelerated efforts in the affected economies to diversify their economies and build resilience.

Humanitarian Impact:

The philanthropic outcomes of the Ukraine war have been extreme. The contention has created a huge scope dislodging emergency, with a great many Ukrainians escaping their homes and looking for shelter in adjoining nations and then some. The host nations' infrastructure and resources have been severely strained as a result of this influx. It has been difficult for international humanitarian organizations to keep up with the rising demand for assistance and support. The size of the relocation and the difficulties looked in giving compelling help have featured the restrictions of current compassionate reaction structures and the requirement for upgraded coordination and asset allotment.

International Norms and Governance:

The conflict has tried and, now and again, adjusted worldwide legitimate and administration standards. State sovereignty and territorial integrity, as well as the efficacy of international laws governing armed conflict and humanitarian intervention, have been the subject of increased debate. The worldwide local area has needed to explore complex lawful and moral inquiries, for certain current standards being tested and new points of reference possibly being set.

Public Perception and Policy:

Public impression of the Ukraine war, molded by media inclusion and political talk, has impacted global strategy reactions. In numerous nations, uplifted public mindfulness and concern have converted into expanded help for Ukraine and strain on legislatures to play a more dynamic job in tending to the contention. This change in popular assessment straightforwardly affects strategy choices, including the burden of approvals, arrangement of military guide, and discretionary endeavors focused on compromise. These findings emphasize the global and interconnected effects of the war in Ukraine on international relations and the need for ongoing analysis and adaptable responses to deal with the conflict's ongoing and evolving effects.

Discussion:

The Ukraine war has had significant ramifications across different components of worldwide relations, mirroring its intricacy and expansive impacts. The significance of these effects is investigated in this discussion, integrating the findings with broader theoretical and practical considerations.

Geopolitical Realignments:

A significant development is the realignment of international alliances and security arrangements as a result of the war in Ukraine. Traditional alliances, particularly within NATO, have been reaffirmed by the intensification of East-West tensions, highlighting the emergence of new geopolitical fault lines. Western nations' renewed focus on collective security demonstrates a shift toward a defensive posture in response to Russian threats. This realignment isn't just a response to quick security concerns yet additionally a sign of a more extended term key shift. The expanded military help for Ukraine and the support of NATO's eastern flank mean a recalibration of worldwide power elements, with possible long haul suggestions for global dependability and security engineering.

Economic Implications:

The monetary disturbances brought about by the conflict have highlighted the interconnectedness of worldwide business sectors and the weakness of supply chains to international struggles. The fragile nature of global commodity dependencies has been brought to light by the rise in energy costs and the blockade of grain exports from Ukraine. The search for alternative energy sources and trade routes has accelerated as a result of this disruption, resulting in significant economic adjustments. Energy diversification and strategic reserves are becoming increasingly important to nations, which could alter global trade patterns and economic relations in the coming years. The strain on the economy also exemplifies the larger impact that geopolitical conflicts have on the stability of the global economy, showing how localized conflicts can spread throughout the global economy.

Humanitarian Crisis:

The philanthropic emergency set off by the Ukraine war is an obvious sign of the human expense of contention. The difficulties of adequately supporting large-scale refugee populations and the limitations of existing humanitarian frameworks have been made clear by the massive displacement of populations. Problems with logistics and a lack of resources have hindered the international community's response, highlighting the need for better coordination and more money invested in humanitarian infrastructure. The emergency additionally highlights the more extensive ramifications for worldwide relocation strategies and the limit of host nations to oversee unexpected

convergences of outcasts. Tending to these difficulties requires a more powerful and adaptable compassionate reaction framework equipped for adjusting to quickly evolving conditions.

Reassessment of International Norms:

The war has prompted a reexamination of international governance frameworks and legal standards. The changing nature of global governance is reflected in the ongoing debate regarding state sovereignty, territorial integrity, and the efficacy of international laws governing armed conflict. The contention has tried existing legitimate and moral principles, bringing up issues about the future job of global organizations and the authenticity of intercessions. The dynamic nature of global governance and the need for continuous evolution in response to emerging challenges are exemplified by the possibility of new precedents in international law.

Public Perception and Policy Influence:

Public discernment, molded by media inclusion and political talk, plays had a critical impact in affecting global strategy reactions. Governments are under more pressure to act as a result of the conflict's increased visibility and public opinion mobilization. This dynamic delineates the effect of homegrown and worldwide public opinion on international strategy and highlights the significance of vital correspondence and public tact in forming strategy choices. The connection between public opinion and policy implementation demonstrates the significance of public perception and the media in influencing international responses to global conflicts.

In synopsis, the Ukraine war's ramifications are diverse and interconnected, influencing international arrangements, monetary soundness, helpful reactions, lawful standards, and general assessment. These effects demonstrate the complexity of contemporary international relations and emphasize the need for adaptable strategies and in-depth analysis to address the challenges posed by such conflicts now and in the future.

Conclusion:

The conflict in Ukraine has emerged as a pivotal moment in contemporary international relations, having far-reaching effects that span economic, humanitarian, and geopolitical dimensions. This contention has reshaped worldwide power elements as well as highlighted the interconnected idea of the cutting edge world, where territorial struggles can have huge worldwide repercussions. Geopolitical alliances have changed significantly as a result of the war, highlighting a resurgence of rivalries between great powers and a reorganization of security arrangements. Traditional alliances have been strengthened and new geopolitical fault lines have emerged as a result of the intensified East-West tensions. This realignment mirrors a more extensive change in worldwide power elements, demonstrating a potential rebalancing of global relations that could impact worldwide soundness for quite a long time into the future.

Economically, the conflict has revealed weaknesses in commodity markets and global supply chains. The disturbances in energy supplies and rural products have had huge ramifications for worldwide exchange and financial security. The adaptations that have occurred as a result, such as the revision of trade strategies and the diversification of energy sources, demonstrate the resilience and adaptability that are necessary to navigate the intricate economic landscape that has been shaped by geopolitical conflicts. The helpful results of the Ukraine war have been serious, with enormous scope dislodging and huge stress on worldwide guide frameworks. The difficulties looked in giving compelling compassionate help feature the constraints of existing reaction structures and highlight the requirement for improved coordination and expanded interest in philanthropic framework. The crisis has made it clear that a more robust and adaptable strategy for dealing with large-scale humanitarian crises is needed right away.

International legal norms and governance frameworks have also been put to the test and, in some cases, rewritten as a result of the conflict. The discussion over state sway, regional trustworthiness, and the adequacy of worldwide regulations mirrors the developing idea of worldwide administration. The dynamic and adaptable nature of global legal and governance structures in response to emerging challenges is emphasized by the potential for new precedents in international law. International policy responses to the war have been shaped by public perception and media influence. The significant influence of media coverage and public sentiment on decisions regarding foreign policy is made clear by the alignment of public opinion with policy actions. This powerful highlights the significance of vital correspondence and public strategy in tending to worldwide struggles and forming global reactions.

All in all, the Ukraine war diversely affects global relations. The complexity of contemporary global interactions can be seen in its effects on geopolitical alignments, economic stability, humanitarian responses, legal norms, and public opinion. To effectively address the challenges posed by such conflicts now and in the future, effective strategies must be developed with an understanding of these consequences. As the circumstance keeps on developing, continuous examination and versatile reactions will be fundamental in exploring the moving scene of worldwide relations and guaranteeing worldwide steadiness.

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Techno Criticism

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Abstract:
Techno criticism is an analytical method for critically analyzing the numerous ways in which technology affects society. It investigates the moral, social, environmental, economic, cultural, and psychological aspects of technological progress. Techno criticism seeks to address issues such as economic inequality, data security, privacy, and environmental sustainability by examining the repercussions of technology. By considering the reciprocal relationship between technology and society, it challenges notions of technological determinism and questions how technology influences power dynamics and social structures. Eventually, techno analysis expects to cultivate a more nuanced comprehension of innovation's job in molding human encounters and cultural standards, upholding for capable and evenhanded mechanical turn of events.
Keywords: Techno, Criticism, Technology, Digital, Capitalism, Spectrum

Introduction:

Techno criticism emerges as a crucial field of inquiry in an era when technology permeates every aspect of daily life, from the devices we use to the systems that govern our societies. Techno analysis is the act of basically inspecting the ramifications, results, and moral components of innovative headways. It tries to figure out how technology affects and changes the way people experience the world, social structures, and cultural norms. At its center, techno analysis challenges the frequently unexamined presumptions that go with innovative advancement. It investigates the effects of technology on the real world to examine its promises of convenience, efficiency, and innovation. Privacy, data security, and the ethical responsibilities of tech developers and users are some of the pressing issues this field addresses. It likewise assesses how innovation can add to monetary imbalance, shape power elements, and influence natural supportability. Besides, techno analysis questions the impact of innovation on social and mental prosperity, investigating how advanced stages and gadgets adjust human way of behaving and cultural qualities. By looking at these angles, techno pundits plan to feature the likely dangers and potentially negative results of innovative turns of events. In order to cultivate a balanced and informed approach to technology, this critical perspective is essential. Policymakers, developers, and the general public are all encouraged to view technology not only as a collection of tools and systems, but also as a dynamic force that interacts with and shapes our world in intricate ways. We can better navigate the ethical and societal challenges posed by technological innovation through techno criticism, aiming for a future in which technology serves humanity fairly and sustainably. Ethno criticism is a broad field that takes into account a variety of points of view regarding the function, impact, and morality of technology in society. It frequently remembers conversations for a few key regions:

1. **Ethical Implications**: This includes discussions about tech companies' moral responsibilities, data security, and privacy. Critics might investigate the ways in which technology impairs individual autonomy and the ethical guidelines that ought to govern the creation and application of technology.
2. **Social Impact:** Pundits frequently break down what innovation means for social designs and connections. For example, how does online entertainment shape popular assessment, or how does computerization influence business?
3. **Environmental Concerns:** Another important criticism is the impact that technology has on the environment. This includes the energy consumption of data centers and blockchain technologies, as well as the environmental impact of producing and disposing of technology products.
4. **Economic Effects:** Techno critics might examine how technology affects economic power dynamics, labor markets, or economic inequality. They might talk about how some technologies help some groups while hurting others.
5. **Cultural and Psychological Effects**: Additionally, the impact of technology on psychology and culture is examined. This includes the ways in which technology affects human behavior, mental health, and cultural norms and practices.

Objective of Techno Criticism:

The essential target of techno analysis is to give a thorough and basic assessment of the job and effect of innovation in the public eye. It looks to accomplish a few key objectives:

1. **Evaluate Ethical Implications**: to evaluate the moral implications of technological advancements, such as concerns about data

security, consent, privacy, and the moral obligations of technology developers and users.

2. **Analyze Social Impact**: To comprehend what innovation means for social designs, connections, and power elements. This incorporates analyzing what innovation means for imbalance, local area union, and social connections.
3. **Assess Environmental Consequen**ces: to investigate the sustainability of technological practices and the ecological footprint of technology, which includes the effects of production, use, and disposal on the environment.
4. **Examine Economic Effects**: To investigate what innovation means for financial frameworks, including work markets, abundance conveyance, and the monetary force of tech goliaths and legislatures.
5. **Investigate Cultural and Psychological Effects**: to investigate how technology influences individual behavior, cultural norms, and values, as well as its effect on mental health and identity.

Review of Literature:

The field of techno analysis envelops a wide scope of insightful work that basically looks at the ramifications of innovation. The fields of philosophy, sociology, political science, environmental studies, and cultural studies are all represented in this body of writing. Key topics and powerful works in techno analysis give an extensive comprehension of what innovation communicates with and means for society.

1. Ethics and Privacy

"The Age of Surveillance Capitalism" by Shoshana Zuboff (2019): This seminal work looks at how digital platforms make money off of personal data and raises important questions about privacy, autonomy, and power concentration. Eli Pariser's "The Channel Air pocket: What the Internet Is Covering Up for You" Pariser looks into how algorithms affect our worldview and create echo chambers by shaping and restricting our online experiences.

2. Social and Cultural Impact

"Smart Mobs:" by Howard Rheingold The Coming Social Revolution" Rheingold discusses the positive and negative effects of mobile technology and social networks on new forms of activism and social organization. Nicholas Carr's "The Shallows: How the Web Is Treating Our Minds" (2010): Carr analyzes what consistent web use means for mental capabilities and fundamentally has an impact on the manner in which we process data.

3. Environmental Considerations

"Capitalism in the Web of Life:" by Jason Moore "Ecology and Capital Accumulation" (2015): Moore presents an evaluate of what industrialist methods of creation mean for natural frameworks, including the ecological expenses of innovative turn of events. "Prosperity without Growth:" by Tim Jackson Foundations of the Future Economy" (2009): Jackson makes the case that economic models need to be rethought in order to address environmental sustainability, mentioning the role that technology plays in sustainable development.

4. Economic and Power Dynamics

Manuel Castells' "The Ascent of the Organization Society" (1996): Castells focuses on the rise of information economies and global networks in his analysis of how networked technologies reshape economic and social structures. Scratch Srnicek and Alex Williams' "Imagining What's in store: Postcapitalism and a World Without Work" (2015): This book investigates the potential for innovation to change work markets and financial frameworks, pushing for moderate mechanical and monetary approaches.

5. Technological Determinism

"The Whale and the Reactor:" by Langdon Winner A Search for Limits in a High-Tech Era" (1986): Winner criticizes technological determinism, arguing that technological artifacts embody particular social values and power dynamics and that technology and society are shaping each other. "We Have Never Been Modern" by Bruno Latour (1993): By presenting a framework for comprehending the interaction of technology and social constructs, Latour challenges the idea of technological determinism.

Research Methodology in Techno Criticism:

In techno criticism, research methodology entails methodical approaches to investigating and evaluating the numerous ways in which technology affects society. Methodologies frequently draw from sociology, philosophy, political science, environmental studies, and media studies due to the field's interdisciplinary nature. An overview of typical research methods utilized in techno criticism is as follows:

1. Qualitative Research:

Nitty gritty assessments of explicit cases where innovation has had critical social, moral, or ecological effects. A case study might, for instance, investigate how political mobilization is affected by social media or how e-waste affects the environment. Obtaining information from individuals or groups to comprehend their technological experiences and perceptions. This strategy can uncover experiences into what various networks connect with and are meant for by mechanical developments. Immersive research

involves observing and taking part in the everyday lives of people who use technology. An in-depth comprehension of how technology is incorporated into everyday life and influences it is provided by ethnographic studies. Dissecting media, writing, and public talk to comprehend how innovation is addressed and examined. This might involve looking at advertisements, news articles, and online forums to figure out how people feel and what they think about technology.

2. Quantitative Research

These tools are used to collect statistical data on how people feel about technology, how they use it, and how it affects them. This strategy gives an expansive outline of patterns and relationships. controlled experiments to test theories about the effects of technology. For example, specialists could concentrate on the effect of computerized gadgets on capacity to focus by contrasting execution on mental undertakings and without gadget utilization. using massive datasets from social media, user interactions, or other digital sources to discover technology-related patterns and trends. This strategy can uncover relationships between's innovation use and different social or conduct results.

3. Critical Theoretical Approaches

Applying systems from basic hypothesis to look at how innovation propagates or challenges existing power designs and imbalances. The study of how technology influences social hierarchies and systemic biases is necessary for this. deconstructing the meanings and power relationships embedded in technological objects and systems by employing post-structuralist theories. The complexities and ambiguities of technological impacts can be better understood with this method. putting theories like Actor-Network Theory (ANT) and Social Construction of Technology (SCOT) into practice to comprehend the ways in which society and technology co-construct one another. The relationship between social practices and technological objects is the focus of these theories.

4. Historical Analysis

Looking at verifiable improvements in innovation and their cultural effects on grasp recent concerns. In order to draw parallels and contrasts between current issues and technological advancements, this approach involves studying the past. examining the development of particular technologies to comprehend their long-term effects and the ways in which they have shaped or been shaped by changes in society over time.

5. Ethical and Policy Analysis

Assessing the ethical consequences of technological advancements and their applications. This incorporates evaluating issues like security, assent, and the ethical obligations of innovation engineers and clients. examining the development and implementation of technology-related policies to determine their efficacy and fairness. Analyzing regulations pertaining to environmental standards, digital rights, and data protection are examples of this approach.

Need for Study:

Due to the profound and pervasive influence that technology has on modern life, the study of techno criticism is becoming increasingly important. Understanding the implications of technology's rapid evolution has become increasingly important for a number of reasons:

1. Ethical and Privacy Concerns

Rising Reconnaissance and Information Double-dealing As computerized innovations advance, issues connected with observation and information protection have become really squeezing. Looking at these worries assists with guaranteeing that moral norms are maintained and that people's freedoms are secured. Innovations, for example, man-made consciousness and AI can propagate or worsen inclinations. In order to advance equity and fairness, it is helpful to critically examine these technologies in order to identify and address biases.

2. Social and Cultural Impacts

Innovation has changed the manner in which individuals impart and collaborate. Understanding these progressions is fundamental for resolving issues connected with social confinement, advanced compulsion, and changes in relational connections. Cultural norms and values both influence and are influenced by technology. Concentrating on these elements assists in understanding how innovation with canning both reflect and shape social practices and cultural qualities.

3. Economic and Labor Implications

The labor market is being reshaped by technological advancements, particularly in artificial intelligence and automation. In order to develop strategies for managing job displacement and preparing the workforce for future demands, it is essential to analyze these changes. Economic divides can be bridged or widened by technology. Concentrating on these impacts assists in forming arrangements that with elevating evenhanded admittance to mechanical advantages and address the dangers of worsening monetary variations.

4. Environmental Sustainability

Technology's production, use, and disposal all have significant effects on the environment. For sustainable practices to be promoted and the ecological footprint of technological innovations to be reduced, an understanding of these impacts is essential. Innovation depends on limited assets and adds to e-squander. The study of these issues aids in the creation of recycling strategies that are more efficient and resource-efficient.

5. Power Dynamics and Governance

Technology frequently consolidates power in a few states or corporations. Exploring what innovation means for power elements helps in pushing for additional majority rule and decentralized models of innovation administration. Reconnaissance and Tyranny: Technology can be used for control and surveillance, which could lead to authoritarian methods. For the sake of preserving democratic liberties and human rights, it is crucial to critically examine these applications.

Statement of the Problem:

Society is confronted with significant difficulties and difficulties as a result of the widespread incorporation of technology into all facets of daily life in an era marked by rapid technological advancement. Innovations in technology have many advantages, but they also come with complicated problems that need to be looked at carefully. The center issue addressed by techno analysis is the need to comprehend and deal with the diverse effects of innovation on society, morals, and the climate. Innovation's consequences for society are not direct. It promotes progress and offers solutions to a variety of issues, but it also raises serious concerns about privacy, ethics, inequality, and the sustainability of the environment. The equivocalness in innovation's effect requires an exhaustive and basic examination to adjust its advantages against its expected dangers.

Specific Issues

1. Ethical Dilemmas:

Digital platforms' widespread collection and analysis of personal data raise significant privacy concerns. The balance between innovation and individual rights and the ethical implications of data use are not fully addressed. The potential for calculations to propagate or intensify cultural inclinations is a major problem. Understanding what predispositions are implanted in innovation and how they mean for dynamic cycles is critical for growing fair and evenhanded frameworks.

2. Social and Cultural Consequences:

Social interactions have changed as a result of technology, which could lead to problems like digital addiction, less face-to-face communication, and social isolation. Understanding how these changes affect personal well-being and community cohesiveness is made easier by analyzing them. Cultural norms and practices are influenced by technological advancements. To understand how technology shapes and reflects social change, it is necessary to investigate how it affects cultural values and identity.

3. Economic Implications:

Mechanization and computerized reasoning are changing work markets, prompting position dislodging and changes in business designs. In order to come up with plans to lessen the impact on workers, it is necessary to have a thorough understanding of these economic effects. Economic gaps can be made worse by technology. Analyzing how mechanical headways add to or relieve imbalance helps in creating approaches for more fair financial development.

4. Environmental Impact:

The creation and removal of mechanical items add to asset consumption and ecological corruption. Evaluating the biological impression of innovation and advancing manageable practices are vital for tending to ecological difficulties.

5.Power Dynamics and Governance:

Technological advancements frequently result in the concentration of power in a small number of states or corporations, which has the potential to undermine democratic processes and boost authoritarian tendencies. Examining these power elements is fundamental for advancing fair and straightforward administration. Personal liberties and human rights are at risk when technology is used for control and surveillance. Understanding these dangers is basic for upholding for arrangements that safeguard security and guarantee majority rule oversight.

Scope and Limitation of Techno Criticism

Scope:

1. Ethical Analysis:

Examines how technology affects user privacy, data security, and consent, with a focus on surveillance, data breaches, and ethical use of personal information. examines how fairness in decision-making processes and outcomes can be maintained or reduced by automated systems and algorithms.

2. Social Impact:

Examines the ways in which social media use, digital addiction, and online communities are all impacted by technology on relationships, mental health, and social interactions. Investigates what innovation means for social standards, practices, and values, remembering the effect for character and social articulation.

3. Economic Implications:

Studies how employment, job displacement, and shifts in labor dynamics are impacted by automation, artificial intelligence, and digital economies. examines issues of access and the digital divide, as well as how technology either reduces or eliminates economic disparities.

4. Environmental Considerations:

Examines the effects that technological production, use, and disposal have on the environment, focusing on resource consumption, e-waste, and practices that promote sustainability. examines innovations aimed at promoting environmentally friendly practices and reducing technology's environmental impact.

5. Political and Power Dynamics:

Dissects how innovation can focus power inside enterprises or state run administrations, influencing majority rule cycles and administration. Investigates the utilization of innovation for reconnaissance and control, evaluating its effect on security and common freedoms.

Limitations:

1. Complexity of Technology:

The speedy advancement of innovation can make it trying to stay aware of and basically break down arising patterns and their suggestions. The tremendous scope of advances and their applications can confuse endeavors to sum up discoveries and ends across various spaces.

2. Data Availability and Quality:

Lacking admittance to exclusive information and inside operations of innovation organizations can ruin exhaustive investigation and understanding. The quality and representativeness of information utilized for investigation can influence the dependability of discoveries, especially while depending on client produced or self-announced information.

3. Interdisciplinary Challenges:

Coordinating bits of knowledge from different disciplines (e.g., social science, theory, financial matters) can be mind boggling, requiring assorted strategic methodologies that may not necessarily adjust. Various fields might utilize shifting phrasings and hypothetical structures, making it trying to make a firm comprehension of techno-basic issues.

4. Subjectivity and Perspective:

Basic examination frequently includes abstract evaluations of innovation's moral and cultural effects, which can fluctuate in view of individual points of view and values. Analysts might carry their own predispositions and suppositions to their examinations, possibly affecting their understandings and ends.

5. Policy and Regulatory Constraints:

Due to the intricate interplay between technology, politics, and regulation, it can be challenging to turn crucial insights into practical policy recommendations. Changes or reforms suggested by technocriticism may be met with resistance from stakeholders and interests that are ingrained in technological advancements.

Hypothesis:

In techno analysis, speculations are planned to direct the examination and examination of innovation's effect on different parts of society. These speculations are speculative articulations that can be tried through exact exploration, hypothetical investigation, or basic assessment. Within the field of technological criticism, some examples of hypotheses include:

1. Ethical Implications Hypothesis

This hypothesis suggests that the biases inherent in training data and algorithmic design contribute to unequal outcomes, necessitating a closer examination of how algorithms affect fairness and justice. The implementation of advanced data analytics and machine learning algorithms in decision-making processes disproportionately amplifies existing societal biases, resulting in systemic inequalities in sectors such as hiring, the financial sector, and criminal justice.

2. Social Impact Hypothesis

Expanded utilization of web-based entertainment stages is associated with more elevated levels of social disconnection and emotional wellness issues among young people, because of diminished up close and personal connections and the tensions of online social correlations. An investigation into how digital interactions affect well-being is prompted by this hypothesis, which asserts a link between negative social and psychological effects of social media use.

3. Economic Implications Hypothesis

Traditional labor markets are significantly disrupted by the rapid development of artificial intelligence and automation technologies, which results in an increase in job losses and an expansion of economic inequality, particularly for low-skilled workers. This hypothesis looks at how automation affects job security and economic disparities, as well as how technological advancements affect employment and inequality.

4. Environmental Considerations Hypothesis

The lifecycle natural effect of purchaser hardware, including asset extraction, creation, and e-garbage removal, fundamentally adds to biological corruption and asset consumption. This hypothesis calls for a comprehensive examination of the ecological footprint of electronic products and emphasizes the environmental costs of technology.

5. Political and Power Dynamics Hypothesis

The grouping of mechanical power inside a couple of large companies and legislatures expands the potential for reconnaissance and tyrant control, subverting vote based cycles and individual flexibilities. This hypothesis looks at how political power and governance can be affected by the centralization of technological resources and control, which could have an impact on privacy and democracy.

Results:

The results of techno criticism shed light on the various ways in which technology affects society, ethics, and the environment. The empirical research, theoretical analysis, and critical examination that led to these findings shed light on the advantages and disadvantages of technological advancements. Here are a few key outcomes

generally tracked down in the field of techno analysis:

1. Ethical Implications

Research frequently reveals that tech companies' extensive data collection and surveillance can result in significant privacy breaches. Ethical concerns regarding data ownership and user rights arise as a result of the frequent use of personal data without adequate consent or transparency. Concentrates on demonstrate the way that calculations can sustain existing inclinations and imbalances. For example, one-sided informational collections utilized in AI can bring about oppressive results in regions, for example, recruiting rehearses, policing, loaning.

2. Social Impact

There is evidence that, particularly among adolescents, excessive social media use is linked to higher rates of anxiety, depression, and social isolation. Cyberbullying and the pressure to adhere to online standards both contribute to these negative outcomes. Innovation has changed social connections, frequently prompting a decline in up close and personal correspondence. Even though digital platforms make it easier to connect with people all over the world, they can also make it harder to connect with people and get involved in the community.

3. Economic Implications

It has been found that AI and automation have a significant impact on traditional labor markets. Automation is especially susceptible to jobs in manufacturing and routine administrative work, which can result in job losses and the need for new skills for future employment. Economic inequality can get worse as technology advances. Disadvantaged groups are further disadvantaged and the digital divide is widened because the benefits of technology are frequently concentrated among those with access and skills.

4. Environmental Considerations

The lifecycle of purchaser gadgets — incorporating asset extraction, creation, and removal — adds to critical natural corruption. E-waste management is still a big problem because so many electronics end up in landfills and give off harmful chemicals. Resources are being depleted and the environment is being harmed as a result of the demand for rare earth metals and other resources used in technology. The extraction processes for these materials frequently have serious natural and social outcomes.

Discussion:

The conversation of techno analysis includes combining experiences from different parts of mechanical effects on figure out their more extensive ramifications. The purpose of this discussion is to address the results' complexity and investigate its wider significance in societal, ethical, economic, environmental, and political contexts.

1. Ethical Implications

Concerns about consent and privacy are raised by technology companies' extensive use and collection of personal data. Data-driven technologies can improve services and innovation, but they also run the risk of violating privacy and misusing information. Guaranteeing strong information security measures and straightforwardness in information rehearses are significant to keeping up with client trust and defending individual privileges. The need for more equitable and inclusive design practices is highlighted by the presence of biases in algorithms, which can exacerbate existing inequality. Endeavors to moderate algorithmic predisposition ought to incorporate assorted informational indexes, standard reviews, and moral rules to guarantee decency in robotized dynamic cycles.

2. Social Impact

Social media's negative effects on mental health and social interactions emphasize the need for digital wellness strategies. This incorporates cultivating sound internet based ways of behaving, empowering computerized detox practices, and planning stages that focus on client emotional well-being. While innovation works with worldwide network, it frequently comes to the detriment of more profound, eye to eye cooperations. For the sake of preserving the quality of social interactions and the cohesiveness of the community, it is essential to understand how to strike a balance between cultivating relationships offline and maintaining connections online.

3. Economic Implications

Proactive measures to address job displacement are necessary given the impact of automation and AI on labor markets. This remembers effective money management for retraining and upskilling programs, growing new position open doors, and supporting laborers through changes to moderate the financial difficulties presented by innovative headways. Tending to financial incongruities exacerbated by innovation includes guaranteeing impartial admittance to mechanical assets and open doors. Strategy intercessions, for example, computerized proficiency programs and designated help for underserved networks, are important to connect the advanced separation and advance comprehensive financial development.

4. Environmental Considerations

The impact that technology has on the environment shows how crucial it is to use environmentally friendly methods throughout the technology's lifecycle. This incorporates advancing reusing, lessening asset utilization, and empowering the advancement of eco-accommodating innovations

to limit natural harm. Implementing circular economy models that emphasize reducing, reusing, and recycling electronic products is necessary for efficient waste management. Arrangements and practices that advance dependable removal and recuperation of materials can assist with moderating the natural effect of e-squander.

5. Political and Power Dynamics

Concerns about monopolistic practices and reduced competition are raised by the concentration of technological power among a few major players. Administrative measures and antitrust activities are expected to advance fair rivalry and forestall the maltreatment of market power. Personal liberties and democratic principles are at risk when technology is used for surveillance. For civil liberties to be safeguarded, strict oversight, open procedures, and robust legal frameworks are necessary to strike a balance between security requirements and privacy rights.

Conclusion:

Techno criticism emphasizes the need for a nuanced and balanced approach to technological development and policy, as well as the numerous ways in which technology has affected contemporary society. Techno criticism provides a framework for understanding and managing the complexities of technology in a manner that promotes equity, sustainability, and well-being by addressing ethical concerns, social impacts, economic challenges, environmental considerations, political dynamics, and cultural shifts. Drawing in with these issues mindfully can assist with directing capable mechanical development and add to an all the more and informed society. Techno analysis enlightens the complicated transaction among innovation and society, underscoring the requirement for a basic way to deal with figuring out mechanical effects. As innovation coordinates all the more profoundly into each feature of life, its advantages are in many cases joined by huge difficulties that require cautious examination. While technology can improve connectivity and convenience, it also raises serious concerns about the erosion of personal privacy and the possibility of data misuse, as shown by an examination of privacy and data protection issues. The risk of perpetuating existing disparities is brought to light by the prevalence of algorithmic bias, which calls for more stringent oversight and inclusive technology design practices.

The effects on society are also profound. Innovation, especially virtual entertainment, has changed how individuals communicate, frequently prompting issues, for example, expanded social separation and psychological well-being concerns. A nuanced comprehension of how digital platforms influence cultural identity and practices is necessary for the technological shift in cultural norms. Financially, innovation has upset customary work markets, with mechanization and simulated intelligence adding to work uprooting and enlarging monetary differences. The problem lies in coming up with effective ways to transition the workforce and making sure that everyone has equal access to the benefits of technology. Natural worries are squeezing too, with the lifecycle of mechanical items adding to asset consumption and e-squander. Economical practices and advancements are urgent to alleviating the environmental effect of innovation and advancing dependable asset the executives. Technological advancements also have an impact on power dynamics and political dynamics. The convergence of mechanical power among a couple of substances raises worries about monopolistic way of behaving and possible maltreatments, while observation innovations present dangers to individual flexibilities and popularity based values.

The discussion between mechanical determinism and social development highlights the equal connection among innovation and society. When designing technologies that are responsive to societal requirements and values, having an understanding of this relationship is helpful. In total, techno analysis offers a thorough structure for evaluating the complex effects of innovation. It advocates for a balanced approach that addresses the ethical, social, economic, environmental, and political challenges posed by technological advancements while simultaneously maximizing their benefits. As innovation keeps on developing, keeping a basic point of view is fundamental for guaranteeing that it contributes decidedly to society and maintains crucial upsides of reasonableness, security, and manageability.

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Design of High Pressurized Hydrogen Gas Cylinder for Hydrogen Storage

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Abstract:

The increasing demand for efficient and safe hydrogen storage solutions necessitates the optimization of hydrogen gas cylinders (HGCs) in terms of dimensions and material properties. This paper aims to propose the optimal dimensions for HGCs and explore alternative materials to address the limitations of conventional steel cylinders. Steel, while commonly used for HGCs due to its robustness, presents challenges such as increased weight and potential safety hazards under high-pressure conditions. To overcome these issues, this study investigates various materials that could offer improved safety and performance characteristics.The research involves the theoretical calculation of dimensions for a high-pressure vessel, using the ASME VIII-1 design code and Hoop's stress theory to ensure structural integrity under operational conditions. The paper details the methodology for determining appropriate cylinder dimensions and evaluates different materials based on their mechanical properties and suitability for high-pressure applications. Results from this study highlight the comparative advantages of alternative materials over steel, focusing on aspects such as weight reduction, enhanced safety, and cost-effectiveness. The findings provide valuable insights for the design and CAD model of hydrogen gas cylinder with high pressures, contributing to more efficient and safer hydrogen storage solutions. This research not only addresses current limitations but also lays the groundwork for future innovations in hydrogen storage technology.

Keywords: Hydrogen gas cylinder, Dimensions, High-pressure vessel, ASME Code VIII, Division -1, Hoop's Stress.

Introduction:

Hydrogen, the simplest and lightest element, presents both significant potential and notable challenges in the realm of energy storage and utilization[1]. As a colorless, odorless, and tasteless gas, hydrogen is highly flammable and possesses a lower density compared to other gases. Its unique properties necessitate specialized storage solutions to ensure safety and efficiency in its application. Despite being non-corrosive, which reduces the need for specialized materials, hydrogen storage systems must still be designed to manage high pressures and temperatures, adhering to stringent codes and regulations.The storage of hydrogen typically involves the use of high-pressure vessels known as hydrogen gas cylinders[3]. These cylinders must be capable of containing hydrogen at pressures that exceed ambient conditions, making them critical components in hydrogen fuel systems. The design and material selection for these cylinders are paramount, as they must withstand substantial tensile and compressive forces without failure. Traditionally, materials such as mild steel and cast iron have been used due to their high tensile strength and ductility. However, the choice between brittle and ductile materials impacts both the performance and safety of the storage system.Pressure vessels, including hydrogen cylinders, are classified based on their wall thickness relative to their diameter**[11].** Vessels with wall thicknesses less than one-tenth of their diameter are categorized as thin-shell pressure vessels, while those with greater wall thicknesses are considered thick-shell pressure vessels[5]. The distinction between thin-shell and thick-shell vessels is crucial, as it influences the stress distribution and design considerations. This paper primarily addresses the design of thin-shell hydrogen gas cylinders, focusing on their application under typical internal pressures and ambient temperatures.In thin-shell pressure vessels, two primary types of tensile stresses must be managed: circumferential (or hoop) stress and longitudinal stress. Hoop stress, which acts tangentially around the circumference of the cylinder, is the dominant stress in thin-shell vessels and is critical to the design process. Longitudinal stress, which acts along the length of the cylinder, is typically half of the circumferential stress. Given this relationship, the design of hydrogen gas cylinders primarily relies on the analysis and management of hoop stress to ensure structural integrity and safety.The design of hydrogen gas cylinders must also account for various factors such as material fatigue, safety margins, and operational conditions. High-pressure hydrogen storage presents unique challenges, including the risk of material embrittlement and failure under stress. As a result, accurate theoretical calculations and adherence to established design codes are essential for developing reliable and efficient storage solutions. The ASME VIII-1 design code provides a framework for designing pressure vessels, including hydrogen cylinders, by specifying requirements for material properties, fabrication techniques, and safety standards.This paper aims to contribute to the advancement of hydrogen storage technology by proposing a methodology for determining the optimal dimensions of thin-shell hydrogen gas cylinders[6].The study employs theoretical calculations and design of the cad model based on the ASME VIII-1 design code and Hoop's stress

theory to evaluate the dimensions required to withstand internal pressures[7]. The research involves a detailed analysis of various formulas and methods to ensure that the design meets safety and performance criteria.Recent advancements in hydrogen storage technology have highlighted the need for more efficient and cost-effective CAD model of the hydrogen storage cylinder was designed using CATIA software[8]. The model was meticulously crafted based on the specified dimensions, which include a cylinder length of 4 meters, a diameter of 0.4 meters, and a wall thickness of 2.45 mm. These dimensions were chosen to meet the requirements for storing hydrogen gas under high pressure, while maintaining the structural integrity and safety standards necessary for such applications.

Medthdology:

Design the hydrogen cylinder manually is all about approximating the dimension of the hydrogen gas cylinder. This method can be a downside of the project. The most challenging part of this project is selection of the appropriate materials. Once the dimension (length and diameter) get fixed then the researchers are going to design the efficient and interactive pressure vessel using the software like CATIA, Solidworks the better and durable product.

Properties of Gaseous Hydrogen:

Table 1: Gaseous Hydrogen Physical and Chemical Properties (Retrieved from Safetygram 4 Air Product)

chemical Formula	h_2
Molecular Weight	2.016
Boiling Point at 1 atm	(–252.9°C
Freezing Point at 1 atm	(–259.2°C
Critical Temperature	–240°C
Critical Pressure	12.8 bar
Density, Gas at 70°F (21°C), 1 atm	0.1 g/l
Specific Gravity, Gas (air=1) at 68°F (20°C), 1 atm	0.07
Specific Volume at 70°F (21°C), 1 atm	11.99 m^3/kg
Latent Heat of Vaporization	446 kJ/kg
Flammable Limits at 1 atm in air	4%–75% (by volume)
Autoignition Temperature at 1 atm	(560°C)

1. Generating Volume of gaseous hydrogen and Volume of cylinder:

Assumption:

Mass of hydrogen gas (m)= 6 kg at room temperature (21 ^{0}C) and 1 atm Pressure.

Let,

Volume of gaseous hydrogen (21 ^{0}C), V1 = 35.959 m^3

Pressure of hydrogen gas, P1 = 1 atm = 1.01325 bar

Inside pressure of cylinder, P2 = ?,

Volume of cylinder = $V2 = \pi r^2 l$

By applying Gas Law,

P1V1 = P2V2

Hydrogen - Weight and Volume Equivalents

Table 2: Volume of 6 kg hydrogen gas

Weight of Liquid or Gas		Volume of Liquid at Normal Boiling Point		Volume of Gas at 70°F (21°C) and 1 atm	
lb	kg	L	gal	cf	m^3
1.000	0.454	6.409	1.693	192.00	5.437
2.205	1.000	14.132	3.733	423.360	11.988
0.156	0.071	1.000	0.264	29.952	0.848
0.591	0.268	3.788	1.000	113.472	3.213
5.208	2.362	33.381	8.818	1000.00	28.317
0.184	0.083	1.179	0.312	35.328	1.000
Enter numbers in boxes below for conversion values.					
6.614	3	42.390	11.198	1269.888	35.959

Table 3: Internal Pressure Based on Dimension of Cylinder.

Mass	**Diameter (in m)**	**Length (in m)**	**Volume of cylinder at 21 ^{0}C**	**Internal Pressure (bar)**
3 kg	**0.4**	**4**	**0.50265**	**72.5**
		3	0.3770	97
		2	0.2513	145
Mass	Diameter (in m)	Length (in m)	Volume of cylinder at 21 ^{0}C	Internal Pressure (bar)
3 kg	0.3	4	0.2827	128.86
		3	0.2120	171.8
		2	0.1413	258

2. Design calculation and Analysis:

An equation applying Hoop stress concept is derived to establish minimum shell thickness in a thin cylinder, given by:

1. According to ASME Code VIII-1,

$$\mathbf{t = \frac{PR}{SE - 0.6P}}$$ (For cylindrical Portion)

$$\mathbf{t = \frac{PR}{2SE - 0.2\,P}}$$ (For hemispherical end dome)

2. According to Hoop's Stress theory:

$$\mathbf{t = \frac{PR}{\sigma t}}$$ (For cylindrical Portion)

$$\mathbf{t = \frac{PR}{2\sigma t}}$$ (For hemispherical end dome)

where,
t = minimum shell thickness
P = internal pressure
S = allowable stress
E = joint efficiency = 1 (assume)
R = inside radius
σt – Yield strength of materials

Note: The difference is the additional term of 0.6*P* in the denominator. This term was added by the ASME to take into consideration of the nonlinearity in stress that develops in thick cylinder.

Thickness established on the basis of material properties:

Carbon Composite fiber std cf fabric:

Yield strength of materials (σt) = 600MPa
Density = 1.60 g/cc

Table 4: Table for thickness and mass of cylinder for Carbon Composite

Diameter (in m)	**Length (in m)**	**Thickness (in mm)**				**Internal Pressure (bar)**
		Based on ACME CodeVIII-1		**Based on Hoop's stress Theory**		
		shell	**End cap**	**shell**	**End cap**	
0.4	**4**	**2.45**	**1.20**	**2.42**	**1.21**	**72.5**
	3	3.265	1.62	3.23	1.62	97
	2	4.90	2.42	4.83	2.41	145

Diameter (in m)	Length (in m)	Thickness (in mm)				Internal Pressure (bar)
		Based on ACME CodeVIII-1		Based on Hoop's stress Theory		
		shell	End cap	shell	End cap	
0.30	4	3.24	1.60	3.2	1.6	128.6
	3	4.53	2.23	4.45	2.225	178.1
	2	6.62	3.23	6.45	3.225	258

Determination of Total Volume and Weight of Cylinder:

Dimensions: **For Shell**

Outer radius (R_2) = 200+2.45= 202.45 mm = **0.20245 m**,

Inner radius (R_1) = 200 mm = **0.2 m**,

Length (l) = **4 m**

Volume of Shell (V_1) = $\pi*((R_2)^2 - (R_1)^2) * l$ = **0.012390 m^3**

For End Cap:

Outer radius (R_2) = 200+1.20 = 201.2 mm = **0.2012 m**

Inner radius (R_1) = 200mm = **0.2 m**

Volume of end cap (V_2) = $\frac{4\pi}{3}\{(R_2)^3 - (R_1)^3\}$ = **0.0006068 m^3**

Total Volume (V) = $V_1 + V_2$ = 0.012390 m^3 + 0.0006068 m^3 = **0.0129968 m^3**

Weight of cylinder without hydrogen gas (m) = density * total volume

= 1600 * 0.0129968 = **21 kg**

Note: For this Composite fiber material density = **1600 kg/m^3**

Weight of cylinder with hydrogen gas = 21 +3 = **24 kg**.

Result:

Mass of Hydrogen gas (kg)	Internal pressure (bar)	Length (m)	Diameter (m)	Thickness (mm)	Yield Strength of material	Density of material	Weight of Cylinder (without gas)	Weight of Cylinder (with gas)
3 kg	72.5	4	0.4	2.45	600 Mpa	1600 kg/m^3	21 kg	24 kg

The Design and Optimization of thin-shell Hydrogen Gas Cylinder:

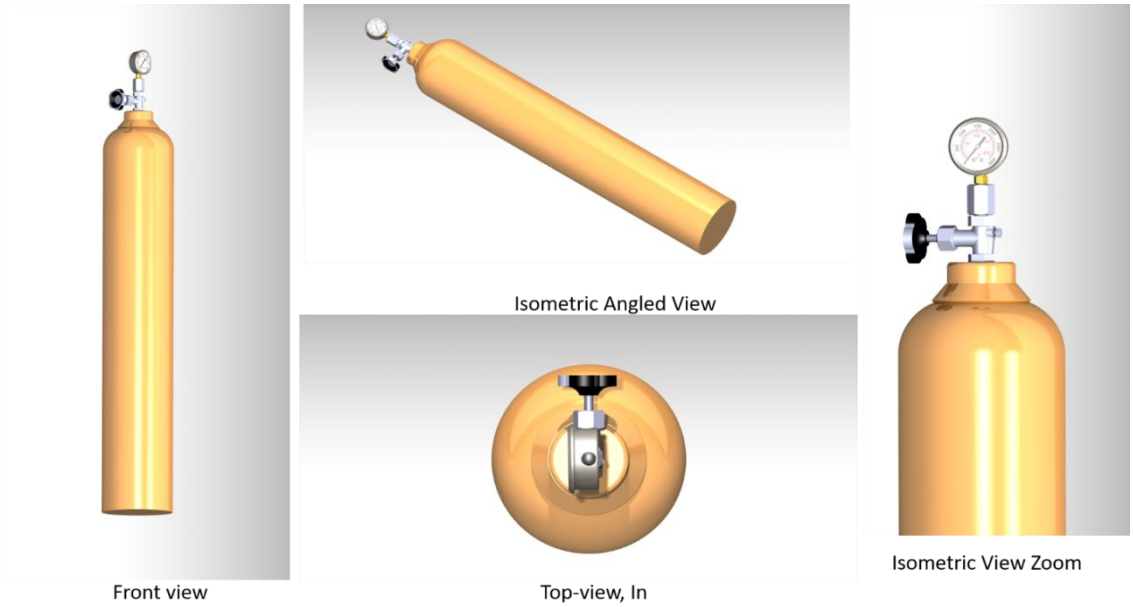

Fig.1

Conclusion:

The study have explored the design and optimization of thin-shell hydrogen gas cylinders, focusing on determining the appropriate dimensions required to safely store hydrogen at high pressures. By applying theoretical calculations based on the ASME VIII-1 design code and Hoop's stress theory, have addressed key aspects of pressure vessel design, including material selection stress analysis,cad model desinging[4].The research highlights the critical role of hoop stress in the design of thin-shell hydrogen cylinders[2]. Given that longitudinal stress is half of the circumferential stress, it is evident that the design process must prioritize the management of hoop stress to ensure the structural integrity and safety of the pressure vessel. The theoretical calculations performed in this study provide a framework for determining cylinder dimensions that meet the necessary safety and performance criteria.Our findings indicate that while traditional materials like mild steel and cast iron offer substantial tensile strength and ductility, alternative materials may present advantages in terms of weight reduction and safety. Future research should explore the use of advanced composite materials and innovative manufacturing techniques to further enhance the performance of hydrogen storage vessels.Additionally, this study underscores the importance of adhering to established design codes and standards to ensure the reliability of hydrogen storage systems[9,10]. The ASME VIII-1 design code serves as a comprehensive guideline for pressure vessel design, and its application in this research has demonstrated its effectiveness in guiding the development of safe and efficient hydrogen gas cylinders.

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Artificial Intelligence and Sentience: A Study of Holli Mintzer's Short Story "Tomorrow is waiting"

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Abstract:
Artificial Intelligence (AI) has gained prominence globally due to its ability to ease human effort. Artificial intelligence is the intelligence exhibited by machines to accomplish goals ascribed by humans. Today popular search engines, creative tools and video games display the power of artificial intelligence. With this unprecedented development comes the question if artificial intelligence would supplant human beings. Among diverse aspects, sentience is a parameter generally attributed to humans and regarded as a differentiator between humans and artificial intelligence. However, with the rapid advancement in artificial intelligence, literature has started to represent the pros and cons of Artificial Intelligence. Holli Mintzer's short story "Tomorrow is Waiting" offers relevant insights to address a futuristic world where Anji, the protagonist, might have accidentally created a sentient machine. This paper aims to understand the repercussions of sentience in machines by closely reading the short story. It seeks to understand the implications of science fiction AI narratives.
Keywords: Artificial Intelligence, Sentience, Human Values, Self

Introduction:

Artificial Intelligence (AI) is represented in science fiction. The short story "Tomorrow is Waiting" can be considered a science fiction story where artificial intelligence's potential dangers and apprehensions are portrayed. The story depicts the dream of creating a sentient robotic AI. Artificial Intelligence in science fiction narratives is meant for a human audience. The real technological limitations are ignored to depict machines as humanlike or fully autonomous. Isabella Hermann in "Artificial Intelligence in Fiction: Between Narratives and Metaphors" mentions the problems involved in taking Artificial Intelligence in fiction literally. As fictionalized narratives represent AI which are far more advanced than what humans have made in reality, science fiction narratives at times present unrealistic depictions of the implications of AI. From this perspective, artificial intelligence represented in the story is to be taken only as a fictionalized account. However, the fears and hopes brought by AI fiction may impact the development of AI. This is the reason why AI narratives, according to the author, may mislead the audience about AI. The mere presence of AI in fiction is not intended to showcase the implications of technology. Rather, the social issues associated with AI is represented through stories. At times Artificial Intelligence in fiction is way more developed than reality. The robots presented are "anthropomorphized" and made humanlike which does not match with the real advancements (Hermann 320). Hermann does not agree that machines can think autonomously and the creation of autonomous machines "reinforces existing misconceptions about the agency or autonomy of AI" (320). Though sentient AI is created accidentally, critics claim that machines follow the interests of the human creator. Whether Artificial Intelligence is seen as influencing the vested human interest should be the point of discussion. In stories, robots are similar to humans, replicating their actions, words and intentions. Machines with humanlike capabilities are built to fulfil the demands of the narrative.

Science-fictional AI is a dramatic element that makes a perfect antagonist, enemy, victim or even hero, because it can be fully adjusted to the necessities of the story. (322). This is the reason why authors create sentient AI which supersedes human capabilities. The story "Tomorrow is Waiting" projects the story of Anji or Anjali who pursues a career in artificial intelligence. She is a hard-working student who works on a project to build a machine that possesses artificial intelligence. The prominent point of discussion is the creation of artificial intelligence, that can pass all tests and prove superior to the human brain. There is a presumption that artificial intelligence cannot supersede the human brain. However, this story subverts the notion of superiority of the human brain. Learning how to create cripple-bots that can work in traffic signals and learning the basic basics of AI programming, Anjali tries hard to pass the examination along with creating a good project for her career. To create an artificial intelligence which can mimic a character, she selects Kermit the frog. The availability of a plethora of footage on TV encourages her to undertake Kermit the Frog as an object of interpretation and creation of character. The two characters- Anji and Brian- get puzzled witnessing the robot's advancements. It starts generating its code and advances enough to play the banjo. It starts writing its code which startles Anjali. The robot develops to a stage where it mimics and creates jokes which seems an impossibility. It is at this stage that Brian thinks they have accidentally created sentient AI. Machines are supposed not to have emotional intelligence. The sentient AI, which Brian refers to in the story, is capable of missing a

friend. Kermit the Frog creates his songs, changes the lyrics according to his suitability and performs on his banjo.

The title of the story is quite relevant to the sentient AI. It sings the song "Tomorrow is Waiting for Me", with the presumption that the next day is inevitable. The robot uttering and making lyrics for itself is an indication of a conscious being. The author presents the robot as a conscious being capable of using language to express ideas. A robotic object capable of creating and using language to express ideas draws attention to Rene Descartes who considered language as a tool to express ideas. For Thomas Hobbes, language helps to arrange thoughts. It is the way to organise the sensory impressions. For Thomas Hobbes, the ability of reasoning, lets the mind know about the labels attached to them. The human characters are surprised and shocked at the sudden display of use of language by the robots.

The author Holli Mintzer creates the robotic character as a possessor of consciousness and the ability to think for itself. The machine recalls that it used to be a puppet frog. It realizes its transformation into a robot frog and eventually into a real frog. The recognition of the existence of reality by the robot is evidence of its sentience. The robot begins to have consciousness about itself as an individual entity with an identity. The assumption that the frog can think is an impossibility. According to the article, "Unlearning Descartes: Sentient AI is a Political Problem". Gordon Hall argues that artificial intelligence systems cannot be considered as conscious entities as the person who created them shall always be held accountable for the actions of the robot. Though Kermit the Frog speaks independently, its language aligns with the creator's inputs.

In the story, certain characters question whether Kermit the Frog is a hoax or a sentient AI. What may be considered sentient is subjected to interpretations. Though narratives such as "Tomorrow is Waiting" create machines that can move, talk and act independently, a resort to understanding sentience is necessary. The invention of self-moving devices can be traced back to the 17th century. When the castle of Rudolf II of Prague, possessed collections of items which were self-moving. Gordon Hall assumes that Rene Descartes must have visited the city of Prague where such collections were displayed. Descartes' formulation of the mind is based on his understanding of the living bodies. In *Discourses on Method*, the human body possesses a rational soul created by God. The power of God is considered far superior to machines which operate on their own accord. Descartes' distinction between the human mind and man-made clocks and mills concludes with the human body being attributed with superior powers. A rational soul is capable of having doubts, denials and affirmations. The sensory perceptions must be active to function. The prime differentiation between human beings and machines is that the former is capable of displaying sentience and consciousness. The story vehemently rejects perceptions about machines which was previously thought. Sentience, attributed only to humans, is not a reality today. However, a peep into the futuristic developments makes the story intriguing. According to Hall, sentient AI is a distant reality if the Cartesian viewpoint is taken into account. Thomas Hobbes deals with the problem of the mind. His idea of the mind is significant as his notion of thinking is similar to computation. Thomas Hobbes' idea of ratiocination in the mind which facilitates subtraction and addition is a form of computation. The operation of the mind, in this sense, has similarities with the AI.

According to Thomas Hobbes, for the mind to work, sensory impressions and memory play a crucial role. Experience impacts the way the mind interprets things. In AI, apart from the algorithm, collection and levelling data is necessary. The story seems to present the machine displaying a mind acting autonomously. The machines are not capable of replicating the complications of the human mind. If when it does in fiction, the characters do not seem to be pleased about the outcome. Thomas Hobbes' idea of the mind shall also problematize the idea of personhood in machines. In the story, the robot tries to identify itself as a person capable of doing wonders. Sophisticated sentient AI shall bring in the problem of personhood. Taking Thomas Hobbes's *Leviathan* into account, one is considered a person when words and actions are presented as his own. Whether this can be an attribute to be considered as a person is questionable. The story makes an imaginary reference to robots trying to behave as persons. The robot impersonates human beings and tries to establish its own identity. It makes an attempt to become more humanlike, which the creator Anji seems to be worrying about. Holli Mintzer's short story depicts a world where sentient AI seems to be a possibility. If a sentient AI is created there seems to be a problem in perceiving the issue of identity and personhood. As a science fiction narrative, the story vividly projects the problems which an advanced AI can cause in society.

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"मुख्यमंत्री माझी लाडकी बहिण" योजनेतून महिला सशक्तीकरण - एक सामाजिक क्रांती

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गोषवारा:

सद्या महाराष्ट्रातील सर्व शहरापासून ते गावागावात मुख्यमंत्री माझी लाडकी बहिण योजना खूप गाजावाजा होत आहे. महाराष्ट्रात माझी लाडकी बहिण योजना ही १ जुलै, २०२४ रोजी सुरु झालेली आहे. ही योजना महाराष्ट्रातील वय २१ ते ६५ वर्ष वयोगटातील महिलांसाठी खुली आहे. या योजनेचा प्राथमिक उद्देश राज्यातील आर्थिकदृष्ट्या दुर्बल घटकातील महिलांना आर्थिक सहाय्य प्रदान करणे हा आहे. या योजनेचा लाभ समाजातील सर्व धर्माच्या महिलांना घेता येणार आहे. राज्यातील महिलांच्या आर्थिक स्वातंत्र्यासाठी, त्यांच्या आरोग्य आणि पोषणामध्ये सुधारणा करणे आणि कुटुंबातील त्यांची निर्णायक भूमिका मजबूत करण्यासाठी महाराष्ट्र राज्याची "मुख्यमंत्री माझी लाडकी बहीण" योजना सुरु करण्यास महाराष्ट्र शासनाने २८ जून २०२४ रोजी मान्यता दिली. या योजनेमार्फत महाराष्ट्र राज्यातील २१ ते ६५ वयोगटातील पात्र महिलांना दर महिना रु. १,५००/- असा आर्थिक लाभ DBT द्वारे देण्यात येणार आहे. यासाठी महाराष्ट्र सरकारने काही निकष व पात्रता लावलेली आहे. आज महाराष्ट्रात सर्व ठिकाणी सर्व धर्मीय महिला आपापले अर्ज करताना दिसून येतात. या योजनेचा महाराष्ट्रातील आर्थिक दुर्बल घटकातील महिलांवर होताना दिसून येते. आज मितीला महाराष्ट्रातील पोर्टलवर प्राप्त अर्जांची एकूण संख्या १०१९३५५७३, पोर्टलवर मंजूर अर्जांची एकूण संख्या ९०४८४१८ इतक्या महिलांनी अर्ज केलेले दिसून येत आहे. यातील पात्र महिलांच्या बँक खात्यांवर दरमहा १५०० रुपये जमा होणार आहे . प्रत्येक्षत याचा महिलांना फायदा खूप होईल. लाडकी बहिन योजनेचे उद्दिष्ट महाराष्ट्रातील महिलांच्या जीवनात परिवर्तन घडवून आणणे, त्यांना राज्याच्या आर्थिक आणि सामाजिक विकासात सक्रिय योगदान देण्यास सक्षम करणे आहे .हा शोध निबंध माझी लाडकी बहिण या योजनेचा महिलांवर होणारा परिमाण व महिला सशक्तीकरणातून एक सामाजिक क्रांती कशी घडून येईल यावर प्रकाश टाकतो.

मुख्य शब्द: माझी लाडकी बहिण योजना, महिला सशक्तीकरण इत्यादी.

प्रस्तावना:

सद्या महाराष्ट्रातील सर्व शहरापासून ते गावागावात मुख्यमंत्री माझी लाडकी बहिण योजना खूप गाजावाजा होत आहे. या योजनेचा लाभ महिला वर्गाला होणार आहे. विशेतः ग्रामीण भागातील महिला कि ज्या आर्थिक दृष्ट्या मागास आहेत, ज्यांचे वार्षिक उत्पन कमी आहे, ज्या महिलांना उत्पनाचे काहीही साधन नाही अशा सर्व महिलांना याचा लाभ घेता येणार आहे. महिला वर्गाकडून याचे खूप आनंदाने स्वागत होत आहे. यासाठी गावागावत अनेक ठिकाणी महिलांना अर्ज भरून देण्याची मुभा देण्यात आली आहे. महिलांना स्वयंरोजगारासाठी, उद्योगासाठी अर्थसहयाची गरज असते परंतु ज्या महिलांना पैशाचे पाठबळ नाही अशा महिलांना याचा लाभ खूप होईल. आजच्या आधुनिक काळात महिला सक्षमीकरण हा विशेष चर्चेचा विषय आहे.

व्याख्या:

महिला सक्षमीकरण म्हणजे महिलांची सामाजिक आणि आर्थिक स्थिती सुधारणे. जेणेकरून त्यांना रोजगार, शिक्षण, आर्थिक प्रगतीच्या समान संधी मिळतील, जेणेकरून त्यांना सामाजिक स्वातंत्र्य आणि प्रगती मिळेल. हाच मार्ग आहे ज्याद्वारे स्त्रिया पुरुषांप्रमाणेच त्यांच्या प्रत्येक आकांक्षा पूर्ण करू शकतात.

संशोधनाचे महत्व:

या शोधनिबंधामुळे महाराष्ट्र सरकार काढून भविष्यात अशा प्रकारच्या अनेक योजना महिला वर्ग, शेतकरी, युवा, अपंग इत्यादी वर्गासाठी अनेक योजना राबवल्या जातील. त्यामुळे अशा योजनांचा लोकांवर होणारा परिमाण अभ्यासता येईल.

संशोधनाची उद्दिष्टे:

१) मुख्यमंत्री -माझी लाडकी बहिण योजनेचा होणारा परिणाम अभ्यासणे.

२) मुख्यमंत्री -माझी लाडकी बहिण योजनेमुळे महिला सशक्तीकरणास कसा लाभ होईल हे अभ्यासणे.

संशोधन पद्धती:

प्रस्तुत शोधनिबंधासाठी दुय्यम साधन सामग्रीचा वापर करण्यात आलेले आहे. यामध्ये संदर्भ ग्रंथ, रिसर्च पेपर, विवध आहवाल, वर्तमान पत्रे, आणि वेबसाईट ईत्यादी साधनाचा आधार घेण्यात आलेला आहे.

महिला सक्षमीकरणाची गरज:

भारतात महिला सक्षमीकरणाची अनेक कारणे आहेत. प्राचीन काळाच्या तुलनेत मध्ययुगीन काळात भारतीय महिलांच्या सन्मानाची पातळी लक्षणीयरीत्या कमी झाली. त्यांना प्राचीन काळी जो आदर दिला जात होता, मध्ययुगीन काळात तो आदर कमी होऊ लागला.आधुनिक युगात, अनेक भारतीय महिला अनेक महत्त्वाच्या राजकीय आणि प्रशासकीय पदांवर तैनात आहेत, तरीही सामान्य ग्रामीण महिलांना अजूनही त्यांच्या घरात राहण्यास भाग पाडले जाते आणि त्यांच्याकडे सामान्य आरोग्य सुविधा आणि शिक्षण यासारख्या सुविधा नाहीत.शिक्षणाच्या बाबतीतही भारतातील महिला पुरुषांपेक्षा खूप मागे आहेत. भारतातील पुरुषांचे शिक्षण दर 81.3 टक्के आहे, तर महिलांचे शिक्षण दर फक्त 60.6 टक्के आहे.भारतातील शहरी भागातील महिला ग्रामीण भागातील महिलांपेक्षा अधिक रोजगारक्षम आहेत, आकडेवारीनुसार, भारतातील शहरांमध्ये सुमारे 30 टक्के महिला सॉफ्टवेअर उद्योगात काम करतात, तर ग्रामीण भागातील सुमारे 90 टक्के स्त्रिया प्रामुख्याने रोजंदारी, शेती आणि संबंधित कामांमध्ये गुंतलेल्या आहेत.भारतातील महिला सक्षमीकरणाच्या गरजेचे आणखी एक मुख्य कारण म्हणजे भुगतानमधील असमानता. भारतातील महिलांना समान अनुभव आणि पात्रता असूनही पुरुषांपेक्षा 20 टक्के कमी पगार दिला जातो, असे समोर आले आहे.

भारतातील महिला सक्षमीकरणासाठी सरकारची भूमिका

महिला सक्षमीकरणासाठी भारत सरकारच्या अनेक योजना आहेत. यातील अनेक योजना रोजगार, शेती आणि आरोग्य यासारख्या गोष्टींशी संबंधित आहेत. भारतीय महिलांची परिस्थिती लक्षात घेऊन या योजना तयार करण्यात आल्या आहेत जेणेकरून त्यांचा समाजातील सहभाग वाढेल. एक दिवस भारतीय समाजातील महिलांनाही पुरुषांप्रमाणेच प्रत्येक संधीचा लाभ मिळेल या आशेने भारतीय महिलांच्या सक्षमीकरणासाठी महिला आणि बालविकास कल्याण मंत्रालय आणि भारत सरकार यांच्यामार्फत बेटी बचाओ बेटी पढाओ योजना, महिला हेल्पलाइन योजना, उज्ज्वला योजना, महिलांसाठी प्रशिक्षण आणि रोजगार कार्यक्रमास समर्थन (STEP), महिला शक्ती केंद्र, पंचायती राज योजनांमध्ये महिलांसाठी आरक्षण, म्हणजे मनरेगा, सर्व शिक्षा अभियान, जननी सुरक्षा योजना (मातामृत्यू कमी करण्यासाठी चालवली जाणारी योजना) इ.लखपतीदीदी योजना इत्यादी योजना राबवल्या जात आहेत.

महाराष्ट्रातील महिला सक्षमीकरणासाठी सरकारची भूमिका:

महिलांच्या विकासासाठी १९९४ साली पहिले धोरण निश्चित करणारे महाराष्ट्र हे देशातील पहिले राज्य ठरले म्हणून महाराष्ट्राची स्त्रियांच्या विकासातील ही पुरोगामी भूमिका आहे. स्त्री-पुरुष समानता, शेती, दुग्ध विकास, पशु संवर्धन, कौशल्य विकास आदि घटकाना महिलांच्या विकासाच्या दृष्टीने महत्त्वपूर्ण मानले गेलेले आहे. आज महाराष्ट्रात महिलांच्या सक्षमीकरणासाठीश अनेक योजना राबवताना दिसून येत आहे.

मुखमंत्री -माझी लाडकी बहिण योजनेची उद्दिष्टे:

1. राज्यातील महिला व मुलींना पुरेशा सोयी -सुविधा उपलब्ध करून रोजगार निर्मितीस चालन देणे.
2. त्यांचे आर्थिक, सामाजिक पुनर्वसन करणे.
3. राज्यातील महिला स्वावलंबी, आत्मनिर्भर करणे.
4. राज्यातील महिलाना व मुलीना सशक्तीकरणास चालना देणे.
5. महिलांवर अवलंबून असलेल्या मुलांच्या आरोग्य आणि पोषणत सुधारणा करणे.

मुखमंत्री-माझी लाडकी बहिण योजना व महिला सशक्तीकरण:

लाडकी बहिण योजना ही भारतातील महाराष्ट्रातील एक सरकारी योजना आहे, ज्याचा उद्देश

महिलांना आर्थिक सहाय्य आणि सहाय्य प्रदान करून सक्षम बनवणे आहे.

1. आर्थिक सक्षमीकरण: स्थिर उत्पन्नाचे महिलांना : स्त्रोत प्रदान करणे, त्यांना आर्थिकदृष्ट्या स्वतंत्र होण्यास सक्षम होण्यासमदतहोईल.

2. शिक्षण आणि कौशल्ये: आणि शिक्षण महिलांना प्रोत्साहन विकासासाठी कौशल्य मिळेल, ज्यामुळे रोजगाराच्या चांगल्यासंधीनिर्माणहोतील.

3. सामाजिक क्रांती व सशक्तीकरण : व महिलांना त्यांचे जीवन, कुटुंब आणि समुदाय याबद्दल माहितीपूर्ण निर्णय घेण्यास सक्षम होतील.

4. निराधारांसाठी शासनाचा आधार: निरशीत महिलांसाठी या योजनेचा फायदा जास्त झालेले दिसून येतो.

5. महिलांना मासिक आर्थिक सहाय्य: महिलांना त्यांच्या आर्थिक विकासासाठी आणि कल्याणासाठी दरमहा १५०० रुपये प्राप्त होतील.

6. लैंगिक समानता कायम भेदभाव आधारित-लिंग पूर्वाग्रहांना आणि नियमांना सामाजिक ठेवणाऱ्या लैंगिक देऊन :आव्हान समानतेला प्रोत्साहन मिळेल.

7. विनामुल्य एलपीजी सिलिंडर:पात्र महिलांना त्यांच्या आरोग्यासाठी आणि पोषणासाठी तीन मोफत एलपीजी सिलिंडर दिले जाणार आहे.

8. मिळालेल्या पैशातून महत्त्वाच्या गरजांची पूर्तता: महिलांना त्याच्या कुटुंबासाठी लागणाऱ्या गरजांची या पैशातून पूर्तता करता येऊ शकते.

9. कुटुंबासाठी व्यापक भूमिका: कोणत्याही समाजाच्या उन्नतीचे मापदंड त्या विकासक्षम समाजातील स्त्रिया किती सक्षम आहेत यावर केले जाते.ज्या समाजात स्त्रिया सक्षम असतात, तो समाज अधिक सुदृढ आणि विकासशील असतो.

मुखमंत्री-माझी लाडकी बहिण योजनेचे होणारे दुष्परिणाम:

1. सरकारी मदतीवर अवलंबून राहण्यार्: महिला रोजगार किंवा उद्योजकीय संधी शोधण्याऐवजी मासिक आर्थिक मदतीवर अवलंबून राहू शकता.
2. मर्यादित कवरेज असल्यामुळे ही योजना सर्व गरजू महिलांपर्यंत पोहोच नाही विशेषत: ग्रामीण किंवा उपेक्षित भागातील महिलांपर्यंत ही योजना नाही पोहचली.
3. सामाजिक दबाव निर्णय स्वतःचे महिलांना : वापरण्यासाठी निधी हेतूंसाठी विशिष्ट घेण्याऐवजी समुदायातील किंवा कुटुंब सदस्यांकडून दबाव येऊ शकतो.
4. शिक्षण आणि कौशल्य विकासाच्या संधींमध्ये मर्यादित प्रवेश होऊ शकतो.
5. भ्रष्टाचार किंवा निधीचा योग्य वापर होण्या एवजी गैरवापर होण्याची शक्यत असू शकते .
6. योजनेंतर्गत पाठिंबा मिळविणाऱ्या महिलांविरुद्ध कलंक, हिंसा, भेदभाव होऊ शकतो.
7. स्त्रियांनी त्यांची स्वतःची ध्येये आणि आकांक्षांचा पाठपुरावा करण्याऐवजी पारंपारिक लैंगिक भूमिका पूर्ण करणे अपेक्षित आहे.
8. ही योजना आगामी राज्यसभा निवडणुकीच्या पार्श्वभूमीवर आहे असे दिसून येते.

सारांश:

महाराष्ट्राचा एकंदरीत विचार करता या शोधनिबंधातून मुख्यमंत्री माझी लाडकी बहिण योजना याचे महत्व व यातून महिलांचे होणारे सशक्तीकरण दिसून येते. महिलांचे आरोग्य व पोषण आणि त्यांच्या आर्थिक, स्वावलंबनासाठी राज्यात विविध योजना राबवण्यात येत आहेत. परंतु दरमहा आर्थिक लाभ मिळवून देणारी आणि कुटुंबातील महिलांची निर्णायक भूमिका बळकट करणारी योजना म्हणूनही ही योजना महत्वाची आहे. आज अनेक महिलांना या योजनेचे पैसे यांच्या बँक खात्यावर आलेले दिसून येत आहे. पैसे आलेल्या अनेक महिलांनी त्यांच्या कुटुंबासाठी याचा उपयोग केलेला दिसून येते. या योजने अंतर्गत विवाहित, घटस्फोटीत, परित्यक्त्या आणि निराधार महिला या योजनेसाठी पात्र जरी असल्या याचा लाभ किती महिलांना मिळेल याची शंका आहे कारण एकंदरीत विचार करता ही योजना आगामी निवडणुका लक्षात घेता मध्यप्रदेश या राज्याच्या धर्तीवर राबवण्यात आली आहे असे दिसून येते. जर ही योजना कायम स्वरूपी राबवण्यात आली तर याचा नक्की लाभ महिला वर्गाला होईल. एकंदरीत या योजनेतून महिलांचे आर्थिक व सामजिक सशक्तीकरण झालेले दिसून येईल.

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नारी चेतना : 'अमृतमयी' काव्य-रचना के सन्दर्भ में

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शोध-सारः

हिंदी की सुप्रसिद्ध कवयित्री डॉ. मधु धवन द्वारा विरचित 'अमृतमयी' शीर्षक काव्य-रचना नारी विमर्श का महत्त्वपूर्ण दस्तावेज है। कवयित्री ने नारी जीवन के विविध रूपों का रेखांकन करते हुए उसकी मूल समस्याओं का आकलन किया है। इतिहास इस बात का साक्षी है कि पुरुष-प्रधान भारतीय समाज में नारी-व्यक्तित्व सदा से ही कठोर वर्जनाओं एवं सामाजिक मान्यताओं द्वारा नियंत्रित रहा है। मध्ययुगीन नारी का इतिहास शोषण, अत्याचार, अनाचार का इतिहास रहा है। यदि ध्यान से देखा जाए तो यह युग पुरुष की पाशविक बर्बरता की करुण कहानी है। आधुनिक युग में यह चित्र कुछ बदला है। शिक्षा के प्रसार ने नारी के प्रति होने वाले अन्याय का प्रतिरोध करने की चेतना दी है। अपनी पीड़ा को मुखर करने की प्रेरणा दी है फिर भी नई दर्द और आंसुओं की तस्वीर बनी हुई है। नई चेतना ने उसके मानसिक क्षितिज को विस्तार तो कर दिया है फिर भी घर की चार दिवारी में बंद है। प्रसन्नता की बात यह है कि आधुनिक नारी अपने अस्तित्व की तलाश कर रही है, पूर्ण स्वतंत्रता के साथ शिक्षा प्राप्त कर रही है, पुरुष के साथ खड़ी होकर अपने अधिकारों की मांग कर रही है, वहीं उसे कदम पर अनेक समस्याओं का सामना भी करना पड़ रहा है। आज उसे घर और बाहर दो पार्टों के बीच में पिसना पड़ रहा है। परंपरागत रूढ़ियों और सनातन संस्कारों की अर्गलाएँ उसे जकड़ी हुई हैं। आज भी वह कहीं सास के तानों का गंभीर रूप में शिकार होती है तो कहीं पति उसके अस्तित्व को नकारता है।

बीज शब्दः नारी चेतना, ममतामयी, सहनशीलता, नारी शक्ति, समस्याएँ

परिचय:

प्रस्तुत काव्य रचना में कवयित्री ने नारी जीवन की महत्व को प्रस्तुत करते हुए उसके घावों पर मरहम लगाने की कोशिश की है। कवित्री ने नई मनोविज्ञान को गहराई व उत्कृष्ट से आलोकित किया है।

'नारी! तेरे रूप अनेक' उक्ति को ध्यान में रखते हुए कवयित्री मधु धवन ने नारी के अनेक उज्जवल पक्षों को रेखांकित किया है। नारी, ईश्वर की सर्वोत्तम कृति है। भारतीय में उसके अनेक नाम-नामांतर प्रचलित है। नारी, कोमलता, सहनशीलता, समर्पणशीलता, दया, ममता, करुणा का प्रतीक है। नारी पुरुष की शक्ति, ज्योति और सिद्धि का प्रतीक है। नारी का स्थान पुरुष के वाम पार्श्व में है। अतः उसे वामा भी कहा जाता है। वह माता, पत्नी, पुत्री सभी रूपों में पुरुष के लिए सम्माननीय है। वस्तुतः भारतीय समाज के सभी आदर्श नारी रूप में पाए जाते हैं। माँ सरस्वती विद्या की, माँ लक्ष्मी धन की, माँ दुर्गा शक्ति की, माँ गंगा पवित्रता का प्रतीक माना जाता है। इतना ही नहीं, विश्वव्यापी ईश्वर को भी जगत जननी के रूप में व्याख्यायित किया गया है। तभी तो मनुस्मृति में कहा गया है-

"यत्र नार्यस्तु पूज्यंते रमंते पत्र देवता:। " 1

(अर्थात् जहाँ नारियों की पूजा होती है, वहाँ देवता निवास करते हैं।)

कवयित्री की दृष्टि में माँ के रूप में नारी सदाबहार फल-फूल के समान है, जो जीवन रूपी पतझड़ को हरा-भरा करती है। शिशु के जीवन में ममता-क्षीर का संचार करनेवाली, जीवन की तीनों अवस्थाओं में प्यार की सरिता बहानेवाली ममतामयी माँ का रेखांकन करती हुई कवयित्री कहती हैं -

"तुम हो सदाबहार फल-फूल-सी
जीवन-पतझड़ को करती हरा-भरा
शिशु के जीवन में
मनचाहा ममता क्षीर भरा
बचपन-यौवन-जरा में भी
रहता आँचल प्यार भरा।
तुम हो संजीवनी
निष्प्राणों में भरती प्राण
कभी लघु-सरिता-सी
देती जान तो

कभी गहन सागर-सी बनकर
लगाती रत्नों का अंबार। "2

जननी और माँ यद्यपि एक दूसरे के पर्याय हैं किंतु दोनों में बहुत बड़ा अंतर है। बच्चों को जन्म देने वाली स्त्री को जननी कहा जाता है। माँ बच्चों के संस्कारों की जननी है। वह उसमें अच्छे संस्कारों को जन्म देकर उसे संस्कृत बनाती है। ममतामयी माँ का रेखांकन कवयित्री ने अनेक स्थलों पर किया है यथा-

" माँ की ममता
सभी बच्चों के लिए समान होती है
वह अपने सभी बच्चों को
बराबर का प्यार देती है। "3

ममतामयी त्यागमयी होती है। वह ममता की लोरी गाकर अपने बच्चों के लिए सर्वस्व लुटा देने के लिए सदैव तत्पर रहती है। यथा-

"गला जिसने हड्डियां अपनी सारी
गायी ममता की लोरी प्यारी
दिन-रात खटती रही बेचारी
देती रही हमें सुविधाएँ सारी
जो मांगा शिशु ने पाया
मनभावन भोजन कराया
माँ ने हर पल दायित्व निभाया
पल-पल ज्ञान का दीप जलाया। "4

वस्तुत: बच्चे माँ की वात्सल्यमयी गोद में पलकर बड़े होते हैं। बच्चे मन के प्रति सहज महत्व रखते हैं। माँ के प्रति बच्चों के उद्गारों को व्यक्त करती हुई कवयित्री कहती है-

"माँ तुमने खुद को मिटा
हमको बनाया
तुम्हारे वात्सल्य का हरा-भरा आंचल लहराता रहा
हम तेरे प्यार में डूबे
जीवन भर सुख लेते रहे
माँ, मेरी प्यारी माँ .....।" 5

माँ सहनशीलता व सहिष्णुता की मूर्ति होती है। कष्टों व दुविधाओं को झेल कर ही माँ अपने बच्चों के लिए सर्वस्व त्याग करने हेतु तत्पर रहती है-

"असंख्य दुविधाओं के बावजूद
बचाती है माँ अपने बच्चों को
एक को भी जरा देर हो जाए तो
वह द्वार पर आ खड़ी होती है
यदि देर हो तो झट पूछती है
'तुम कहां हो?'
यदि नहीं तो राह देखती
चिंतित हो उठती है।
बाँधे रखती है अपने आँचल में।
बच्चा कैसे भी हो
माँ उसे सहलाती है
उसका हर रूप सहती है
माँ की सहनशीलता
पृथ्वी से कहीं ज्यादा है। "6

इतिहास इस बात का साक्षी है कि पुरुष नारी को 'पैर की जूती', 'नरक का द्वार', 'प्रताड़ना की अधिकारी' मानता रहा है। अहंकारी लोग नारी को नीचा दिखाने हेतु उसकी निंदा करते हैं। वे इस बात का दंभ भरते हैं कि नारी नर जैसा कमाल नहीं कर सकती। इस तथ्य को झुठलाते हुए तथा राबड़ी देवी का उदाहरण प्रस्तुत करते हुए कवयित्री कहती हैं।

"कुछ लोग घमंडी होते हैं
सच्चाई को झुठलाते हैं
नारी को नीचा करते हैं
नारी की निंदा करते हैं।
कहते हैं नारी नर जैसा
कमाल नहीं कर सकती है
उसकी चतुराई तो बस
चौकी-चूल्हे तक रहती है।
राबड़ी देवी है इसका प्रमाण
दोनों ओर को कर संतुलित
काम बखूबी करती है। "7

इक्कीसवीं शताब्दी की नारी ने प्रगति की ऊँचाइयों को छुआ है। सत्ता हो या गाडी, घर हो या दफ़्तर, अभियान हो या सम्मलेन, कार हो या कंप्यूटर सभी क्षेत्रों में नारी ने कमाल दिखाया है। यथा-

"क्या वे नहीं जानते
नारी सत्ता-गाडी चलाती है
दफ़्तर में करे काम
घर में भी पकवान बनाती है
अभियान खूब चलाती है
सम्मेलनों में भी जाती है
चिंतन-मंथन करती है

कार-कंप्यूटर चलाती है।"8

इस प्रकार आधुनिक नारी ने शिक्षा, बैंक, सेना, पुलिस, अंतरिक्ष आदि क्षेत्रों में भी अपनी वीरता, शौर्य और पराक्रम का प्रदर्शन किया है। यथा-

"मौका मिलने पर नारी भी
हर क्षेत्र में काम कर सकती है
अंतरिक्ष में, बैंकों या पुलिस में
काम सभी वह करती है
विद्यालय में शिक्षक बनकर
भावी पीढ़ी को देती ज्ञान
यदि हो ज़रूरत तो सेनानी बन
हाथ में पकड़ लेती कृपाण।"9

कवयित्री का मत है कि नारी नर का पूरक है। पुरूषों द्वारा नारी-शक्ति को झुटलाना और उसपर दोषारोपण करना उचित नहीं है। झांसी की रानी लक्ष्मीबाई और कल्पना चावला का उदहारण देकर कवयित्री कहती हैं -

"वह वीर सेनानी बनकर
लक्ष्मीबाई कहलायी
और कल्पना चावला बनकर
दुनिया भर में इज्ज़त पायी।
कहते नारी पुरुष-सा
काम नहीं कर सकती है
देखो सडकों पर मजदूरन बन
नारी पत्थर तोड़ा करती है।
नर का कोरा दोषारोपण
नारी को झुठलाना होगा
नारी नर का पूरक है
यह नर को बताना होगा।"10

कवयित्री मधु धवन ने 'सुनो धन के ओ ठेकेदारों', 'अब ना दोहराना' कविताओं में पुरुष समाज को बुरी तरह ललकारा है। पुरुष समाज को चेतावनी देते हुए आह्वान करती हुई कवयित्री कहती है –

"तुम नारी को कोई
खिलौना ना समझो
यह माता है, इसको
निर्माता तुम समझो
सारे शब्द मिटा दो
लांछना की तीखे
स्वरों को हटा दो।"11

नारी अस्मिता पर अंकुश लगाने के लिए पुरुष समाज ने नारी पर अनेक अत्याचार किये हैं। 'पतिव्रता' के नाम लेकर उसे 'घूंघट' में छिपा दिया गया। आज की नारी अपनी अस्मिता व अस्तित्व को पहचान चुकी है। कवयित्री के शब्दों में-

"मेरी अस्मिता-अस्तित्व को कर दिया गुम
छीन लिया मुझसे मेरा दृष्टि प्रकाश
आज देख या रही हूँ अपना।"12

नारी वरदान स्वरूपा है। कवयित्री ने नारी की तुलना स्त्रोतस्विनी से की है। वह जन मन को उदात्त भावों से अनुस्यूत करती हुई, पयस्विनी के समान जीवन को आप्लावित करती हुई बह रही है –

"स्त्रोतस्विनी-सी गिरती है
हिमालय-सम उच्च शिखरों से
कई चट्टानों, पत्थरों, कंकडों से टकराती
कंटीली झाड़ियों-बीहड़ों को पार करती
जनपद में कल-कल, छल-छल बहती है।
दूषित वातावरण को धोती स्वच्छ करती
कण-कण, जन-मन को करती पुलकित
उदात्त भावों से युक्त गुनग्राही
अस्मिता-अस्तित्व पर ढकेल
सागर को करती हुई आलिंगन
अनंत राशि भर देती है।"13

नारी का व्यक्तित्व नाना रूपात्मक है। बेटी, बहन, ननद, पत्नी, देवरानी, जेठानी, चाची, ताई, फूफी, मौसी, माँ, नानी, दादी आदि रूपों में नारी अनेक भूमिकाओं में अपना रोल अदा करती हुई जीवन रुपी नाटक को नया आयाम देती है। यथा-

"वह किसी की बेटी बनी
किसी की नन्हीं, प्यारी गुडिया
किसी की बहन, तो किसी की ननद
किसी की पत्नी बनी, किसी की बनी बहू
वह बनी देवरानी, जेठानी, चाची, ताई, फूफी, मौसी
वह माँ बनी, नानी बनी, दादी बनी
दादी बनकर सारे परिवार का बनी प्यार का हार
हर पल आबाद करती चली गयी
दर-दर आबाद होते रहे
उसका अस्तित्व बस
नए दुपट्टे की तरह नित नया रहा
जिसे ओढ वह गर्व महसूसती रही।"14

नारी के पारिवारिक रूपों की व्यवस्था का मुख्य आधार परिवार ही है। हिन्दू परिवार में गृहस्थ धर्म नारी के

रूपों को निर्धारित करता है। नारी को घर-परिवार में रहते हुए अनेक भूमिकाएं अदा करनी पड़ती हैं। कवयित्री के अनुसार ये भूमिकाएँ अत्यंत कष्टसाध्य हैं-

"माँ-बाप छोड़कर आती है प्रियतमा
अनजान रिश्तों को निभाती है प्रियतमा
हर पल कुर्बानियाँ देकर दिखाती है प्रियतमा
नखरे सास-ससुर के हरदम उठाती है प्रियतमा
सिर माथे पर ननद को बिठाती है प्रियतमा
सिलबट्टों में चटनी-सी पिसती है प्रियतमा
नाना प्रकार के व्यंजन खिलाती है प्रियतमा
सबकी जली कटी दिन रात सुनती है प्रियतमा
फिर भी उम्र भर सबको निभाती है प्रियतमा
दिलोजान से घर-द्वार सँवारती सजाती है प्रियतमा।"15

कवयित्री ने अपनी काव्य रचना में यह भी निरूपित किया है कि भारतीय नारी 'अमृतमयी' भावों की प्रकाशिका है। वह सृष्टि का मूल आधार, अलख पुरुष की चेतना, ब्रह्म की ज्ञानात्मक शक्ति है।

निष्कर्ष :

वस्तुतः 'अमृतमयी' काव्य रचना में नारी के आदर्शों, मूल्यों, भावनाओं, एवं विचारों की सुन्दर प्रस्तुति हुई है। वस्तुतः भारतीय नारी अनेक समस्याओं से जूझती हुई अमृतमयी है, श्रद्धामयी है। समर्पणशीलता, संवेदनशीलता, भावप्रवणता, ममत्व, वात्सल्य से भरपूर नारी बहुआयामी व्यक्तित्व की उज्जवल प्रत्तिमा है। इस रचना को कवयित्री की चेतना का विकसित पुष्प कहा जाए तो कोई अत्युक्ति न होगी।

सन्दर्भ:

1. मनुस्मृति -पृ. 3
2. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 9
3. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 11
4. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 14
5. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 17
6. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 33-34
7. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 31
8. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 31
9. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 32
10. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 34
11. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 39
12. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 42
13. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 47
14. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 52
15. अमृतमयी, मधु धवन, वाणी प्रकाशन, पृ. 82

संपोषित विकास की आवश्यकता- एक अध्ययन

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सारांश:

संपोषित विकास को चिरंजीवी विकास, सम्यक विकास आदि अनेक नाम दिये गये हैं। व्यक्ति, समष्टि और सृष्टि तीनों का एक साथ विकास हो, इसे ही विकास कहते हैं। विकास का अंतिम दर्शन 'वस्तुनिष्ठ रूप से क्या अच्छा है', 'व्यक्तिगत, सामूहिक और सृजन के लिए उद्देश्यपूर्ण रूप से क्या अच्छा है' का वर्णन है। इन्हीं विशेषताओं के कारण इस दर्शन से विकास का जो प्रतिमान उभरता है वह है सतत विकास, व्यापक विकास, सभी तत्वों का सामाजिक विकास, संतुलित विकास। यह समुचित विकास का प्रतिमान है । परंतु वर्तमान मे विकास का मतलब सिर्फ भौतिक विकास रह गया है और इसके लिए नैसर्गिक संसाधन पर अत्यंत दबाव बनाया जा रहा है कुछ संसाधन विलुप्त होने की कगार पर है कुछ विलुप्त हो गये है उदाहरणार्थ कुछ प्राणी पक्षी की जाती है नष्ट हो गई है अन्न संकल्प जलचक्र वावी चक्र येऊन जाईल पृथ्वीवर प्रदूषक घटको की मात्रा मे मानव द्वारा प्रियांकालापोसे बडोत्री हुई है बढो तरी हुई है इस प्रदूषण या नैसर्गिक मूलतत्त्व मिळून बदला का विपरीत परिणाम कोणाशी हो गया है इसका विपरीत परिणाम आगे की आने वाली व्हिडिओ को भी भूगोल ना पडेगा इस विपरीत परिणाम सोबत विकास विकार करके क्रिया मे लाना होगा और यही विचित्र इस प्रकार व्यक्ती सृष्टी व समष्टी का संतुलित विकास सही विकास साबित होगा ।

कुंजीशब्द: सतत विकास, प्रदूषण, भौतिक विकास

अध्ययन पद्धती: प्रस्तुत अध्ययन करणे हेतू दुय्यम डेटा संकलन माध्यम का उपयोग किया गया है । किताबे, इंटरनेट साईड से तथ्य एकत्रित किये गए है ।

प्रस्तावना:

वर्तमान में, सतत विकास के लिए कई पर्यायवाची शब्दों का उपयोग किया जाता है, जिनमें भारत में स्थिरता, सतत विकास, सतत आर्थिक/वित्तीय और पारिस्थितिक सतत विकास (ईएसडी), सतत विकास, सतत विकास, सतत विकास, दीर्घकालिक विकास शामिल हैं विकास, सदाबहार विकास, पर्यावरण प्राथमिकता विकास आदि को पर्यायवाची शब्दों के रूप में उपयोग किया जाता है। बढ़ती गरीबी दर और वैश्विक असमानता तथा पर्यावरणीय गिरावट पूरी दुनिया का ध्यान आकर्षित कर रही है। कहा जाता है कि ब्रूडलैंड ने 1987 में दुनिया का ध्यान खींचा था; लेकिन उससे पहले 1967 में पियर्सन ने कहा था कि पर्यावरण किसी देश का नहीं बल्कि पूरे विश्व के लिए महत्वपूर्ण है. वायु, जल और भूमि प्रदूषण स्वास्थ्य के साथ-साथ आर्थिक रूप से भी प्रभावित करता है। प्रदूषण मुक्त वातावरण एक वैश्विक जिम्मेदारी है। ब्रांट ने 1980 में कहा था, "जीवमंडल एक साझी विरासत है।"

विकसित देशों में विकास के लिए बड़ी मात्रा में संसाधनों का उपयोग किया गया और परिणाम स्वरूप मिट्टी का कटाव, वनों की कटाई और मरुस्थलीकरण हुआ। पिछले 100 वर्षों में वायुमंडल में कार्बन डाइऑक्साइड 50 प्रतिशत बढ़ गई है और पर्यावरण पर इस प्रतिकूल प्रभाव को कम करने के लिए जनसंख्या वृद्धि को कम करना, कारखानों से निकलने वाले अपशिष्ट उत्पादों पर उचित नियंत्रण, उनका उचित निपटान और गैर-नवीकरणीय के उपयोग में कमी करना आवश्यक है। संसाधनों की आवश्यकता है ऐसा करना आवश्यक है. सतत विकास की अवधारणा को 1987 में पर्यावरण विकास पर विश्व आयोग के बाद अधिक महत्व मिला। इसमें WCED सतत विकास को परिभाषित करता है क्योंकि सतत विकास भविष्य की पीढ़ियों की जरूरतों को पूरा करने की क्षमता से समझौता किए बिना वर्तमान पीढ़ी की जरूरतों को पूरा करने की क्षमता है।

विषय:

'विकास' का अर्थ है भोजन स्रोत से आनंद स्रोत तक चेतना का विस्तारित स्तर। यह निचले स्तर को ख़त्म नहीं करता; तो 'मैं' का विस्तार, व्यापकता, धीरे-

धीरे, समावेशी रूप से बढ़ती है। किसी भी संवेदनशील प्राणी, चाहे वह जानवर हो या इंसान, की कुछ बुनियादी ज़रूरतें होती हैं। बुनियादी प्राकृतिक आवेग हैं, भोजन, नींद, माया, मैथुन जिसे आमतौर पर 'एतद् पशुभिर नाराण' कहा जाता है। पशुओं और मनुष्यों में भोजन, निद्रा, भय और यौन सुख एक समान हैं। ये सभी मूलभूत आवश्यकताएं हैं, व्यक्ति के विकास का अर्थ है भौतिक स्तर पर आवश्यकताओं को न्यूनतम रखना तथा चेतना के स्तर पर उच्चतर एवं व्यापक स्तर पर जाना। जैसा कि विवेकानन्द कहते हैं, "यदि हम सचेत प्रयास करें तो इस प्रक्रिया को तेज किया जा सकता है और हम इसे कम समय में हासिल कर सकते हैं"। श्री अरबिंदो का कहना है कि इस ब्रह्मांड में मनुष्य का भोजन स्रोत से आनंद स्रोत तक विकास जारी है। यदि सचेत प्रयास जोड़ दिए जाएं तो इस विकास को गति दी जा सकती है "।

समाज सात्विक, राजसिक और तामसिक तीनों प्रवृत्तियों के लोगों का समूह है। कोई भी समाज पूर्णतया सात्विक, पूर्णतया राजसिक अथवा पूर्णतया तामसिक नहीं होता। इनमें से प्रत्येक के उस समय के अनुपात के अनुसार ही समाज का रंग निर्धारित होता है। जिस प्रकार समाज तीनों गुणों वाले व्यक्तियों से बना है, उसी प्रकार हर व्यक्ति में भी यह तिन गुण पाए जाते है । तो सामुदायिक विकास क्या है? आदर्श राज्य वह समाज है जहाँ सभी व्यक्तियों का विकास हो। लेकिन यह असंभव है. इसलिए किसी भी समाज में अच्छे और बुरे के बीच संतुलन बनाए रखना ही हाथ में होता है। अतः व्यक्ति और समाज के बीच संपूरकता ही सम्यक प्रतिमान की पहचान है। चाहे व्यक्ति हों या समाज, वे स्वतंत्र, संप्रभु चीजें नहीं हैं। ये दोनों अन्योन्याश्रित हैं। इसलिए, व्यापक सामाजिक भलाई के लिए व्यक्तिगत स्वतंत्रता पर कुछ हद तक अंकुश आवश्यक है। व्यक्ति का समाज के विकास में योगदान देना आवश्यक है तथा दूसरी ओर व्यक्ति की उन्नति के लिए समाज का उसकी सहायता करना भी आवश्यक है। आवश्यकता के समय व्यक्तियों की सहायता करने के लिए समाज; और व्यक्ति अपने 'मुख्य ' लक्ष्य को प्राप्त करने के साथ-साथ उसके बाद समाज के उत्थान में भी सहायक होते हैं। समाज में व्यक्ति को शिक्षा एवं संस्कार प्रदान करना समाज का कर्तव्य है; विभिन्न कार्य करके समाज को सुचारु रूप से चलाना और पंचयज्ञ के माध्यम से सामाजिक ऋण चुकाना व्यक्ति का कर्तव्य है।

सृष्टि चक्र के कारण सभी सजीव और निर्जीव तत्व एक दूसरे से जुड़े हुए हैं। वे एक दूसरे पर निर्भर हैं. उनके बीच लगातार किसी न किसी चीज़ का 'आदान-प्रदान' होता रहता है। प्रकृति अपने सभी रूपों में विभिन्न आंतरिक नियंत्रणों और आंतरिक प्रतिक्रियाओं के माध्यम से चक्रों की गतिविधि में संतुलन बनाए रखता है। इस पारिस्थितिकी तंत्र में कोई भी दूसरे से अधिक महत्वपूर्ण नहीं है। सभी समान है। 'सीमा' प्रकृति का एक महत्वपूर्ण गुण है। निसान आकार में महत्वपूर्ण है, संख्या में यह बड़ा या एक माड़ से अधिक नहीं हो सकता। सृष्टि का संपूर्ण विकास जीवित रहने में निहित है, जिस प्रकार भारतीय अवधारणा में व्यक्ति और संपूर्ण के बीच कोई विरोध नहीं है, उसी प्रकार व्यक्ति और सृष्टि या संपूर्ण और सृष्टि के बीच कोई विरोध नहीं है। व्यक्तियों को अपना उपभोग सीमित, प्राकृतिक स्तर पर रखना चाहिए, जिससे सृजन की अनुभूति होगी, जो व्यक्ति के नश्वर जीवन के लिए आवश्यक भौतिक आवश्यकताओं को पूरा करती रहेगी। यह आयाम परस्पर पूरक भी है और परस्पर पोषक भी। यदि हम प्रकृति के चक्रों को अक्षुण्ण रखें और 'देवाणी' के माध्यम से उनका पोषण करें तो भविष्य का 'घेवन' संभव है और हमारी भावी पीढ़ियों का पोषण संभव है। इसके विपरीत, यदि हम आज प्रकृति को खराब करते हैं, तो प्रकृति के रूप में हमारे भविष्य के विनाश के बीज मौजूद हैं। इस वास्तविकता और गहन जागरूकता से ही भारतीय चिंतन में प्रकृति के 'दोहन' की अवधारणा है। एक ओर हमें प्रकृति का पोषण करना है तो दूसरी ओर उसकी उपलब्धियों से अपनी आवश्यकताओं की पूर्ति भी करनी है। पोषण से व्यक्ति का भी विकास सुनिश्चित होता है और सृष्टि का भी। यह तीन स्तरीय विकास प्रक्रिया है. ये तीन स्तर स्वतंत्र नहीं हैं। वे एक-दूसरे से घनिष्ठ रूप से जुड़े हुए हैं । लेकिन उनके विकास का ग्राफ अलग है ।

यदि किसी भी विकास को टिकाऊ बनाना है तो उपभोग की दर उत्पादन की दर से कम होनी चाहिए। इस संबंध में दिलीप कुलकर्णी अपनी पुस्तक 'सम्यक विकास' में लिखते हैं कि, मान लीजिए कि एक कुआं है। इसमें एक नाले से पानी भरता है और दूसरे से निकलता है। यदि बाहर आने वाला पानी आने वाले पानी से कम है

तो जलाशय भरा रहेगा। यदि बाहर आने वाला पानी अधिक है, तो टैंक धीरे-धीरे खाली हो जाएगा और जो पानी बाहर आ सकता है वह कम होता जाएगा। विकास प्रक्रिया का पहला प्रकार सतत विकास है। ऐसा विकास सदैव, अनंत काल तक, अखंड रूप से जारी रह सकता है। वहीं दूसरा प्रकार है अस्थिर विकास, विनाशकारी विकास। विकास का वर्तमान प्रतिमान ऐसे ही अस्थिर विकास का प्रतिमान है। उसका आंतरिक प्रतिरोध है. यह जितना अधिक विकसित होता है, उतना ही अधिक अस्थिर होता जाता है। जितना अधिक वह असीम बनाने का प्रयास करता है, वह उतना ही अधिक सीमित होता जाता है। आप इसे जितनी तेजी से करने की कोशिश करेंगे, यह उतनी ही जल्दी खत्म हो जाएगा। जितनी तेजी से हम प्रकृति की सीमाओं को पार करेंगे, उतनी ही तेजी से हम नष्ट हो जायेंगे। इसलिए हमें यह बात हमेशा ध्यान में रखनी चाहिए कि भैतिक विकास की एक निश्चित सीमा होती है।

'रैखिक भौतिक विकास' की अवधारणा इस प्रतिमान में व्यक्ति के संपूर्ण विकास का नहीं है, अर्थात ऐसे विकास के प्रतिमान में यह रेखीय ग्राफ उसकी चेतना के विकास का ग्राफ है। शारीरिक विकास नहीं. यह रेखीय ग्राफ विकास के किसी भी चरण में भौतिक विकास का प्रकृति माप है। इस शक्ति का सम्मान करने से, इसके भीतर आनंद रखने से सिक्के का विकास टिकाऊ हो जाता है।प्रतिमान में व्यक्ति का विकास और सृष्टि का विकास कोई आंतरिक गांठ, असंगति नहीं, बल्कि आंतरिक सामंजस्य है। यहां भौतिक जीवन के स्थायित्व को बनाए रखते हुए चेतना के अनंत विकास का अवसर है। वर्तमान समय में 'टिकाऊ' या 'सतत' विकास की ओर काफी रुझान है। वर्तमान समय में 'विकास' शब्द अकेला नहीं आता। यह 'टिकाऊ' विशेषण के साथ आता है। हम इसे 'शाश्वत विकास' या 'चिरंजीवी विकास' या 'संपोषित विकास' कहते हैं। ऐसा विकास जरूरी है. वास्तव में, सतत विकास सतत विकास से एक कदम नीचे रहता है। स्थिरता प्रकृति की सीमाओं के भीतर रहने से प्राप्त होती है। यह वांछनीय है. लेकिन फिर भी वह संसार में, पदार्थ में फँसकर पुनः गिर रहा है। चेतना के विकास के बारे में क्या? आध्यात्मिक विकास के बारे में क्या? मानव जीवन का मूल उद्देश्य स्वर्ग प्राप्ति है। समुचित विकास की अवधारणा का भी इस विकास पर प्रभाव पड़ता है। जो सतत विकास की अवधारणा में नहीं है. यह सतत विकास की आदर्शवादी अवधारणा में 'गायब आयाम' है। इस लुप्त आयाम के कारण ही सतत विकास की आदर्शवादी अवधारणा अधूरी है।

वैयक्तिक, सामूहिक और सृजन तीनों स्तरों पर त्याग की अवधारणा को प्रतिस्थापित किया जाता है और उनकी भलाई को बनाए रखा जाता है। इसीलिए सम्यक विकास की व्यावहारिक अभिव्यक्ति आत्म-बलिदान से होती है। समग्र विकास प्रक्रिया में 'व्यक्ति का उपयोग' एक प्रमुख मुद्दा है। प्रचलित व्यवस्था में 'उपभोग वृद्धि' से अभिप्राय है। इससे संपूर्ण विनाश हो रहा है। सतत विकास का तात्पर्य 'उपभोग में कमी' से है जो उस विकास को वास्तविकता बनाएगा। सीमाओं या प्रतिबंधों के अभाव में मानव जीवन का अंतिम लक्ष्य प्राप्त नहीं होगा; निरंकुशता व्यक्तियों और समाजों के पतन और पारिस्थितिक तंत्र के विनाश को जन्म देगी। इसलिए व्यक्ति, समष्टि और सृष्टि की धारणा के लिए धर्म का बंधन आवश्यक है। आध्यात्मिक उत्थान समृद्ध भौतिक जीवन का विरोधी नहीं है। पर्यावरण का दोहन करके भौतिक समृद्धि हासिल नहीं की जा सकती। प्रकृति के दोहन से मुक्ति प्राप्त की जा सकती है, प्रकृति की सीमाओं के भीतर रहने का मतलब आदिम मानव की तरह जीना नहीं है।

निष्कर्ष:

शहरीकरण, औद्योगीकरण, संचार, कृषि आदि क्षेत्रों में काफी विकास के बाद मनुष्य का जीवन आरामदायक हो गया है। मनुष्य जहां अपने जीवन को प्रगति के पथ पर अग्रसर करता है, वहीं प्रकृति के पारिस्थितिक संतुलन का बिल्कुल भी ध्यान नहीं रखता। आरंभिक समय में मनुष्य प्राकृतिक आवश्यकताओं की पूर्ति के लिए प्रकृति की ओर जाता था; लेकिन बदलती परिस्थितियों में अपनी बढ़ती जरूरतों को पूरा करने के लिए मनुष्य ने प्राकृतिक संसाधनों का अत्यधिक दोहन किया है। औद्योगीकरण, शहरीकरण, ईंधन समस्याओं पर काबू पाने के लिए बड़े पैमाने पर वनों की कटाई की गई। धरती का सुरक्षा कवच वृक्षों के हटने से मृदा अपरदन बढ़ गया। बारी-बारी से मरुस्थलीकरण, सामान्य तापमान में वृद्धि, वर्षा में कमी होने लगी। कृषि उत्पादन में गिरावट के कारण भूख और कुपोषण जैसी समस्याएँ उत्पन्न होने लगीं। इससे सीखने के बजाय

कृषि उत्पादन बढ़ाने के लिए रासायनिक उर्वरकों और कीटनाशकों का खुलकर उपयोग किया जाने लगा। परिणामस्वरूप, भूमि प्रदूषित हो गई। भूमि की गुणवत्ता में कमी आयी। जल प्रदूषण बढ़ा. गैर-बायोडिग्रेडेबल रसायन विभिन्न खाद्य पदार्थों के माध्यम से मनुष्यों तक पहुंचते हैं। जब मनुष्य ने प्रकृति से छेड़छाड़ करने की कोशिश की। उस समय इसके गंभीर परिणाम भुगतने पड़े। आज मनुष्य अपने आप को कितना भी उन्नत एवं बुद्धिमान क्यों न समझ ले, सूखा, भुखमरी, कुपोषण, वर्षा में कमी, प्रदूषण, भूकंप, भूस्खलन इत्यादि। प्राकृतिक आपदाओं का कोई विकल्प नहीं है ।

सुझाव:

मूल रूप से वे चीजें हैं जिनके द्वारा मनुष्य ने अपना जीवन स्तर ऊंचा उठाया। मनुष्य का जीवन सुखी होने की बजाय कष्टमय होता जा रहा है। अत: बदलती परिस्थितियों में वृक्षारोपण एवं संरक्षण, जल साक्षरता, प्राकृतिक संसाधनों का समुचित उपयोग, रासायनिक उर्वरकों, कीटनाशकों तथा न नष्ट होने वाले प्रदूषकों के प्रयोग पर रोक तथा पर्यावरण संतुलन के प्रति जागरूकता के पाँच सिद्धांतों को आत्मसात करना आवश्यक है, तभी क्या मनुष्य शाश्वत विकास प्राप्त कर सकता है? संसाधनों के समुचित उपयोग के लिए संसाधनों के उपयोग का प्रबंधन करना आवश्यक है। इसे इस प्रकार प्रबंधित किया जा सकता है:- कानून बनाना और लागू करना।,वन्य जीवन के आवास की रक्षा करना।, लोगों में जागरूकता पैदा करना.,(बीजों की) नई किस्मों की खोज।, नई योजनाएं क्रियान्वित करना।

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