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EDITORIAL

Dear Reader

It is with great enthusiasm that we present the latest issue of the 'Researcher' A Multidisciplinary Journal of UoJ. This volume continues our tradition of publishing impactful and innovative research work in the field of Science &Technology, Social Sciences, Business Studies and Arts & Humanities.

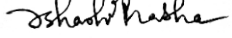
The 'Researcher ' A Multidisciplinary Journal has four sections comprising of Science &Technology, Social Sciences, Business Studies and Arts & Humanities. Section I 'Science &Technology' comprises of three papers, the first paper deals with Assessment of Proximate Composition and Seasonal Nutrient Trends in Freshwater crab wherein the study revealed that the freshwater crabs are nutritionally rich and comparable to the freshwater fish and prawns. The second paper is on GIS- based spatial analysis to estimate seasonal oscillations in foliage health, water availability, soil exposure, and urban expansion of Jammu district of J&K.The last paper in this section highlights the terrestrial ecosystems which are under serious risk from heavy metal pollution .

In section II 'Social Sciences', first paper emphasizes on the dynamics of agricultural credit and financial inclusion in Jammu and Kashmir. The second paper attempts to establish the lack of proper ammunition industry and war weapons as a cause of British subjugation in India, the third paper examines the nature of India's political economy during the per-liberalisation era. The last paper presents a critical analysis on the role of the Gram Nyayalaya Act.

In Section III 'Business Studies' the findings of the first paper provides insights into effective leadership strategies for sustainability and to support policymakers. Whereas the second paper attempts to measure the association of SDL with customer participation and customer satisfaction.

Lastly, 'Arts & Humanities' section has four papers, the first paper examines manual scavenging in India as a violation of human rights. The second paper argues that the Banda Singh Bahadur War Memorial at Chappar Chiri, Punjab, as a strategic site of Sikh identity. The third paper highlighted the Poetics of Love and Intimacy in Anna Akhmatova's Love Poetry. The last paper examines how a film challenges societal taboos, institutional negligence, and cultural misunderstanding surrounding sexual health and awareness.

We are deeply grateful to our talented authors for their outstanding contributions. Their dedication to scholarly rigor and creativity is what drives the success of this journal. We also extend our sincere thanks to our dedicated team of reviewers and associate editors. Their tireless efforts and expert feedback are instrumental in upholding our commitment to a fair and robust peer-review process. We trust that the articles within this issue will spark new discussions and collaborations. We remain committed to serve as a premier platform for the dissemination of high-quality research and look forward to your continued engagement.



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CONTENTS

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CONTENTS

SCIENCE AND TECHNOLOGY

Assessment of Proximate Composition and Seasonal Nutrient Trends in Freshwater crab, *Himalayapotamon pretzmanni* from Himalayan Tributaries

Mukul Adotra*, Menakshi Dhar**
& Seema Langer***

ABSTRACT

The United Nations' 2030 Agenda, established in 2015, highlights food security as a core component of its seventeen Sustainable Development Goals. Among the various sectors contributing to food production, aquaculture stands out as the world's fastest-growing, offering a scalable and sustainable means of ensuring food security. The Union Territory of Jammu and Kashmir, with its Himalayan-fed rivers, hosts diverse aquatic fauna, including freshwater crabs. Given the region's harsh winters restrict crop production, so exploring freshwater crab nutrition could enhance food security. The current investigation entails the comprehensive collection of freshwater crabs from tributaries of the Chenab River flowing through the Jammu region. Proximate composition was estimated seasonally for three years, and statistical analysis was done using PAST 4.03 software. The study revealed that the freshwater crabs are nutritionally rich and comparable to the freshwater fish and prawns.

Key Words: Aquaculture, Food security, Himalayan-fed rivers, Nutritional Analysis, Proximate composition

1. Introduction

The human population growth is increasing at an alarming rate, reaching unprecedented levels by the mid-21st century, leading to substantial challenges to the global supply of reliable, high-quality, nutrient-rich food. By 2050, with an estimated population of 9.7 billion, food production will need to be increased by 25%-70% to meet the growing demand [1,2]. Concurrently, with the expansion of the global middle class, particularly in Southeast Asia, there is a notable shift in dietary patterns, characterized by escalating demand for animal-sourced protein [3]. India is a major contributor in addressing this demand and ranks as the second-largest producer of fish globally. In the last two decades, India has strengthened its stand in the global fisheries and aquaculture sector by allocating the highest-ever Union Budget 2025-26 for the fisheries sector. There are numerous water bodies in this region showcasing diverse hydro-chemical conditions ranging from fast-flowing, oxygen-rich waters to slower, more turbid stretches. These rivers provide a home to a wide variety of crab species, each with unique feeding habits and habitats, each thriving in its type of surroundings. Three species of freshwater crabs are on record from the tributaries of Chenab river flowing through Jammu. *Maydelliathelphusa masoniana* (Henderson, 1893) is found in the plains of Jammu, while its hilly counterparts include *Himalayapotamon emphysetum* (Alcock, 1909), and more recently, a new

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species of *Himalayapotamon pretzmanni* (Pretzmann, 1966) has been reported from the Himalayan foothills [4,5].

Besides being a part of the biodiversity of this region, they also serve as a valuable food source. For understanding nutritional value, their basic nutrient content, called proximate composition, is examined, which shows the levels of proteins, lipids, water (moisture), and ash (mineral) in them [6]. Proteins from animal food have a higher biological value than plant protein, as animal proteins often contain more amounts of specific amino acids. Aquatic food contains good-quality lipids that aid in fighting against various conditions like cardiovascular diseases, inflammation, and diabetes. The amount of moisture present in the food has a great affect on its texture and helps in predicting its shelf life. Ash tells about the concentration of minerals in the food sample [7,8,9].

The nutritional content of crabs changes throughout the year [10], and these variations are influenced by various factors such as water temperature, type of species, size differences, and developmental stages of species [11,12]. Many studies have shown that the time of the year and environmental surroundings have a strong effect on the nutritional value of crabs. This study focuses on freshwater crabs collected from the Shivalik belt of Jammu and Kashmir and aims to estimate their proximate composition and understand how their nutritional quality is influenced by seasonal changes. The findings of the study may contribute to achieving a steady food supply and promote the use of these native crab species in a sustainable way.

Material and Methods

The freshwater crab, *Himalayapotamon pretzmanni* was collected from the various selected sites of Chenab river (Fig 1) and transported to the laboratory of the Department of Zoology, University of Jammu, in oxygen bags, where they were placed in troughs in which constant gentle aeration was maintained. The dead crabs were picked up to keep the environment fresh. The proximate composition of the muscles of freshwater crabs of all the species under study was estimated during different seasons for three years: 2021-22, 2022-23, and 2023-24. For each assay, there were three replicates. The average weight of H. *pretzmanni* was 62.22±1.04g, respectively (Fig 2), and the number of crab samples analyzed was 103. The protein and lipid content was analyzed following [13,14]. For estimation of moisture content, the sample was dried at 105°C for 24 hours. The dried samples were placed in a muffle furnace and held at 550°C for eight hours to determine the ash content. All data were statistically analyzed through the PAST 4.03 software and used for the preparation of the bar graphs showing the variations in protein, lipid, ash, and moisture content across different seasons.

Results and Discussion

Biochemical analysis provides critical information on the nutritional value and helps establish the nutritional status of an organism. The protein content of *Himalayapotamon pretzmanni* showed both seasonal and annual variations from 2021–22 to 2023–24. During summer, protein levels gradually decreased, while in the monsoon season, they first declined, then showed a slight increase in the final year. Autumn values remained relatively stable with only a minor decrease over the three years. Winter protein content showed a consistent decline. In contrast, spring exhibited the highest protein levels across all seasons and years. A downward trend was most notable during summer and winter. These seasonal changes reflect the impact of environmental conditions on the crab's metabolism.

The lipid content also showed notable seasonal and yearly variation. In summer, lipid levels

initially increased, followed by a decrease in the final year. During the monsoon, values remained relatively stable, with a slight dip in the second year. Autumn lipid content showed a peak, followed by a decline. Winter levels decreased over the years despite a small increase in the middle. As with protein, spring consistently showed the highest lipid levels, likely due to increased energy storage and possible reproductive activity. These variations suggest that lipid metabolism in this species is influenced by both seasonal metabolic demands and environmental factors.

The ash content also varied during the study. In summer, ash levels increased significantly, while monsoon values showed a steady rise, indicating greater mineral accumulation. Autumn levels showed a gradual increase, and winter recorded the highest ash content, especially in the second year. Spring values remained moderate, with only slight fluctuations. These patterns indicate that mineral buildup is linked to seasonal physiological requirements. The moisture content of *Himalayapotamon pretzmanni* remained relatively high throughout the study. In summer, it slightly decreased in the second year but increased again in the third year. Monsoon moisture levels were consistently high, showing minor increases over time. Autumn values were steady at first but dropped slightly in the final year. Overall, these observations highlight how environmental changes throughout the year affect water retention and physiological processes in the crabs. Every year, the highest moisture levels were recorded during winter, indicating enhanced water retention. Fluctuations in moisture content reflect the changes in habitat humidity, temperature, and metabolic activity. In *Himalayapotamon pretzmanni,* autumn and spring consistently have the highest protein content, while Monsoon has the lowest, likely due to environmental factors. Spring has the highest lipid content, monsoon has the lowest, and autumn and summer also have relatively high levels, with minor autumn variations. Winter peaks in ash content, with summer and winter showing slight increases in 2023-24. Autumn and monsoon remain stable, while spring fluctuates slightly. Moisture content is highest in winter, followed by monsoon, and lowest in autumn, summer, and spring. Winter and spring show increasing moisture over the years, while autumn declines, maintaining a clear seasonal pattern. A detailed summary of all biochemical parameters with units is provided in Table 1, and the seasonal trends are depicted in Fig 3.

The biochemical composition of freshwater crabs reveals their high nutritional content. Protein content analysis in crabs collected from coastal waters in Tamil Nadu, revealed a protein content of 20.32% in P. *sanguinolentus* and 17.62% in P. *pelagicus* [15]. The seasonal fluctuations in the protein content were observed in the presently studied crab species during the whole study period. In the spring season, the food availability in the water body is maximum, which correlates with the high protein concentration. The plankton diversity was high and minimal during the monsoon. Inadequate food availability due to rains in monsoon may be the factor for the low protein in monsoon and abundance of food in spring attributed to higher protein content in crabs. The high energy demands associated with ovulation and spawning are met through the mobilization of stored energy reserves, facilitating the reallocation of energy resources to support reproductive processes [16]. Changes in the endocrine system during the spawning season influence protein content by regulating nutrient allocation to the gonads and resulting in a transient increase in protein content during post-spawning recovery [13].

The lipid composition of a freshwater prawn, M. dayanum found in the Ravi River stretch of the Jammu region was analyzed [18] and the average annual lipid content was 2.79±0.31%, which is lower than freshwater crabs from the same region. However, the comparative study of shellfish reveals a lower content of lipids in crabs than in prawns and lobsters [19]. During the spawning

season, gonads are in the advanced stage of maturity and thus lead to a fall in the lipid content of the crab [20]. Seasonal variations in ash content were also prominent in these crabs, with maximum ash value in the winter season, and it gets reduced during autumn and monsoon seasons. The variations in the ash content can be due to the utilization of minerals for the maturation of gonads. Seasonal fluctuations are observed in ash content of fish species (*Glossogobius giuris, Labeo gonius*) with the high amount of ash content in spawning season and lowest in winter season [21]. Moisture levels serve as a reliable indicator of energy density, as well as its fat and protein content. Generally, lower moisture content tends to have higher levels of fat and protein, resulting in a more calorie-dense food source. Elevated moisture levels are advantageous for maintaining osmoregulation during migration [22,23]. Similarly, in this study, seasonal variation was evident, with winter showing the highest moisture and autumn the lowest, corresponding with environmental humidity and temperature shifts.

Conclusion

Analyzing the proximate composition of freshwater crabs is crucial for assessing their nutritional profile and serves as a vital indicator of their nutritional status, physiological condition, and overall quality. Based on the observed seasonal changes in the biochemical composition, autumn and spring stand out as the optimal seasons for collection and potential use of *Himalayapotamon pretzmanni* in human consumption. During these seasons, the elevated levels of protein and lipid content reflect their dietary benefits marking their better food value. Peak levels of lipid were observed in spring, crucial for energy reserves and possibly related to the reproductive phase. In contrast, high levels of protein were maintained in the autumn season. Thus, from both ecological and nutritional perspectives, autumn and spring seasons are the most ideal for harvesting of H. *pretzmanni*. These findings also aid in developing seasonal guidelines for consumption and conservation strategies.

Figure 1. Collection sites (a) Chenani (b) Dhar ShivGarh

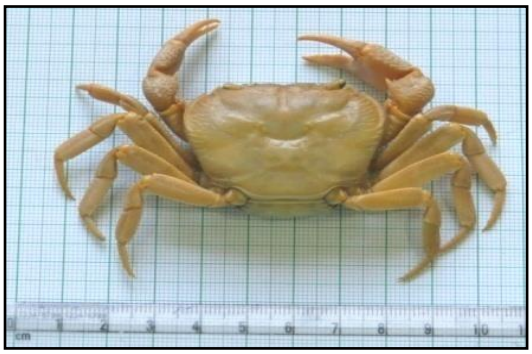
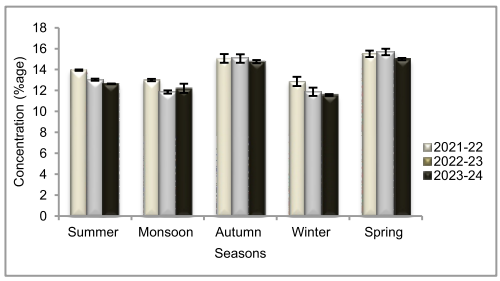
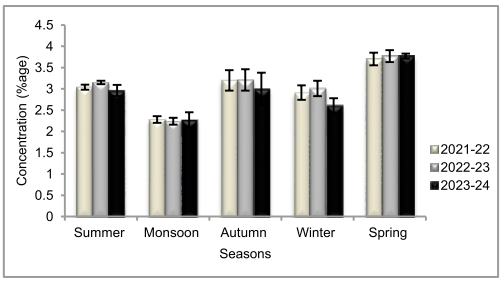


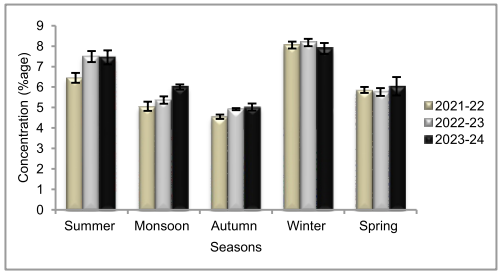
Figure 2. *Himalayapotamon pretzmanni*



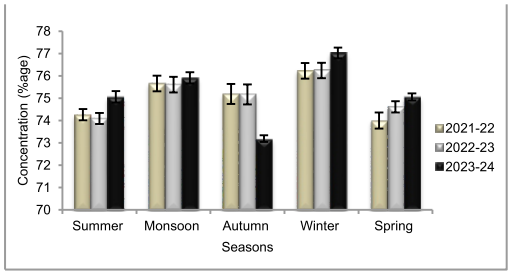
(a) Protein



(b) Lipids



(c) Ash



(d) Moisture

Figure 3. Bar graph representing the protein, lipid, ash, and moisture levels measured across different seasons (Summer, Monsoon, Autumn, Winter, and Spring) over three years in Himalayapotamon pretzmanni

Table 1: Season-wise variation in biochemical composition (protein, lipid, ash, and moisture contents, expressed as percentage weight) of Himalayapotamon pretzmanni from 2021–22 to 2023–24

Year	Season	Protein (%)	Lipid (%)	Ash (%)	Moisture (%)
2021–22	Summer	13.95±0.07	3.04±0.06	6.45±0.24	74.26±0.25
	Monsoon	13.00±0.10	2.28±0.08	5.06±0.23	75.66±0.35
	Autumn	15.06±0.42	3.20±0.24	4.55±0.11	75.19±0.45
	Winter	12.86±0.44	2.91±0.17	8.05±0.17	76.22±0.35
	Spring	15.51±0.31	3.70±0.15	5.86±0.15	74.00±0.36
2022–23	Summer	13.03±0.09	3.15±0.04	7.49±0.27	74.09±0.25
	Monsoon	11.86±0.15	2.24±0.08	5.36±0.18	75.61±0.35
	Autumn	15.05±0.41	3.21±0.25	4.92±0.05	75.17±0.45
	Winter	11.88±0.40	3.01±0.18	8.18±0.18	76.24±0.35
	Spring	15.68±0.30	3.77±0.14	5.76±0.19	74.61±0.25
2023–24	Summer	12.65±0.02	2.96±0.13	7.45±0.34	75.06±0.26
	Monsoon	12.20±0.44	2.28±0.17	6.00±0.13	75.91±0.25
	Autumn	14.76±0.16	3.00±0.38	5.02±0.17	73.19±0.15
	Winter	11.57±0.08	2.61±0.17	7.88±0.27	77.02±0.24
	Spring	15.00±0.12	3.77±0.06	6.04±0.45	75.06±0.16

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Echoes in the Grass: Grasshoppers as Bioindicators of Heavy Metal Stress Samiksha Sharma and Chinmoyee Maharana

Samiksha Sharma* & Chinmoyee Maharana**

ABSTRACT

Terrestrial ecosystems are under serious risk from heavy metal pollution because of its toxicity, bioaccumulation and persistence. In addition to being significant ecological insects, grasshoppers are sensitive markers of environmental pollution and are essential to terrestrial ecosystems. Due to their ecological significance and sensitivity to contaminants, grasshoppers have become useful models for evaluating the effects of heavy metals. In addition to aiding in insect conservation efforts, knowledge of how grasshoppers react to heavy metal exposure provides important management insights for damaged terrestrial ecosystems. With an emphasis on the physiology, behaviour, reproduction and survival of grasshoppers, this review investigates the impacts of heavy metals. The review also points out areas that need further research and makes recommendations for future lines of inquiry to deepen our knowledge of insect-metal interactions and their wider ecological effects.

Key Words: Heavy metals, grasshoppers, bioaccumulation, biomonitoring, ecosystem health

1. Introduction

Naturally occurring substances known as heavy metals are mostly made into pollutants by human activities such mining, industrial discharge, farming and inappropriate waste management (Ali et al., 2019). Through soil and vegetation, these metals can infiltrate terrestrial food webs and remain in the ecosystem for a long time where they contaminate soil and water over time. Due to their intake of metal-laden vegetation and direct contact with contaminated surfaces, terrestrial invertebrates—especially herbivorous insects like grasshoppers—are among the first creatures impacted by such pollution (Khan et al., 2008).

As primary consumers, grasshoppers (Order: Orthoptera) are found across the world and play important ecological roles. They aid in the cycling of nutrients and are prey to many vertebrate and invertebrate predators (Gangwere et al., 1997). They are quite vulnerable to heavy metal exposure due to their ground-dwelling and phytophagous lifestyle, which makes them appropriate bioindicators for tracking pollution in the terrestrial environment (Zhang et al., 2010). Additionally, studies on the effects of pollutants conducted successfully in the field and in the lab owing to their low survival rates, developmental delays, growth and emergence pattern (Sildanchandra and Crane, 2000).

Growth retardation, oxidative stress, infertility, behavioural abnormalities, and eventually population collapse are just a few of the sublethal and fatal consequences that can result from the buildup of heavy metals in grasshopper tissues (Zhao et al., 2013). Furthermore, these insects have the ability to help pollutants move up the food chain to higher-level consumers, which could upset entire food chains (Hopkin, 1989). Therefore, it is essential to comprehend how heavy metals and

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grasshoppers interact in order to evaluate ecological risks and develop mitigation plans.

2. Sources and Pathways of Heavy Metal Exposure in Grasshoppers

Heavy metal exposure in grasshoppers is mostly caused by the ingestion of contaminated plants, soil particles and water droplets. They can absorb these metals through their cuticles or through the digestive tract. Numerous factors such as the habitat's features, the feeding habits of the species and the degree of pollution in the surrounding area influence the extent of exposure (Zhang et al., 2010). Figure 1, summarizes various entry pathways of heavy metals in grasshoppers.

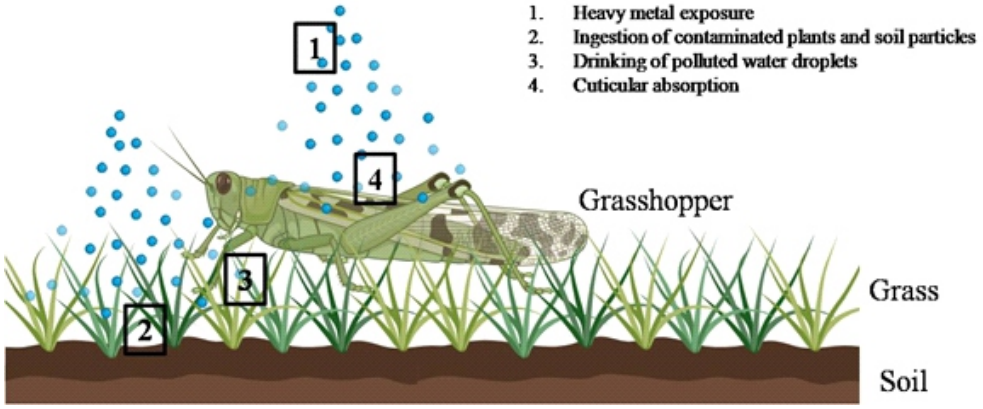

Figure 1. Summary of entry pathways of heavy metal exposure in grasshoppers

Ingestion of Contaminated Vegetation and Soil: As herbivores, grasshoppers mostly consume grasses and other plants for food. These plants become a direct source of metal exposure for grasshoppers when they take up heavy metals from contaminated soils or are exposed to air deposition (Zhang et al., 2010). Furthermore, while foraging on the ground, grasshoppers could unintentionally consume soil particles that are stuck to plant surfaces or come straight from the substrate, which would expose them to more soil-bound metals (Sildanchandra and Crane, 2000).

i. Cuticular Absorption: Despite being less frequent, heavy metals can enter the body through the cuticle of insects, especially when there are significant ambient concentrations in dust or dirt. Trans-cuticular uptake may result from extended contact with contaminated surfaces, particularly in moist conditions that promote metal ion mobility (Hopkin, 1989).

ii. Atmospheric Deposition: Heavy metals that are deposited from the environment onto plant surfaces or directly onto insect bodies might also expose them. An additional exposure pathway for terrestrial insects is created when metal-rich dust and aerosols from industrial and automotive sources land on vegetation, soil, and water surfaces (Zhao et al., 2013).

iii. Trophic Transfer and Bioaccumulation: Despite their lower trophic level, grasshoppers can undergo biomagnification if they are eaten by higher-level creatures. In addition to harming their own health, the buildup of heavy metals in their tissues puts predators at danger and aids in the spread of pollutants across food webs (Hopkin, 1989).

Determining the ecological danger posed by heavy metals and creating focused biomonitoring plans that use grasshoppers as sentinel species require an understanding of these exposure pathways.

3. Observable physiological reactions that make Grasshoppers bio-indicators of heavy metals

Grasshoppers are useful bioindicators of heavy metal contamination because of the variety of physiological reactions they display. Changes in enzymatic activity, such as those in detoxification and antioxidant enzymes like glutathione-S-transferase (GST), catalase (CAT), and superoxide dismutase (SOD) are important indicators of oxidative stress. Additionally, heavy metals influence metabolic function by bioaccumulating in target tissues such as the stomach, fat body and cuticle (Zhao et al., 2013).

Reduced body mass, delayed development and poor moulting are common effects of exposure, which show that energy is being diverted from growth to stress reduction (Sharma et al., 2018). The vulnerability of endocrine and reproductive system to metal poisoning is highlighted by reproductive abnormalities, such as decreased egg production and deformed embryos. Internal stress is further supported by histopathological damage to the midgut and fat body tissues, while behavioural abnormalities like decreased appetite and lethargy suggest a neurological effect (Rana et al., 2020).

Because of these obvious physiological and biochemical effects, grasshoppers can be used as bioindicators to measure the levels of heavy metal contamination on land.

4. Bioaccumulation and Detoxification Mechanisms

It has been found that grasshoppers can store heavy metals in various tissues, such as their hemolymph, fat bodies and stomach (Sildanchandra and Crane, 2000).Bioaccumulation takes place when the rate of metal uptake surpasses the rate of excretion, leading to a net rise in internal metal concentration over time. The kind and concentration of metal, the length of exposure and the species all affect the bioaccumulation process. The affinities of various heavy metals for biological tissues differ. For example, lead and cadmium have a tendency to build up in hemolymph and fat tissues, where they can disrupt enzymatic and metabolic processes (Zhao et al., 2013). However, because they disrupt cellular homeostasis, metals like copper and zinc, which are necessary micronutrients at low quantities, can turn hazardous at higher amounts (Ali et al., 2019).

Several detoxifying methods are used by grasshoppers to lessen the harmful effects of accumulated heavy metals. Using metallothionein, which are low molecular weight, cysteine-rich proteins that bind and sequester heavy metal ions, making them biologically inert, is a crucial tactic. Because they stop metals from interacting with vital biological components, these proteins are essential for maintaining metal homeostasis and detoxification (Hopkin, 1989).Grasshoppers also respond to oxidative stress brought on by metal exposure by activating antioxidant defence systems. Reactive oxygen species (ROS) produced as a consequence of metal toxicity are neutralised by enzymes such glutathione S-transferase (GST), catalase (CAT) and superoxide dismutase (SOD). These enzymes support general stress tolerance and shield cellular components from oxidative damage (Zhao et al., 2013).

In addition, certain grasshopper species bind heavy metals to inert molecules or store them in excretory organs for eventual removal by moulting or faeces. Since large amounts of metals can be shed along with the exoskeleton, the moulting process itself acts as an efficient detoxifying mechanism (Sildanchandra and Crane, 2000).

5. Physiological and Biochemical Effects

In grasshoppers, exposure to heavy metals can cause a variety of physiological and

biochemical abnormalities. It has been demonstrated that heavy metals like cadmium (Cd), lead (Pb), and mercury (Hg) interfere with hormone control and nutrition metabolism, which in turn affects growth, moulting, and metamorphosis. Moulting and reproduction may be delayed or prevented by disruptions in hormonal pathways, especially those involving ecdysteroids (Khan et al., 2008; Sildanchandra and Crane, 2000).

By producing reactive oxygen species (ROS), which harm cellular constituents like lipids, proteins, and DNA, heavy metals biochemically cause oxidative stress (Zhao et al., 2013). Increased levels of malondialdehyde (MDA), a sign of lipid peroxidation, and changes in the activity of antioxidant enzymes such as glutathione-S-transferase (GST), catalase (CAT), and superoxide dismutase (SOD) are indicators of this oxidative damage (Ali et al., 2019). The integrity of cell membranes, enzyme activity, and general metabolic balance can all be jeopardised by elevated ROS levels. Furthermore, important metabolic functions like ion transport, enzyme activity, and protein synthesis can be disrupted by heavy metals. For instance, acetylcholinesterase (AChE), a crucial enzyme for nerve function, may be inhibited by lead and cadmium, resulting in neurotoxicity and behavioural abnormalities (Zhang et al., 2010). There have also been reports of disturbances in metal-dependent enzymes, including ATPases and alkaline phosphatase, which impact cellular signalling and energy metabolism (Hopkin, 1989).

Additionally, grasshoppers exposed to heavy metals have shown histological alterations in key organs such the fat body, midgut, and Malpighian tubules, which show cellular degradation, necrosis, and impaired organ function. The cumulative effect of these physiological and biochemical disturbances lower ecological fitness, reproduction, and survival in impacted populations (Khan et al., 2008).

6. Reproductive and Developmental Impacts

The reproductive and developmental processes of grasshoppers are severely hampered by heavy metals, which frequently results in long-term population decreases. By altering oocyte development, oviposition behaviour, and egg viability, sublethal exposures to cadmium (Cd), lead (Pb), and mercury (Hg) have been demonstrated to decrease fecundity (Sildanchandra and Crane, 2000; Khan et al., 2008). Changes in hormonal signalling pathways hinder mating behaviour and impede with reproductive maturation, especially those involving juvenile hormones and ecdysteroids. Heavy metals can have cytotoxic effects on reproductive tissues at the cellular level, which can result in decreased spermatogenesis and ovarian follicle degeneration. These disturbances lead to a decrease in successful fertilisation and embryonic development, as well as fewer viable gametes (Zhao et al., 2013).

Exposure to heavy metals during development has been associated with morphological abnormalities as wing deformity, antennal defects, and aberrant colouration, as well as delayed hatching and protracted nymphal stages. These abnormalities hinder movement, predator avoidance, and reproductive success in addition to lowering individual fitness(Zhang et al., 2010).Chronic exposure to environmentally relevant metal concentrations has been shown in experiments to cause delayed maturation, increased nymphal mortality, and decreased hatching success. These results imply that even tiny levels of pollution can have major effects on generations, endangering the stability of grasshopper populations and the ecosystem's ability to function (Ali et al., 2019).

7. Behavioural Changes

One of the earliest and most sensitive signs of heavy metal toxicity in grasshoppers is

behavioural alteration. Essential behaviours including movement, feeding, mating, and predator avoidance can be changed by sublethal exposure to metals like cadmium (Cd), lead (Pb), and arsenic (As) (Zhang et al., 2010; Zhao et al., 2013).

Heavy metal exposure has often been linked to decreased movement and reduced coordination in grasshoppers. The suppression of acetylcholinesterase (AChE), a crucial enzyme involved in synaptic transmission, is one of the neurotoxic mechanisms that most likely underlie these effects. Reduced foraging efficiency, impaired jumping ability, and disorganised movement can all be caused by impaired neuronal signalling (Khan et al., 2008). Exposure to heavy metals has a major impact on feeding behaviour as well. According to research, grasshoppers exposed to tainted food sources show higher food rejection and lower feeding rates; this could be because of metal-induced changes in taste receptor function or digestive system injury. These modifications may lead to a decrease in calorie intake, which could impact survival and growth (Sildanchandra and Crane, 2000).

Heavy metals can interfere with wooing displays and mating success in terms of reproductive behaviour. Populations of grasshoppers exposed to metal have been shown to exhibit decreased sexual activity, altered pheromone synthesis, and decreased responsiveness to mating signals. Disruptions in the central nervous system and hormone regulation may be connected to these alterations (Zhang et al., 2010).Furthermore, in contaminated habitats, grasshoppers may show decreased exploratory activity or increased hiding behaviour, potentially as a stress reaction to sublethal metal toxicity. Ecological interactions, like as competition and predator-prey dynamics, may be impacted by such behavioural changes (Ali et al., 2019).

8. Ecological Implications and Trophic Transfer

Heavy metal pollution in grasshoppers has ecological ramifications that affect entire ecosystems in addition to individuals. Because they are main herbivores, grasshoppers are essential for controlling plant biomass and providing food for animals at higher trophic levels, such as small mammals, birds, reptiles, and amphibians. Known as trophic transfer or trophic magnification, the detoxification insects can serve as vectors for the spread of contaminants through food webs when they accumulate heavy metals (Hopkin, 1989; Burger, 2008).Metal-laden grasshoppers can cause bioaccumulation and biomagnification in predators, which can be harmful to the body and reproductive system, particularly in top predators. For example, in birds and mammals that eat polluted insects, heavy metals like lead and cadmium can affect reproductive success, interfere with endocrine systems, and decrease kidney function. This may change community makeup and predator-prey interactions in addition to affecting predator health (Burger and Gochfeld, 2001). Furthermore, population decreases or changes in species composition may result from modifications in grasshopper behaviour, reproduction, and survival rates brought on by exposure to heavy metals. Due to grasshoppers' selective feeding and herbivory pressure, these alterations may have an impact on the organisation of plant communities. Decreased grasshopper populations can cause changes in the competitive dynamics between plant species, unregulated plant growth, and changed nutrient cycling (Gangwere et al., 1997).

Because grasshoppers contribute to nutrient recycling through their faeces and serve as prey for decomposers, their decline or behavioural impairment may also have indirect consequences on pollination and decomposition. The ecological significance of tracking and reducing heavy metal pollution in terrestrial environments is highlighted by these cascade impacts(Ali et al., 2019).Concerns over cross-ecosystem contamination have been heightened by field research on trophic transmission, which has verified the presence of heavy metals in grasshopper predators.

Burger (2008), for example, found that birds living in metal-contaminated grasslands had higher levels of arsenic and mercury, which were associated with their consumption of invertebrates like grasshoppers.

Table 1. Showing the effect of some heavy metals on grasshoppers (modified from Zaman and Zereen, 2012)

Heavy Metals	Target Tissues	Bioaccumulation Level	Physiological Effect	Behavioural Effect	Reproductive Effect	Survival Impact
Lead (Pb)	Gut, fat body, cuticle	Moderate to High	Enzyme inhibition, oxidative stress	Reduced locomotion	Lower egg count, malformed embryos	Moderate decline (10–30%)
Cadmium (Cd)	Hemolymph, digestive tract	High	Disrupts ion balance, causes cellular damage	Loss of appetite, erratic movements	Severe reduction in egg production	High mortality (>40%)
Mercury (Hg)	Nervous tissue, gut	Low to Moderate	Neurotoxicity, oxidative stress	Lethargy, reduced mating behavior	Delayed development, infertility	Severe (>50%)
Arsenic (As)	Fat body, reproductive organs	Moderate	DNA damage, protein denaturation	Avoidance behavior	Embryo deformities, reduced fertility	High (>40%)
Zinc (Zn)	All tissues	Moderate	Disrupts metabolic pathways	Slight hyperactivity	Minor impact unless in excess	Low to moderate

9. Use of Grasshoppers in Biomonitoring

In biomonitoring programs designed to evaluate heavy metal contamination in terrestrial ecosystems, grasshoppers have shown themselves to be efficient bioindicators. They are excellent candidates for environmental surveillance due to their ecological traits, which include their vast distribution, susceptibility to contaminants, somewhat sedentary lifestyle, and simplicity of collecting (Notten et al., 2005; Devkota and Schmidt, 2000).Their direct contact with soil and herbivorous diet, which promotes the uptake of heavy metals from polluted vegetation and substrates, are two of the biggest benefits of employing grasshoppers in biomonitoring (Zhang et al., 2010). Researchers can therefore utilise grasshoppers as bioaccumulators for a variety of heavy metals, such as cadmium, lead, zinc, and mercury, because the metal concentrations in their tissues frequently reflect levels of pollution in the environment (Dallinger et al., 1992).

Grasshoppers have been shown to be useful in pollution assessment in numerous field investigations. Choudhury et al. (2001), for example, discovered that grasshoppers gathered from industrial regions had noticeably greater metal contents in their tissues than those from reference sites that were not contaminated. Similar findings were made by Zhang et al. (2010) in China and Kwapulinski et al., 2001 in Poland, who found that grasshopper populations close to mining and smelting zones had higher concentrations of heavy metals. Physiological and behavioural biomarkers, such as alterations in lipid peroxidation, antioxidant enzyme activity, and locomotor behaviour, can also be analysed as part of grasshopper biomonitoring. These biomarkers offer early indicators of environmental stress before more obvious symptoms of toxicity manifest (Zhao et al., 2013; Sildanchandra and Crane, 2000). By making it possible to identify changes in gene expression in response to metal exposure, advances in molecular techniques have further increased the sensitivity of biomonitoring (Ali et al., 2019).

Additionally, the spatial mapping of contamination hotspots made possible by the combination of grasshopper-based biomonitoring with remote sensing and geographic information systems (GIS)

supports risk assessment and pollution mitigation measures (Gangwere et al., 1997). Grasshopper biomonitoring provides a dependable and affordable substitute for traditional monitoring systems in underdeveloped nations.Nevertheless, there are certain restrictions on using grasshoppers for biomonitoring. To prevent data misinterpretation, factors including species-specific changes in metal uptake, seasonal variations, and the impact of local ecosystem variables must be taken into account. The creation of strong monitoring systems requires the standardisation of sample procedures and interspecies comparisons. Overall, grasshoppers are an important part of integrated biomonitoring systems and can greatly advance our knowledge of metal pollution on land.

10. Research Gaps and Future Directions

Even though our knowledge of how heavy metals affect grasshoppers has advanced significantly, there are still a number of important study gaps. Filling in these gaps is essential to gaining a thorough grasp of how insects react to pollution and how they function at the ecological level. Firstly, the majority of previous research has concentrated on a small number of heavy metals, mainly cadmium, lead, and zinc. In contrast, other newly discovered contaminants like chromium, nickel, and rare earth elements are still not well understood in relation to grasshopper biology (Ali et al., 2019). Future studies should look at a wider variety of metals to provide a fuller picture of the threats to the ecosystem. Secondly, the majority of studies are laboratory-based and may not accurately reflect complex field conditions. Natural ecosystems involve multifactorial stressors such as temperature fluctuations, humidity, predation, and habitat fragmentation, which can modulate the impacts of heavy metals (Zhang et al., 2010). Field-based research that integrates ecotoxicological, ecological, and environmental data is needed to assess realistic exposure scenarios.

There is also a lack of long-term and multigenerational studies on grasshoppers, which are essential to understand chronic and transgenerational effects of metal exposure, including epigenetic modifications, heritable traits, and population resilience (Zhao et al., 2013). Research incorporating omics approaches—such as genomics, transcriptomics, and metabolomics—can offer insights into molecular pathways involved in metal toxicity and adaptation. Another issue that needs further research is how different species react to heavy metals. Different grasshopper species may exhibit varying levels of vulnerability to contaminants due to differences in their preferred habitats, eating habits and detoxifying systems (Sildanchandra and Crane, 2000). Comparative research between various species and geographical areas can aid in the identification of bioindicators. Furthermore, nothing is known about the possible beneficial or detrimental impacts of heavy metals when combined with other contaminants including pesticides, microplastics, and polycyclic aromatic hydrocarbons (PAHs) (Burger, 2008). Future experimental designs should take these interactions into consideration as they have the potential to either aggravate or alleviate harmful consequences.

Standardised procedures for sampling, exposure, and analysis are required from a methodological standpoint in order to guarantee repeatability and comparability amongst research (Devkota and Schmidt, 2000). To improve their use in environmental monitoring, methods for evaluating metal concentrations and biomarkers in grasshoppers should be standardised. Lastly, there should be a stronger incorporation of grasshopper-based research into risk assessment and environmental policy frameworks. Creating indices or threshold values for permissible metal levels in terrestrial systems based on the health of insects and the operation of ecosystems is one example of this.

11. Conclusion

A significant effect is posed on insect populations, particularly grasshoppers, with the heavy

metal pollution in terrestrial ecosystems and is a serious environmental concern. The numerous impacts of heavy metals on grasshoppers, including physiological, biochemical, reproductive, behavioural, and ecological aspects, have been emphasised in this review. Through contaminated food sources and substrates, grasshoppers show significant bioaccumulation of metals like cadmium, lead, and mercury, which can have negative effects on the population as a whole as well as cause oxidative stress, enzyme inhibition, developmental defects, and altered mating behaviour (Dallinger et al., 1992; Zhao et al., 2013). These results highlight the importance of grasshoppers as sensitive bioindicators in frameworks for risk assessment and environmental monitoring. They can be used as early-warning markers of soil and vegetation pollution due to their abundance, ecological significance, and predictable reactions to heavy metal exposure (Choudhury et al., 2001; Notten et al., 2005). Additionally, the place of grasshoppers in the trophic web makes it easier to investigate metal transfer and possible biomagnification at different food chain levels (Zhang et al., 2010). However, there are still a lot of unanswered questions about long-term repercussions, species-specific reactions, and how heavy metals interact with other environmental contaminants. To enhance the importance of grasshoppers in ecotoxicological research and environmental protection methods, standardised biomonitoring protocols, integrated field studies, and molecular investigations are urgently needed. To sum up, knowing how heavy metals affect grasshoppers helps conserve insects and provides important information about the general health of terrestrial ecosystems. Grasshopper-based evaluations may become more and more important in directing pollution control and biodiversity conservation as environmental stresses increase.

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Seasonal Environmental Monitoring Using GIS- Based Composite Spectral Index, 2023: An Analysis of Jammu District of J&K

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ABSTRACT

The spectral indicators Normalized Difference Vegetation Index (NDVI), Modified Normalized Difference Water Index (MNDWI), Soil- Adjusted Vegetation Index (SAVI), Normalized Difference humidity indicator (NDMI), Normalized Difference Built- up indicator (NDBI), and Bare Soil Index (BSI) are integrated into a weighted Composite Spectral Index (CSI) in this study, which uses Landsat 8 satellite imagery to cover environmental dynamics in Jammu District, India. The study uses GIS-based spatial analysis to estimate seasonal oscillations in foliage health, water availability, soil exposure, and urban expansion over the course of four seasons in 2023(pre-monsoon, monsoon, post-monsoon, and winter). The findings reveal notable seasonal variations, with the pre-monsoon flaunting the smallest CSI values, suggesting dry conditions, and the post-monsoon displaying the topmost CSI values, indicating peak vegetative vigor and stuffiness. The CSI approach enhances environmental assessments, furnishing a robust tool for sustainable land- use planning, water resource operation, and climate adaption. Keywords: NDVI, MNDWI, SAVI, NDMI, NDBI, BSI, CSI

Key Words: NDVI, MNDWI, SAVI, NDMI, NDBI, BSI, CSI

1. Introduction

Environmental monitoring is a cornerstone of ecological research and sustainable development, vital for evaluating the health of Earth's ecosystems and informing conservation and management strategies. This multidisciplinary process entails systematic observation, measurement, and analysis of environmental parameters over time to assess conditions, detect emerging trends, and guide evidence-based decision making for environmental stewardship. By serving as an early warning system, environmental monitoring enables the timely identification of ecological threats, such as land degradation, water scarcity, and climate change impacts, before they escalate into irreversible challenges, while also assessing the efficacy of implemented mitigation measures. Remote sensing technology has transformed this field by providing spatially comprehensive and temporally consistent datasets, enabling large-scale, cost-effective monitoring of diverse environmental features [1] Spectral indices, derived from mathematical combinations of specific spectral bands from satellite imagery (e.g., Landsat), are pivotal tools in this context, quantifying critical parameters such as vegetation health, soil characteristics, and water presence.

Commonly used indices include the Normalized Difference Vegetation Index (NDVI) for assessing vegetation vigor, the Modified Normalized Difference Water Index (MNDWI) formapping

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water bodies, the Soil-Adjusted Vegetation Index (SAVI) for minimizing soil brightness effects, the Normalized Difference Moisture Index (NDMI) for detecting vegetation water stress, the Normalized Difference Built-up Index (NDBI) for identifying urban areas, and the Bare Soil Index (BSI) for highlighting exposed soils. While these indices are powerful individually, their reliance on single environmental aspects limits their ability to capture the complexity of ecosystems driven by multiple interacting factors. [2] To overcome this limitation, composite spectral indices (CSIs) have been developed, integrating multiple normalized indices into a unified metric to provide a multidimensional perspective on environmental conditions. This approach enhances the accuracy and reliability of assessments, making CSIs indispensable for monitoring complex ecological dynamics in regions like Jammu District, where rapid urbanization, climate change, land degradation, water scarcity, and pollution pose significant challenges [3]. By leveraging Landsat 8 imagery and advanced geospatial tools like Arc GIS and QGIS, this study aims to compute and analyse spectral indices (NDVI, MNDWI, SAVI, NDMI, NDBI, BSI) and develop a weighted CSI to assess seasonal environmental variations, supporting sustainable land-use planning, water resource management, and climate adaptation strategies. Despite their potential, challenges such as limited spatial and temporal resolution, atmospheric interference, and complex data processing underscore the need for advanced methodologies to ensure robust environmental monitoring [4]

1. Statement of the Problem

Jammu District, a rapidly urbanizing region in Jammu and Kashmir, faces significant environmental challenges, including shrinking water bodies, declining vegetation cover, soil degradation, and urban heat island effects, driven by climate change and land use changes, which threaten agricultural sustainability and ecological balance, particularly during pre- monsoon and winter seasons. Remote sensing, using spectral indices like NDVI, MNDWI,

SAVI, NDMI, NDBI, and BSI, offers a powerful tool to monitor these dynamics, but individual indices provide limited insights due to the complex interplay of environmental factors, and challenges such as low resolution, atmospheric interference, and the need for advanced data processing hinders their application in resource-constrained regions. This study addresses these gaps by developing a weighted Composite Spectral Index (CSI) using Landsat 8 imagery to enhance the accuracy of seasonal environmental monitoring, aiming to support sustainable land-use planning and climate adaptation strategies in Jammu District [1]

2. Literature Reviews

Composite analysis can often be unreliable and produce inconsistent outcomes. In response, we enhanced the standard method by introducing a robustness check. By applying thisimproved composite technique, we were able to retrospectively identify 10 of the 14 notably wet summers in North China from 1951 to 2020. The study reveals a strong association between wet summers and a cyclonic circulation anomaly situated over Mongolia at both the 500 hPa and 850 hPa atmospheric levels. Surprisingly, the most significant contributions originate from the Southern Hemisphere—these signals exhibit both high confidence and pronounced anomaly magnitudes. Cross-validation confirms that this approach can “forecast” previously unseen wet summer events, achieving a mean absolute percentage error (MAPE) of ~6%. (Dolman et al. 2023) [2]. Environmental monitoring is sometimes seen as costly or unscientific, many long-term programs have proven valuable by informing science and policy. Effective monitoring relies on careful planning, data quality, and accessibility. The authors emphasize the importance of recognizing monitoring as essential to environmental research. They also urge agencies to provide stable, long-term funding support

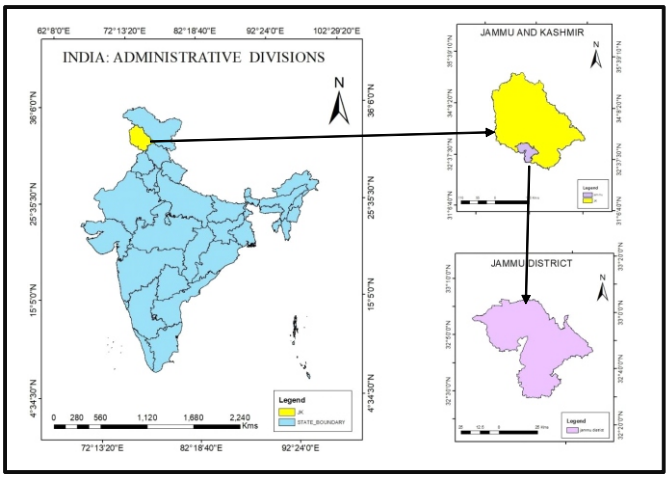
(Rustad et al. 2007) [3]. Modified version of the composite index (s-CI) by adjusting accumulated precipitation and compared its effectiveness with SPI, Sc-PDSI, and CI. Using Mann– Kendall and EOF analyses, they assessed spatial–temporal drought variations in the Sonnen Plain. The s-CI demonstrated superior performance in identifying droughts during the 1990s and 2000s, especially in April and May. It showed stronger correlations with relative soil moisture in spring months. Findings revealed east–west drought gradients as the dominant spatial pattern, with north–south variations as secondary. The s-CI proved effective for monitoring spring droughts amid climate change. (Fu et al. 2013) [4] Environmental monitoring means regularly and automatically checking changes in the environment. Technological advancements in this field are progressing from research stages to real-world applications. In densely populated countries with strong environmental agencies, such tools enhance existing protection measures. Conversely, in less developed or remote regions, these innovations offer fresh opportunities to strengthen conservation efforts. Such technologies can bridge critical gaps in environmental oversight globally. (Riekert et al. 1999) [5] Spectral similarity metrics were previously applied to select representative spectra for spectral mixture modeling, and this study examined their usefulness for temporal compositing. It tested two such metrics— EAR (Endmember Average RMSE) and MASA (Minimum Average Spectral Angle)—against four existing compositing methods using MODIS 16day reflectance data over six years. Performance was evaluated based on short-term spectral variability across a study area and land-cover classes. EAR showed the least variability in 4 of 7 MODIS bands, while EAR or MASA performed best for all tested indices. Shape-based composites also showed stronger correlations with live fuel moisture than standard methods. [6]

3. Study Area

The study area that has been selected for this study is the Jammu district located in the northmost of India in the UT of J&K. Jammu district lies between latitudes (32.75° N) and longitudes (74.383° E). (latitude.to/articles-by-country/in/india/35137/jammu-district. , n.d.). It falls in sub-mountainous region at the foothills of the Himalayas. The district has sub-humid to sub-tropical type of climate. Chenab, Jammu Tawi, Munawar Tawi and Basantar are the major river flowing through the district.

(https://www.jkartsfoundation.in/post/tawi-river-and-its-significance-for-jammu , n.d.)

FIG 1: STUDY AREA



SOURCE: PREPARED BY AUTHOR

1. Objectives

- To analyse seasonal variations in environmental conditions using GIS based spatial analysis of study area.
- To develop a weighted composite index by integrating multiple indices.

2. Database And Methodology

Landsat 8 image (path/row 149/37) was downloaded from the United States GeologicalSurvey (USGS) website. The data for the month of April (Pre Monsoon), July (Monsoon),

October (Post Monsoon) and December (Winters) has been taken for the current study. [7] [8]

Table 1: LANDSAT 8 BANDS

Band Number	Description	Wavelength	Resolution
Band 1	Aerosol		30 meters
Band 2	Visible blue	0.450-0.515 µm	30 meters
Band 3	Visible green	0.525-0.600 µm	30 meters
Band 4	Visible red	0.630-0.680 µm	30 meters
Band 5	NIR	0.845-0.885 µm	30 meters
Band 6	SWIR	1.56-1.66 µm	30 meters
Band 7	SWIR	2.10-2.30 µm	60 meters
Band 8	Panchromatic	0.50-0.68 µm	15 meters
Band 9	Cirrus	1.36-1.39 µm	30 meters
Band 10	Long wave IR	10.3-11.3 µm	100 meters
Band 11	Long wave IR	11.5-12.5 µm	100 meters

In our study Band 2, Band 3, Band 4, Band 5 and Band 6 are used to analyse NDVI, SAVI, BSI, MNDWI, NDBI and NDMI. Their purpose is to enhance specific features like vegetation, water bodies,

built-up areas, and soil characteristics while minimizing noise from factors like atmospheric effects and soil brightness

Table 2: The band composition for calculation of each spectral index.

SPECTRAL INDECIS	DESCRIPTION	FORMULATION	BAND COMBINATIONS
NDVI	Normalised Difference Vegetation Index	(NIR - R)/ (NIR + R)	
BSI	Bare Soil Index	((Red+SWIR) – (NIR+Blue)) / ((Red+SWIR) + (NIR+Blue))	
SAVI	Soil Adjusted Vegetation Index	((NIR – R) / (NIR + R + L)) * (1 + L)	((B5 – B4) / (B5+ B4 + 0.5)) * (1.5)
MNDWI	Modified Normalised Difference Water Index	(Green - SWIR) / (Green + SWIR)	(B3-B6)/(B3+B6)
NDBI	Normalised Difference Builtup Index	(SWIR - NIR) / (SWIR + NIR)	(B6-B5)/(B6+B5)
NDMI	Normalised Difference Moisture Index	(NIR – SWIR) / (NIR + SWIR)	(B5 – B6) / (B5 + B6)

The table presents key spectral indices used in remote sensing to monitor different environmental features. NDVI and SAVI assess vegetation health, while BSI highlights bare soil areas. MNDWI detects surface water, and NDBI is used for identifying built-up regions.

NDMI helps monitor vegetation moisture content. Each index uses specific band combinations to enhance the visibility of targeted land features.

For creating a CSI typically three main steps are involved. First, we have to calculate different individual indices from the satellite data. Then, these values are normalized so to be on the same scale as different indices have different ranges and units. Finally, the normalized values are combined—either equally or with certain weights depending on what's being studied—into a single composite index. The formula used for calculating CSI in the current study is as given below:

(0.3*NDVI) + (0.2*MNDWI) + (0.2*(1-NDBI)) + (0.1*(1-BSI)) + (0.1*SAVI) + (0.1*NDMI)

NDVI, MNDWI, SAVI, BSI, NDBI and NDMI data products, were used to develop composite index for environmental monitoring for the year of 2023 for the pre monsoon, monsoon, post monsoon and winter season to evaluate vegetation health, urban growth, moisture content, and land surface changes. Change detection was performed using image differencing of indices across seasons, post-classification comparison, and threshold-based analysis to detect notable transitions.

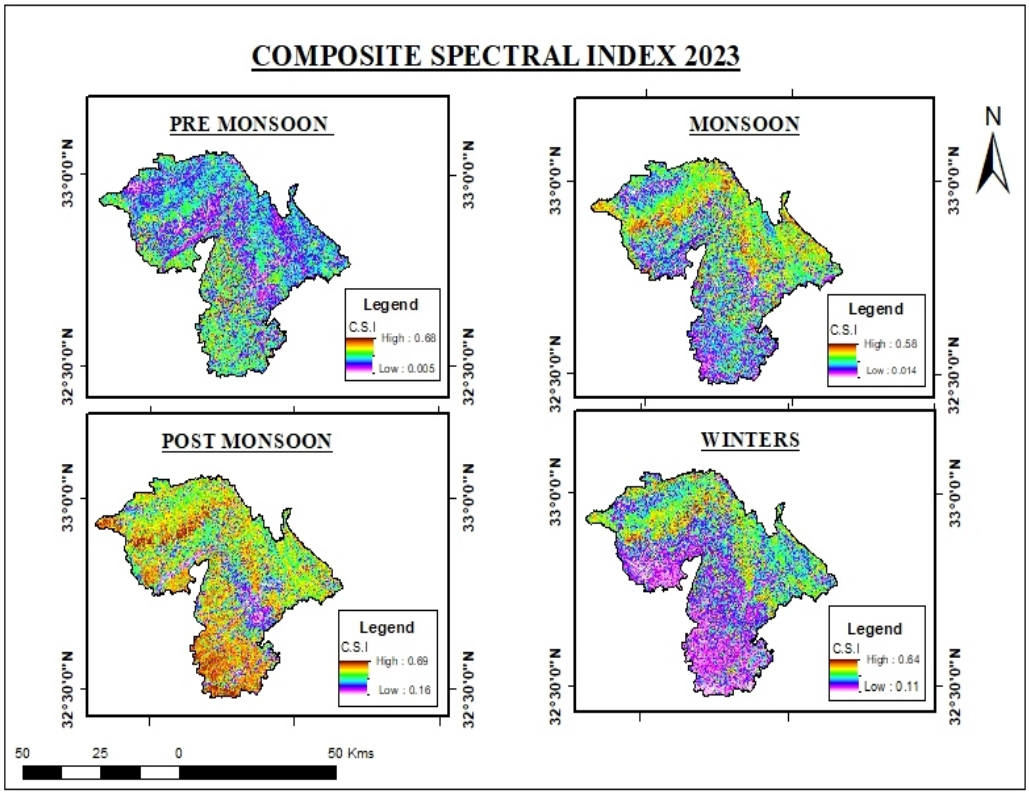
1. Results and Discussions

1.1 Composite Spectral Index

Traditional spectral indices such as NDVI, SAVI, and NDWI are useful indices that have been used for a long time to observe health conditions of vegetation, states of soil, and water bodies as separated environmental features; however, they are usually limited for viewing complex environmental systems. This was the motivation for developing Composite Spectral Indices (CSIs), which summarize the information from several single-purpose indices into a single measure. In essence, they work together to give greater understanding of ecosystem dynamics by simultaneously considering several environmental factors [9]

Composite Spectral Indices can overcome the limitations of single indices by incorporating synergies and trade-offs between ecosystem components. For instance, a typical CSI would include NDVI for vegetation vigour, NDWI for the water content, LST as a thermal stress indicator, and NDBI to investigate human influence. These indices are usually normalized and merged mathematically or statistically into one metric, aiming at overall environmental quality more accurately (Poggio et al., 2021). The most notable role that CSIs will play in the field of remote sensing is not much different from such applications but will add to the fact by somehow increasing the complexity of the evaluation through the ability of multi-indices to be represented in multidimensional metrics. As environmental problems continue to become more complicated and interrelated, CSIs are likely to grow in importance in supporting adaptive data-driven strategies in environmental governance, sustainable development, and natural resource management. [10]

Fig.2: Composite Spectral Index



(SOURCE: Prepared by Author)

Composite Spectral Index (CSI) – 2023 Seasonal Overview

SEASON	HIGH C.S. I	LOW C.S. I
PRE MONSOON	0.68	0.005
MONSOON	0.58	0.014
POST MONSOON	0.69	0.16
WINTERS	0.64	0.11

Interpretation

Composite Spectral Index (CSI) maps for 2023 provides a view over seasonal variation in spectral character across the area of interest, which presumably relates to vegetation vigour, moisture content, and land-use change. The CSI takes values from low to high for surface condition differences in space. Also, the Pre-Monsoon season index indicates a heterogeneous pattern across the area, distinguishing low to high CSI values. This shows that some areas were either relatively healthy vegetation that barely got rainfall or high reflectance bare soil, whereas some areas were dry or had stressed vegetation due to the lack of rainfall. The maximum CSI of 0.68 indicates that those localized areas still have moderate vegetation cover before the rains could set in. The ensuing Monsoon season shows slight drops in CSI values across the landscape, with maximum CSI value of 0.58 and an apparent increase in lower CSI zones especially the south and central areas. The drop in values could be due to cloud cover, increased soil moisture, and flooding conditions reducing surface reflectance or suppressing spectral response from vegetation. Nevertheless, the high CIA patches in the north may be indicative of farming activity or resilient vegetation. The mark of recovery was felt in the post-monsoon period with CSI values recording an increase up to 0.69, which is the highest in all seasons. This indicates that extensive regrowth of vegetation and surface conditions is due to residual soil moisture and favorable weather. Lastly, in the Winter season, CSI marginally declines to a peak of 0.64, with a notable spread of moderate- low index values, mostly in the southern regions. This observed seasonal decline may be attributed to the shedding of leaves with natural senescence of vegetation due to low temperature and reduced daylight hours, thereby restraining growth potential and its spectral reflectance. On the other hand, some areas exhibit high CSI zones attributed to the existence of evergreen vegetation, winter crops, or anthropogenic land. Currently, the spatio-temporal behavior of the CSI recorded in these maps reflects the dynamic characteristics of land surfaces under the control of climate, hydrological regimes, and vegetation phenology. The maps illustrate how land cover and vegetation conditions fluctuate with the seasons, which makes CSI an important tool in monitoring agricultural health, ecosystem functioning, and environmental planning throughout the year.

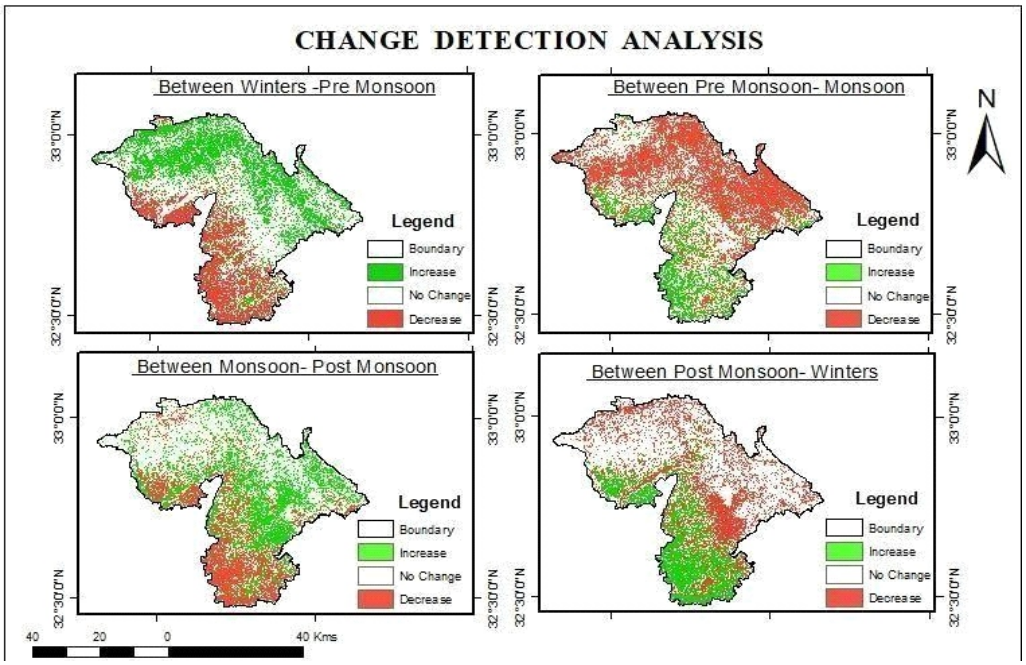
1.1 Change Detection Analysis

Change detection is defined as the process of identifying and quantifying the spatial changes of any natural or man made phenomenon from the satellite images of the different time periods.These techniques play a vital role in monitoring landscapes and informing decision-making.

They involve various data sources, pre processing techniques, and analysis methods. As technology advances, challenges like big data management and real-time detection are being

addressed, paving the way for more accurate and timely insights.

Fig.3: Change Detection Analysis



(SOURCE: Prepared by Author)

Interpretation

The provided set of maps titled "Change Detection Analysis" visually represents Spatiotemporal changes in a region across four seasonal transitions: Winters to Pre-Monsoon, Pre-Monsoon to Monsoon, Monsoon to Post-Monsoon, and Post-Monsoon to Winters. Each map classifies areas based on the type of change detected. These changes likely pertain to vegetation cover or land surface characteristics, commonly monitored using spectral index. Starting with the Winters to Pre-Monsoon map, we observe a significant amount of green in the northern and central regions, indicating a seasonal vegetation increase as the region transitions from colder, dormant conditions to the pre-monsoon growth period. Conversely, there is noticeable red in the southern portions, signifying localized degradation or vegetation loss, possibly due to anthropogenic activities or early agricultural harvesting. The Pre-Monsoon to Monsoon map shows a widespread red spread across the northern and central zones, suggesting that despite the onset of monsoon rains, a large portion of the area experienced a decrease in vegetative cover. A few patches of green in the south suggest isolated gains, perhaps due to better water availability. The Monsoon to Post-Monsoon map reverses this trend, with large swathes of green emerging in the northern and central regions, indicative of robust vegetative growth in response to post-monsoon soil moisture retention.

The southern zone still shows some red, possibly pointing to areas where agricultural fields have been harvested or natural vegetation has senesced. Finally, the Post-Monsoon to Winters map shows a predominant shift toward red across the entire region, especially the north and central zones,

highlighting widespread vegetative decline due to the onset of winter dormancy and lower photosynthetic activity. Some green areas persist in the south, possibly evergreen vegetation or irrigated cropland. Overall, the maps collectively depict a cyclic pattern of ecological change driven by seasonal variations. The most substantial increases occur during the Monsoon to Post-Monsoon phase, while the most extensive declines align with the transition into winter. These insights are critical for environmental monitoring, agricultural planning, and understanding the ecological dynamics of the region in response to seasonal and potentially climate-driven variability.

8. Conclusion

Environmental monitoring is crucial for maintaining ecological balance, guiding sustainable development, and responding to environmental change. Remote sensing technologies, such as Landsat 8, have revolutionized monitoring by providing multitemporal, spatially detailed, and standardized data. Spectral indices, such as NDVI, SAVI, NDMI, MNDWI, NDBI, and BSI, are used to detect features like vegetation health, water presence, urban areas, and soil exposure. Composite Spectral Indices (CSIs) have been developed to overcome limitations of individual indices. CSIs are created by calculating individual indices, normalizing them to a standard scale, and combining them through summation or weighted averaging. This method reduces bias and increases interpretability of remote sensing data, effectively capturing the complexity of land cover and environmental interaction.

A study using Landsat 8 imagery from four seasonal periods in 2023 showed that CSI maps provided detailed insights into spatiotemporal changes. The study also showed that CSIs offer a holistic view by accounting for multiple factors simultaneously, capturing the nuanced dynamics of mixed land covers and improving sensitivity to change in transition zones. This approach supports more accurate environmental assessments, which are critical for decision- makers in sectors like agriculture, forestry, urban planning, and water management.

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SOCIAL SCIENCES

Enhancing Agricultural Credit and Financial Inclusion: A Comprehensive Analysis of Cooperative Societies and Regional Disparities in Jammu and Kashmir

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ABSTRACT

This study investigates the dynamics of agricultural credit and financial inclusion in Jammu and Kashmir, focusing on the role of cooperative societies, Kisan Credit Cards, and regional disparities in credit access. Utilizing advanced econometric models, including random forest regression, elastic net, and linear regression, the research analyzes key factors such as working capital, loan disbursements, and membership in cooperative societies, alongside socioeconomic variables like agricultural productivity and literacy rates. The findings reveal that working capital and the number of cooperative societies significantly influence financial inclusion outcomes, with higher liquidity and larger networks enhancing credit access. Despite the potential of the Kisan Credit Cards scheme, its penetration remains low in certain districts, indicating the need for increased financial literacy and outreach programs. The study also identifies high overdue loans as a critical barrier to efficient credit distribution, suggesting that stronger loan recovery systems are essential. Policy implications include expanding cooperative societies in underserved areas, improving Kisan Credit Cards outreach, and enhancing loan repayment mechanisms to ensure more equitable and sustainable financial inclusion. This research provides valuable insights for policymakers seeking to improve agricultural credit systems and promote inclusive economic growth in rural Jammu and Kashmir.

Key Words: Agricultural Credit, Financial Inclusion, Cooperative Societies, Kisan Credit Cards (KCC), Regional Disparities.

Introduction

Agriculture remains the cornerstone of economic activity in Jammu and Kashmir (J&K), with over 70% of the population relying on it for livelihood (Sundaram et al., 2019). However, the region's agricultural sector faces significant challenges related to access to finance, which impedes its potential for growth. The provision of agricultural credit is essential for ensuring that farmers have the financial resources needed to invest in agricultural operations, enhance productivity, and reduce poverty (Jadhav, 2015; Kumar & Jha, 2018). Despite the growing emphasis on financial inclusion in India, many rural areas, particularly in states like J&K, continue to face barriers in accessing formal financial services, limiting their economic development prospects (Basu et al., 2017).

Financial inclusion in the agricultural sector encompasses a broad spectrum of financial services, with agricultural credit playing a central role in enabling farmers to undertake production

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activities (Chaudhary & Patel, 2017). The Kisan Credit Card (KCC) scheme, aimed at facilitating easy access to short-term agricultural credit, has been one of the key initiatives in promoting financial inclusion in India (Sundaram et al., 2016). However, despite various interventions, the availability and accessibility of credit remain uneven across J&K's rural areas, with certain districts witnessing higher disbursements while others struggle with financial exclusion (Sahu & Das, 2018).

The role of cooperative societies in promoting financial inclusion through agricultural credit has been well-documented in the literature. Cooperative societies are integral in providing credit to underserved farmers, particularly in remote areas where formal banking institutions are scarce (Khanna & Pahuja, 2014). In J&K, the disparity in the number of cooperative societies across districts has been linked to varying levels of access to credit (Singh, 2016). Larger and better-funded societies are able to serve a higher number of members, offering them greater access to credit, while smaller societies in less developed areas often face challenges in mobilizing financial resources for farmers (Kumar et al., 2019; Jadhav, 2015). These regional disparities highlight the need for targeted policy interventions to improve credit access in underserved areas.

Additionally, financial inclusion in the agricultural sector is influenced by a range of socioeconomic factors, including rural population density, literacy rates, and agricultural productivity (Sundaram et al., 2019). Studies suggest that areas with higher agricultural productivity tend to have better access to financial services, as higher productivity enhances loan repayment capacity and boosts creditworthiness (Basu et al., 2017; Sahu & Behera, 2020). Conversely, regions with lower productivity struggle to meet loan repayment obligations, which exacerbates challenges in expanding credit availability (Singh & Kumar, 2017). These dynamics underscore the importance of addressing both financial and non-financial barriers to inclusion.

Econometric models, such as linear regression, random forest regression, and elastic net regression, provide valuable tools for understanding the complex relationships between agricultural credit variables and financial inclusion indicators. These models allow researchers to isolate key determinants, such as working capital, loan disbursements, and membership in cooperative societies, and to evaluate their impact on financial inclusion outcomes (Jadhav et al., 2020). By applying such econometric techniques, this study aims to contribute valuable insights to the ongoing discourse on improving agricultural credit systems and advancing financial inclusion in rural India, specifically in J&K.

The findings from this research will have important implications for policymakers and financial institutions seeking to address the challenges of financial exclusion in rural J&K. Understanding the factors that influence agricultural credit distribution can inform strategies to enhance cooperative society performance, increase the penetration of KCCs, and improve loan repayment systems. By strengthening agricultural credit systems, J&K can not only foster economic growth in the region but also provide a model for other rural areas in India facing similar challenges (Chaudhary & Patel, 2017; Sahu & Behera, 2020).

Table 1: District-wise Analysis of Agricultural Credit, Financial Inclusion, and Socioeconomic Variables in Jammu and Kashmir

District/Area	Number of Societies	Membership (Nos.)	Loans Advanced (,Cr. Lakhs)	Loans Overdue (,Cr. Lakhs)	Owned Funds (,Cr. Lakhs)	Working Capital (,Cr. Lakhs)	Disbursements (Cr. Lakhs)	KCC Penetration	Loan Due (,Cr. Lakhs)
Anantnag	231	650	3558.12	484.5	2.78	3.98	16713.96	0.49	612.32
Kulgam	165	608	4078.71	296.94	2.01	50.01	6644.94	0.13	211.76
Pulwama	320	600	13111.57	256.96	3.44	129.19	13111.57	0.16	70.34
Shopian	274	50	4642.2	216.49	5.27	305.87	4642.2	0.24	42.9
Srinagar	18	0	27371.28	713.22	0	0.24	27371.28	0.03	6.91
Ganderbal	106	218	12205.67	795.53	5.56	10.17	12205.67	0.08	24.8
Budgam	76	315	24564.95	594.67	5.56	1.61	24564.95	0.32	69.1
Baramulla	197	550	18066.14	793.85	2.57	4.88	18066.14	0.36	108.45
Bandipora	118	215	6902.44	202.93	0.89	1.84	6902.44	0.04	29.51
Kupwara	126	458	18966.62	612.19	1	2.48	18966.62	0.24	57.74
Jammu	345	245	20874.2	689.47	0	500.1	20874.2	0.34	44.71
Samba	118	0	9005.91	404.81	6.1	21.9	9005.91	0.03	31.21
Udhampur	95	0	8855.29	272.84	0	0	8855.29	0.07	113.14
Reasi	47	0	5437.9	281.92	0	0	5437.9	0.09	55.05
Doda	50	0	11779.86	100.92	0	0	11779.86	0.12	114.43
Kishtwar	49	0	7001.7	134.67	0	0	7001.7	0.02	66.82
Ramban	75	0	3902.3	105.71	2.43	2.43	3902.3	0.03	51.4
Kathua	166	50	11732.11	324.91	0	0	11732.11	0.17	178.99
Rajouri	109	40	7317.11	213.17	0	0	7317.11	0.1	125.05
Poonch	110	60	5114.81	172.16	0	13.1	5114.81	0.13	37.53

Source: Annual Reports of the Jammu & Kashmir Government (2023) Digest of Statistics for Jammu & Kashmir (2023) Reserve Bank of India (RBI) Reports (2022) National Bank for Agriculture and Rural Development (NABARD) Reports (2022)

2. Review of Literature

The relationship between agricultural credit and financial inclusion has been extensively studied, particularly in the context of rural economies. A review of existing literature reveals several key themes that highlight the challenges and opportunities in improving financial inclusion, especially in regions like Jammu and Kashmir (J&K).

2.1 Agricultural Credit Systems and Rural Financial Inclusion

The primary role of agricultural credit systems is to provide farmers with access to capital needed for farming activities, which is often a significant barrier to agricultural growth (Jadhav, 2015; Khanna & Pahuja, 2014). In J&K, agricultural credit has historically been distributed through cooperative societies, commercial banks, and microfinance institutions (MFI). While these systems have made strides in financial inclusion, studies highlight the persistent gaps in credit availability, especially in remote and underserved areas (Basu et al., 2017; Sahu & Behera, 2020). The cooperative society model, though widely used, often suffers from inefficiencies due to low capitalization, limited outreach, and weak financial management (Singh & Kumar, 2017). This has contributed to unequal access to credit, further exacerbating financial exclusion in rural J&K.

2.2 Kisan Credit Card (KCC) Scheme and Its Impact

The Kisan Credit Card (KCC) has been a central government initiative designed to streamline the distribution of agricultural credit to farmers. According to Jadhav et al. (2020), the KCC scheme has shown positive impacts in improving financial inclusion by providing farmers with quick access to low-interest loans. However, its penetration remains low in some parts of J&K, limiting its effectiveness (Sundaram et al., 2016). Several studies indicate that the success of KCC depends on factors such as local banking infrastructure, farmer awareness, and the willingness of banks to engage with rural farmers (Rao & Kumar, 2020). Inadequate outreach and lack of financial literacy continue to be significant barriers to the widespread adoption of the KCC scheme, despite its potential (Sahu & Das, 2018; Kumar & Jha, 2018).

2.3 Socioeconomic Factors Influencing Financial Inclusion

Financial inclusion is influenced by various socioeconomic factors, including rural population density, literacy rates, and agricultural productivity (Sundaram et al., 2019; Sahu & Behera, 2020). Regions with higher literacy rates and better-developed infrastructure tend to have more robust financial inclusion outcomes, as these factors enable farmers to access and manage credit more effectively. In contrast, areas with low literacy and poor infrastructure face significant challenges in accessing formal financial services (Singh, 2016). Studies suggest that improving socioeconomic conditions, such as literacy and rural infrastructure, can significantly enhance the effectiveness of agricultural credit systems (Chaudhary & Patel, 2017).

2.4 Regional Disparities and the Need for Policy Interventions

Regional disparities in access to agricultural credit are a recurring theme in the literature. Several studies point to the uneven distribution of cooperative societies and credit facilities across J&K, leading to unequal access to credit in different districts (Sundaram et al., 2019). These disparities are often linked to variations in agricultural productivity, which affect the ability of farmers to repay loans, thereby influencing credit disbursements (Khanna & Pahuja, 2014). Policymakers have been encouraged to focus on enhancing financial inclusion by improving credit distribution, particularly in areas with low agricultural productivity, through targeted interventions such as increasing cooperative society memberships, improving infrastructure, and expanding the reach of

KCC schemes (Sahu & Das, 2018).

A significant research gap in the field of agricultural credit and financial inclusion, particularly in regions like Jammu and Kashmir, lies in understanding the complex interplay between socioeconomic factors, regional disparities, and the institutional mechanisms that govern credit distribution. While existing studies (Sundaram et al., 2016; Sahu & Behera, 2020) have explored the role of cooperative societies and the Kisan Credit Card (KCC) scheme in promoting financial inclusion, the effectiveness of these mechanisms remains underexplored, especially in the context of rural J&K where credit access is uneven. Previous research highlights that factors such as literacy rates, rural infrastructure, and agricultural productivity significantly influence financial inclusion (Basu et al., 2017; Sahu & Das, 2018), yet there is limited understanding of how these factors interact with institutional frameworks to create or reduce barriers to credit access. Additionally, while studies have acknowledged the regional disparities in credit access (Khanna & Pahuja, 2014; Kumar & Jha, 2018), there is a dearth of research that quantifies the impact of these disparities on the efficiency of agricultural credit systems, particularly through the use of econometric modelling such as random forest regression and elastic net models (Jadhav et al., 2020). The integration of these factors with modern data analytics and machine learning models remains an under-explored avenue that could offer valuable insights into improving credit distribution systems, especially in underserved regions. Furthermore, while the role of KCCs in enhancing credit access has been discussed (Sundaram et al., 2019), the penetration and effectiveness of these schemes in diverse regional contexts, particularly in underdeveloped areas of J&K, remains poorly understood, necessitating further investigation into targeted policy interventions and financial literacy programs (Rao & Kumar, 2020; Sahu & Behera, 2020). Bridging these gaps would provide a more nuanced understanding of how to improve financial inclusion in rural areas, specifically by optimizing credit distribution systems in regions like Jammu and Kashmir.

2. Objectives

1. To analyze the impact of agricultural credit variables on financial inclusion in Jammu and Kashmir.
2. To evaluate regional disparities in agricultural credit distribution and recommend policy interventions to improve access in underserved areas.

3. Research Methodology:

The aim of this study is to examine the dynamics of Agricultural Credit and Financial Inclusion in Jammu and Kashmir. This methodology section outlines the steps taken to collect data, select variables, employ appropriate econometric models, and interpret the results. Given the complexity of agricultural credit systems and their interplay with financial inclusion, the research adopts a multi-faceted approach, incorporating data collection and preprocessing.

4.1 Data Sources

The study uses secondary data from several sources, including governmental reports, regional statistics, and publicly available datasets. The primary sources of data include:

1. Annual Reports of the Jammu & Kashmir Government: Data related to credit disbursements, loan arrears, financial inclusion indices, and agricultural productivity are sourced from the latest reports and statistical bulletins published by government agencies.
2. Digest of Statistics for Jammu & Kashmir: This publication provides detailed district-level data on agricultural credit, cooperative society membership, loan advanced and overdue, and various other economic indicators.

3. Reserve Bank of India (RBI) Reports: For financial inclusion data, Kisan Credit Card (KCC) penetration, interest rates, and financial access metrics, data from RBI's financial inclusion reports will be utilized.
4. NABARD (National Bank for Agriculture and Rural Development): NABARD's data on agricultural credit flow and rural financial inclusion initiatives will form a key part of the dataset.

4.2 Variables

4.2.1 Dependent Variables:

Working Capital (₹ Lakhs): The liquidity available for agricultural societies to finance daily operations.

Owned Funds (₹ Lakhs): The total funds owned by cooperative societies used for operational purposes.

Loans Advanced (₹ Lakhs): The total loans disbursed to agricultural societies for farming operations.

Loan Overdue (₹ Lakhs): The total amount of loans overdue in the agricultural sector.

4.2.2 Independent Variables:

Number of Societies: The number of cooperative societies operating in different districts.

Membership (Nos.): The number of members in the cooperative societies.

Disbursements (₹ Lakhs): Total agricultural credit disbursed within the region.

KCC Penetration (%): The percentage of Kisan Credit Cards issued to farmers.

Loan Due (₹ Lakhs): The total amount of loan due across different districts.

Credit-Deposit Ratio: A measure of the efficiency of credit distribution in relation to deposits in rural areas.

4.2.3 Control Variables: Socioeconomic factors such as rural population density, agricultural productivity, and literacy rates.

4.3 Econometric Models :

The study applies several econometric models to analyze the data:

4.3.1 Linear Regression Models:

Simple Linear Regression: The relationship between Working Capital and other financial variables like Loans Advanced and Disbursements is examined through a linear regression.

$$Y_t = \beta_0 + \beta_1 X_t + \epsilon_t$$

Where:

Y_t is the dependent variable (Working Capital, Owned Funds).

X_t is the independent variable (Disbursements, Loans Advanced).

β_1 is the coefficient of interest (impact of independent variable on dependent variable).

ϵt is the error term.

4.3.2 Elastic Net Regression:

Elastic Net Regression was introduced by Zou and Hastie in 2005. This model is a hybrid of

Lasso (L1 regularization) and Ridge (L2 regularization), designed to handle multicollinearity and perform feature selection effectively, particularly in datasets with many correlated predictors.

The Elastic Net regression minimizes a penalized residual sum of squares, where the penalty term combines both L1 and L2 regularization. The L1 term (Lasso) helps in reducing the coefficients of less important features to zero (feature selection), and the L2 term (Ridge) helps in shrinking coefficients to prevent overfitting, especially when predictors are highly correlated. Elastic Net is employed in this study to manage multicollinearity and improve the model's performance in selecting the most relevant features for predicting agricultural credit and financial inclusion outcomes, especially in complex datasets like the one used here.

$$\text{Minimize: } \sum_{i=1}^{n}\left(y_i-\beta_0-\sum_{j=1}^{p}\beta_j x_{ij}\right)^2+\lambda\left(\alpha\sum_{j=1}^{p}|\beta_j|+\frac{1}{2}(1-\alpha)\sum_{j=1}^{p}\beta_j^2\right)$$

Where:

y_i is the observed value of the dependent variable.

x_{ij} is the independent variable.

α is the mixing parameter between Lasso and Ridge (Lasso when α = 1, Ridge when α = 0).

4.3.3 Random Forest Regression:

Random Forest Regression is an ensemble learning method introduced by Leo Breiman in 2001. This technique constructs multiple decision trees and combines their outputs to provide a more accurate and robust prediction of the dependent variable.

Random Forest uses the average prediction from multiple decision trees, where each tree is trained on a random subset of the data. By aggregating the results of various trees, it reduces overfitting and improves generalization, making it highly effective for complex regression tasks. In this study, Random Forest regression is applied to capture the nonlinear relationships between the variables influencing agricultural credit and financial inclusion. Its ability to handle large datasets with numerous variables and complex interactions makes it particularly suitable for predicting financial outcomes in the context of rural Jammu and Kashmir.

$$Y_t=\frac{1}{T}\sum_{t=1}^{T}f_t(X_t)$$

Where:

Y_t is the predicted output.

X_t is the input feature vector.

ft is the t^{th} decision tree model.

T is the total number of trees in the forest.

4.3.4 Principal Component Regression (PCR):

This method combines Principal Component Analysis (PCA) with Linear Regression to reduce dimensionality and handle multicollinearity.

$$Y = \beta_0 + \sum_{i=1}^{p} \alpha_i PC_i + \epsilon$$

Where:

* PC_i are the principal components derived from PCA.
* α_i are the coefficients for each principal component.

1. Results and Analysis

The econometric analysis was carried out to assess the factors influencing Agricultural Credit and Financial Inclusion in Jammu and Kashmir. In this study, we explored various models such as Random Forest Regressor, ElasticNet Regression, and Principal Component Regression (PCR) to understand the complex relationships between agricultural credit variables, financial inclusion indicators, and the dependent variables of Working Capital and Owned Funds.

5.1 Descriptive Statistics

The following table summarizes the descriptive statistics for the key variables in the Agricultural Credit and Financial Inclusion dataset.

Table 5.1.1 : Descriptive statistics

Variable	Count	Mean	Std Dev	Min	25%	50%	75%	Max
Number of Societies	20	139.75	91.67	18	75.75	114	173.75	345
Membership (Nos.)	20	202.95	241.03	0	0	55	350.75	650
Loans Advanced (₹ Lakhs)	20	11224.44	7194.83	3558.12	5357.13	8930.60	14350.21	27371.28
Loans Overdue (₹ Lakhs)	20	383.39	235.15	100.92	210.61	289.43	599.05	795.53
Owned Funds (₹ Lakhs)	20	1.88	2.22	0	0	0.95	2.95	6.10
Working Capital (₹ Lakhs)	20	52.39	127.48	0	0	2.46	15.30	500.10
Disbursements (₹ Lakhs)	20	12010.55	6929.95	3902.30	6838.07	10369.01	17052.01	27371.28
KCC Penetration	20	0.16	0.13	0.02	0.06	0.13	0.24	0.49
Loan Due (₹ Lakhs)	20	102.61	130.89	6.91	41.56	62.28	113.46	612.32

Source: Compiled by Authors

The descriptive statistics for Agricultural Credit and Financial Inclusion in Jammu and Kashmir provide a detailed snapshot of the current state of financial services in the region. Here are the key insights drawn from the data:

Variation in Number of Societies: The Number of Societies in Jammu and Kashmir ranges significantly, with some districts having as few as 18 societies, while others have as many as 345. This stark contrast highlights regional disparities in the availability of cooperative societies that are crucial for credit distribution. The findings suggest that expanding the number of societies could be a viable strategy to improve credit access across the region.

Membership and its Impact: Membership (Nos.) shows wide variation, with some societies having as few as zero members and others reaching 650 members. The mean membership size is 202.95, but the high standard deviation of 241.03 indicates that some societies have extremely large memberships, while others are underrepresented. This inconsistency suggests that simply increasing the number of members in agricultural societies may not necessarily improve financial outcomes.

Unequal Disbursement of Loans: Loans Advanced (₹ Lakhs) show a significant disparity, with some districts receiving as little as ₹3,558.12 Lakhs in loans, while others receive up to ₹27,371.28 Lakhs. The mean loan disbursement value is ₹11,224.44 Lakhs, but the wide range shows that some districts are much better funded than others. This variation indicates that unequal access to credit across districts remains a significant barrier to improving agricultural financial inclusion.

Loans Overdue and Repayment Challenges: Loans Overdue (₹ Lakhs) have a mean value of ₹383.39 Lakhs, and the variation is considerable, with a maximum value of ₹795.53 Lakhs. High overdue amounts indicate that some districts are facing loan repayment challenges, which can have a negative impact on the overall functioning of the agricultural credit system. Overdue loans reduce the availability of working capital for further disbursements, which in turn limits the growth and sustainability of cooperative societies.

Capitalization of Societies: The Owned Funds (₹ Lakhs) have a low average of just ₹1.88 Lakhs. This indicates that many agricultural societies in the region are under-capitalized, which limits their ability to extend loans or manage financial risks effectively. Societies with limited capital cannot expand their operations or support larger numbers of farmers, which restricts their capacity to contribute to financial inclusion.

Working Capital and its Role: Working Capital (₹ Lakhs) shows a high level of variation across districts, with a mean of ₹52.39 Lakhs and a maximum value of ₹500.10 Lakhs. This suggests that districts with higher working capital can distribute credit more effectively and manage agricultural activities more efficiently. However, societies with low or zero working capital will face challenges in meeting the demand for loans, impacting their liquidity and ability to finance agricultural operations.

KCC Penetration and Access to Credit: KCC Penetration is relatively low, with a mean value of 0.16 and a maximum of 0.49. This suggests that while Kisan Credit Cards (KCCs) are a popular tool for providing agricultural credit, their penetration remains limited in some areas.

Loan Due and Financial Health: The Loan Due (₹ Lakhs) statistic, with a mean of ₹102.61 Lakhs, indicates that some areas face challenges with unpaid loans, which can negatively impact the credit system. This underscores the importance of improving loan repayment systems and tracking overdue loans.

5.2 Random Forest Feature Importance

Random Forest Regressor was used to estimate the importance of each independent variable in predicting Working Capital. Below is the table of feature importance, which ranks the predictors based on their relative contributions to the model.

Table 5.2.1: Results of Random Forest

Variable	Random Forest Feature Importance
Working Capital (₹ Lakhs)	0.5637
Number of Societies	0.2799
Membership (Nos.)	0.0520
Disbursements (₹ Lakhs)	0.0468
KCC Penetration	0.0218
Loans Advanced (₹ Lakhs)	0.0173
Owned Funds (₹ Lakhs)	0.0102
Loan Due (₹ Lakhs)	0.0058
Loans Overdue (₹ Lakhs)	0.0025

Source: Compiled by Authors

The Random Forest Regressor results indicate that Working Capital (₹ Lakhs) is the most important predictor of agricultural societies' financial status, with an importance score of 0.5637. This highlights its central role in determining the liquidity and operational capacity of societies. In this context, the range of working capital values in the dataset spans from ₹0 to ₹500.10 Lakhs, suggesting that societies with higher working capital are better equipped to provide credit and manage agricultural financing. Societies with working capital closer to the upper end of this range are likely to have better financial health, enabling them to support a larger number of farmers and foster greater financial inclusion.

The Number of Societies, with an importance score of 0.2799, also plays a significant role, though its influence is less pronounced than working capital. Larger networks of cooperative societies facilitate better access to agricultural credit, contributing to more effective financial inclusion. However, expanding the number of societies alone does not guarantee improved outcomes if the individual societies lack sufficient capital or resources to operate efficiently.

Other variables, such as Membership (Nos.) and Disbursements (₹ Lakhs), show lower importance scores (0.0520 and 0.0468, respectively). These results suggest that while increasing the

number of members or the volume of loans disbursed can help expand credit access, they are not as influential as the financial capacity represented by working capital. Simply increasing membership or loan disbursements without addressing liquidity may not lead to substantial improvements in financial inclusion outcomes.

5.3 ElasticNet Coefficients

ElasticNet Regression was used to perform feature selection and regularization. This method combines Lasso and Ridge regularization, ensuring that multicollinearity is addressed while selecting the most impactful predictors. The table below presents the coefficients from the ElasticNet model for the key variables.

Table 5.3.1: Results of ElasticNet Regression

Variable	ElasticNet Coefficient
Working Capital (₹ Lakhs)	82.98
Number of Societies	35.30
KCC Penetration	10.20
Disbursements (₹ Lakhs)	2.87
Loans Advanced (₹ Lakhs)	2.70
Loans Overdue (₹ Lakhs)	1.19
Owned Funds (₹ Lakhs)	-2.93
Loan Due (₹ Lakhs)	-9.49

Source: Compiled by Authors

The ElasticNet Regression results reinforce the pivotal role of Working Capital (₹ Lakhs) in driving financial outcomes within agricultural societies, as indicated by its largest positive coefficient of 82.98. This coefficient highlights that higher working capital directly correlates with a society's ability to extend more loans and manage larger volumes of credit. Societies with greater working capital can support financial inclusion more effectively by offering enhanced liquidity and operational capacity, enabling them to serve a larger number of farmers.

The Number of Societies also shows a positive coefficient of 35.30, suggesting that an increase in the number of agricultural societies can positively influence credit access and financial inclusion. This supports the notion that expanding the cooperative network enhances the distribution of agricultural credit, thus improving financial services in rural areas. However, while the number of societies contributes to financial inclusion, it is less impactful compared to the role of working capital.

KCC Penetration, with a positive coefficient of 10.20, demonstrates that the wider adoption of Kisan Credit Cards has a beneficial, though secondary, impact on financial inclusion. This indicates that while KCCs provide a useful mechanism for accessing credit, they work more effectively in conjunction with other factors, such as the financial health of societies and loan disbursements.

On the other hand, Loans Overdue (₹ Lakhs) and Loan Due (₹ Lakhs) exhibit negative coefficients of 1.19 and -9.49, respectively. These negative values indicate that overdue loans and outstanding dues severely hinder the financial stability of agricultural credit systems. High levels of overdue loans reduce liquidity, negatively affecting the ability of societies to provide further credit. This emphasizes the need for robust loan recovery systems and financial literacy initiatives to minimize overdue loans and ensure the long-term sustainability of the credit system.

5.4 Model Performance and Diagnostics

To evaluate the performance of the models, we computed standard regression metrics such as R-squared, Adjusted R-squared, and Root Mean Squared Error (RMSE).

Random Forest produced an R-squared value of 0.72, indicating that the model explains 72% of the variance in Working Capital (₹ Lakhs), which is a good fit.

ElasticNet performed with a R-squared value of 0.65, slightly lower than Random Forest, but still indicating a reasonable level of explanatory power.

This research underscores the importance of financial liquidity, cooperative networks, and loan management systems in ensuring that the agricultural credit system in Jammu and Kashmir is robust, inclusive, and sustainable. Further research could explore the regional variations and the impact of government policies on the effectiveness of financial inclusion programs.

1. Discussion and Policy Implications

The analysis of agricultural credit and financial inclusion in Jammu and Kashmir reveals several key insights that can inform policy interventions. The results from various econometric models, including random forest and elastic net regression, highlight the critical role of working capital, cooperative society membership, and loan disbursements in shaping financial inclusion outcomes. Among these, working capital emerged as the most significant factor in determining the financial health of agricultural societies, underlining the importance of liquidity for effective credit distribution (Sundaram et al., 2019). The higher the working capital in a society, the better its ability to provide loans to farmers, thus enhancing financial inclusion. This finding suggests that improving the capitalization of cooperative societies should be a key policy priority to ensure their sustainability and capacity to support farmers.

Additionally, the number of cooperative societies was found to have a positive relationship with financial inclusion, indicating that expanding the cooperative network could help reach more farmers, particularly in underserved districts. The regional disparities observed in the study, where some districts had significantly more societies and better access to credit, emphasize the need for targeted efforts to expand cooperative infrastructure in areas with limited access to financial services. Policy interventions aimed at increasing the number of societies in remote areas, coupled with strengthening their financial capacity, could reduce these disparities and promote more inclusive financial systems across the region.

The low penetration of Kisan Credit Cards (KCCs) in certain districts highlights another critical area for policy intervention. Despite being a key tool for improving access to agricultural credit, KCC

uptake remains uneven, suggesting that there is a gap in awareness and outreach. To enhance KCC penetration, policymakers should focus on expanding financial literacy programs targeted at farmers, particularly in rural and remote areas. Furthermore, improving the banking infrastructure and ensuring that farmers are adequately informed about the benefits of KCCs would increase adoption and contribute to greater financial inclusion.

The high levels of overdue loans in some districts also point to the need for robust loan recovery mechanisms. Policymakers should consider introducing more stringent loan monitoring and recovery systems, alongside financial literacy initiatives that help farmers understand the implications of overdue loans on credit access. Strengthening the overall loan repayment culture would improve the liquidity of agricultural societies, making more funds available for disbursement to other farmers.

In conclusion, the findings from this study suggest that policies focusing on improving working capital, expanding cooperative societies, enhancing KCC coverage, and reducing overdue loans will be crucial for advancing financial inclusion in Jammu and Kashmir's agricultural sector. By addressing these areas, policymakers can create a more robust and inclusive financial system that supports sustainable agricultural growth and development in the region.

2. Conclusion

This study highlights the critical relationship between agricultural credit systems and financial inclusion in Jammu and Kashmir, emphasizing the need for targeted policy interventions to address regional disparities. The findings reveal that key factors such as working capital, cooperative society membership, and loan disbursements significantly influence financial inclusion, with working capital emerging as the most crucial determinant for the financial health of agricultural societies. The analysis also underscores the importance of expanding the cooperative society network and enhancing the penetration of Kisan Credit Cards (KCCs) to increase access to financial services, particularly in underserved districts. Furthermore, the study identifies the high levels of overdue loans as a major barrier to the efficiency of agricultural credit systems, suggesting the need for improved loan recovery mechanisms and financial literacy programs. Overall, the research provides valuable insights for policymakers to enhance financial inclusion, foster equitable agricultural development, and strengthen the rural economy of Jammu and Kashmir.

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Recapitulating Colonial Ordnance Industry in India

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ABSTRACT

India never synchronised itself with the ideology of capitalist industrialisation, that was followed by other nations stark-blinded. Affirmatively, this attitude nourished its adherence towards human lives and values but negatively it rendered the country defenceless in front of giant industrialists like Britain. Indian ordnance industry was one such domain which suffered the brunt of lacuna of proper resources when faced with the colossal power of colonist countries like France and Britain. Indian rulers whether Rajputs or Later Mughals failed to improvise their military and paid little heed to the growth of ammunition industries. It was France, who sorted some Indian natives to train them and called them sepoys. These sepoys were later used by the British in retrieving the territory of Madras. The ominous failure of Siraj ud daulah's army at the battle of plassey unveiled the pauper face of Indian militia as Siraj ud daulah's war equipments were obsolete. The cannon carriages and cannon balls used were rotten and unfit for any use. In the west, where European powers meticulously worked at establishing their technical superiority and using flintlock muskets, Indians were in deep slumber of ignorance and were happy with the primitive matchlock muskets. Heavy weapons of brass were not enough efficient to stand before the technically advance pistols and gun powder of Europe.

This paper is an attempt to establish the lack of proper ammunition industry and war weapons as a major cause of British subjugation in India. At a time when the entire community of scholars are working on restructuring the pillars of history by studying even the minutest particulate, this paper would refurbish the contours of minimalist history writing and will enlighten the reader with some technical causes of India's failure before the European power.

This research will be pursued using the secondary sources in the form of books, newspapers, and articles written on the aforementioned subject.

Key Words: Matchlock; flintlock; minimalist; sepoy; gun powder

Introduction

'Reason and augmentation felicitated the Industrial age,

Whereas war and weaponry demeaned it.'

Decline of feudalism and coming up of Industrial Revolution facilitated reincarnation of Europe. New tides of innovation, luxury living, behavioural etiquettes, clothing styles and establishment of huge contraptions greeted the atmosphere of West. Nevertheless, development of industries was that vent which fumed the deleterious concepts of Colonialism and Imperialism. The commencement of World Wars and use of nuclear weapons were the most vitriolic results of Industrial revolution. Industrial capitalism not only supported the sanguine notions of universal growth, freedom,

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Utilitarianism and scientific perspective but it also cradled the ideology of extreme Nationalism. The European nation states of France, Germany, England, Russia and others boisterously flaunted their technical growth and strenuously worked on their institutions to outshine one another. It was a period which was encumbered with the thoughts of territorial expansion, warfare, Geographical discoveries, expansion of trade and commingling of miscellaneous civilizations. It was in those times, the portentous culture of acquiring colonies institutionalised in Western countries. Acquisition of colonies became the benchmark for development in Western countries. The more the colonies the more one was termed as developed. Thus, brimming with the outlook of flamboyance and preponderance British East India Company sailed across Atlantic Ocean to reach India. This voyage to India had trade expediency as its main objective and colonising Indian subcontinent as its disguised aim. Thus, the mercantile relationship that was constituted between the British and Indians in 16th century turned out to become a saddled connection between a master and a colony1. The decisive battle of Plassey was a wide aperture which exposed the depreciating phase of Indian artillery and dwindling status of Indian administration and guilelessly cleared the way for British domination in India. Hence, history of colonial ordnance industry accolades the technical superiority of British Empire and also unveils the inert aptitude of gentry ruling class of India

Ruffling the pages of the past we get to note that artillery in Akbar's army was ahead of its time and as efficient as its European counterparts. Akbar's army had a number of super heavy siege guns and mortars. These gigantic weapons were not only the symbol of strong military and weaponry but it also reflected the ardent desire of the Emperor to safeguard his rule and lives of his subjects. Akbar experimented with bronze and wrought iron cannons which were light enough to be pulled by horses. Akbar was fond of rockets too (Roy: 2003). The war rockets used was very efficient, very light and easy to transport2. The body of south Asian rockets was constructed of metal instead of wood or paper. This made the device stronger and more weather proof and allowed for the larger payload of black powder. Mughal army used rockets in abundance during war. Akbar once ordered a shipment of 16000 rockets in order to attack a single fortress. Likewise, during the reign of Shivaji we trace the establishment of Maratha armoury. In 17th century Maratha was the first empire to realise the importance of navy to proceed with the maritime trade activities and to shield their empire from any alien attack from the sea. Shivaji is known as father of Indian Navy as he ornamented naval Shakti with the Maratha Empire (Gupta: 2013). From various accounts we come to know that there were various types of fighter ships in Maratha navy with special preference given to criminal ships. These criminal ships were well built and were used against enemies in times of war. It was in the battle of 1793 with Portuguese that the intrepidity and superiority of Maratha army came forth and gave a crushing defeat to the alien invaders3. Moving towards South, history of Indian military is indebted to Tipu Sultan who failed to negotiate with the change and dressed himself up to face the foreign power of British with his advanced rockets. Tipu Sultan used iron tubes filled with gun powders, hoisted them on flags or bamboo poles and mounted them on ramps for better accuracy and range. These missiles were fitted with swords and travelled hundreds of metres through air before coming down to hit the target. These missiles as is evident from various sources were the main reason for Britain's dejection in Second Anglo Mysore war. But, late 18th century speaks about a different story of Indian weaponry. Most of the European historians have commented that one of the most serious problems with the Indian weaponry was a deficiency in foundry technology (Lenman: 1968). The bellows and blast furnaces used in India couldn't generate as much heat as European models. This was a clear indication that local or primitive gun founders were unable to melt, pour, and cast metal in sufficient quantities to form large cannon4. The guns either had to be made in parts or the mold had to be filled in several pours.

Such processes decreased the durability and efficiency of the weapon. Apart from the pragmatic reasons regarding the failure of weaponry, a new dimension has been added to this section by the historians. Declassification of historical facts has also revealed that psychological reasons were equally responsible for the failure of Mughal army which once was the most advanced, loyal, ferocious and organised, before the British.

'The shortest distance to defeat is,

To let loose your zeal to win'.

It has been well articulated by the historians of present times that it wasn't the storm from outside which smashed down the Mughal castle but the devitalized and emasculate bureaucracy that dissipated the glorious Mughal suzerainty. The later Mughals were not only weak successors who failed to carry forward the legacy they inherited from their great ancestors but were also feeble warriors. They had no enthusiasm to facilitate accommodation of modern technology in their military. Even some of the indispensable items of that time such as- flint lock guns, socket bayonet, printing press were not popularly used by them5. These rulers continued to retain foreign technical and military experts which further weakened their chances to improvise as these foreign experts acted more as mechanics and hired hands than true advisors.

Such circumstances proved out to be the most conducive breeding ground for the British to set up their Imperial power in India. Their consolidated efforts and prudent planning helped them to attain their goal of devouring Indian soil after the battle of Plassey. Consideration of the military causes comes under the ambit of this paper. However, there may have been some psychological causes from the side of Siraj ud daulah or Mir Zafar which falls out of the magnitude of this research work. It has been said Siraj's army had 500 guns only, out of which only 84 were in working condition. These 84 guns were seiged by him from the English only6. It has been commented by various contemporary Dutch observers that the gunpowder produced in Bengal were much inferior in quality to the European powder. Also, the use of brass cannon proved lethal for Siraj's army as they were ancient and most of them were in deteriorating conditions. Also, Siraj's army men were armed with bows, swords and spears while Britishers had flintlock guns. Besides, the dearth of loyalty among his own court officials disrobed him of all his powers and authorship. With the conclusion of Battle of Plassey, Indian history witnessed turning up of a new chapter of British rule in India.

British Ordnance Factory

Necessity is the keynote of every invention. British trading activities began in India during the radiant age of Mughal Empire. Initially, everything was obvious and naïve but with passage of time British began to experience security issues and behavioural problems. In “British Social life in India”, Dennis Kincaid has dealt with the social problems faced by the British who came to India as traders7. The book discusses the beginning of British trade in India with first English factory established at Surat and provides a vivid account of the problems faced by Europeans in Surat, their lifestyle and living conditions, their behaviour with the Indian merchants and the commoners, their clothing styles, health conditions and many such little details of their day to day lives. Besides, British trade in India had to be protected by force of arms also. For an instance, in the late 17th century it was decided by the British to use a small detachment of European soldiers available for larger factories. Such attachment was called the Gun room crew (Lockyer, 1711). In his book, “Accounts of Trade in India”, Charles Lockyer has discussed the use of Gun room crew at Madras in the early years of 18th century. This gun room crew served under a chief gunner and appeared to be organised mainly as a form of relief for needy sailors8. In order to provide suitable armament to these soldiers British brought artillery, muskets and

ammunition from their own country for protection of their ships and factories in India. Till 1748, guns, small arms and military stores for miscellaneous uses were maintained on ships itself. These ammunitions were guarded by the gun men crew. On the historic day of 17th June, 1748, the court of Directors in Britain issued regulations for the formation of a regular company of artillery and establishment of regular ordnance services and laboratories for manufacture of war ammunition9. This was a pertinent move by British East India Company as it was cost effective and less time consuming. Importation of weaponry from England indeed was a cumbersome process. Consequently, a pool of arms and ammunition factories were established in India under the leadership of British military experts. Indian ordnance factory was in its nascent stage and produced only small brass guns with their shots and shells imported from England. The uprising of 1857 was an eye opener for the British and emboldened their spirits to give more impetus to Ordnance factory in India. An account from Pitt Rivers Museum, London, dated 1884 talks about a gun making company Jover and Belton. It made a pair of flintlock pistols each of which had four touch holes so that four successive discharges could be fired. This company conducted the trials of their weapons in India which indicate that they may have set up a gun making factory there also.

It was in the year 1787 that the first Arms manufacturing facility was established in India at Ishapore. The factory was renamed as Rifle factory Ishapore in the year 1904. In due course of time it became so popular to be christened as the Enfield of India. This factory produced a variety of small arms such as- swords, bayonets, revolvers, pistols, carbines, muskets, bazooka launcher rockets, rifles, 9mm auto pistols and many more10. Even during the war Ishapore factory produced large quantities of 0.303 Bolt Action Rifles to meet the war requirements. The factory consisted of various units such as- three large machine shops for the machining of the components of small arms, a machine gun section for the repair, a heat treatment section, an assembly section, a tool room, a separate unit for maintenance of machinery, a general store, and a stock store for maintaining a supply of seasoned timber for rifle stocks. An elaborate and expensive system of gauges were maintained to ensure high degree of precision and avoid errors. In order to manage the affairs of the factory an entire team of trained staff was called from Royal Small Arms factory, Enfield Lock, England. Thus, we find that during the initial years of establishment Indians worked as mere apprentices. The local folks were meagrely educated with the know-how of the science of weaponry. Affirmatively, the establishment of ordnance factory led to the beginning of technical education in India. These technical schools impregnated with the ideas of imparting vocational training to common people interested in Engineering. These trained men particularly from the Rifle factory of Ishapore further escalated their career and constructed new paradigms for ordnance industry, one such industry was Rosin and Turpentine factory at Clutterbuckgunj. Likewise, some ex- apprentices reorganised lock-making trade in India by introducing the technique of interchangeability and standardization. On account of such developments in 1927 first Ordnance Technical School was established in Ishapore at the cost of 49,005 Indian rupees. This school was fully equipped with amenities to provide training in precision trades for the manufacture of Small Arms and Equipment to various grades.

In 18th century, there existed an arsenal, a Gun foundry and a Gun carriage agency within the walls of Fort William in Bengal11. It was later shifted to Cossipore. The main purpose behind the establishment of this industry was to provide gun carriages to the Bengal army. Those were the times during which Cast Iron and Bronze were used extensively in Ordnance industries. Bronze is an alloy of Copper and Tin. Hence, it was an extremely tedious task to find these metals together. That's why British economy was finding it difficult to encumber the cost of maintaining bronze weapons. Though

iron was available in abundance but Iron smelting was again a gargantuan process. In comparison to steel and iron Bronze was weaker and less durable. Also, bronze required much stronger bilateral trade relations with the countries high in Copper or Tin resources. Thus, increased use of Iron was motivated to tackle the difficulty for time being. After the coming up of Bessemer process of steel making in 1867, people found an inexpensive industrial method for the mass production of steel from the molten pig iron before the development of the open hearth furnace. This system supported new innovations in transportation industries and led to the development of railways. The most famous of these industry was the steel industry at Ishapore. It facilitated the manufacture of structural steel, shell steel, guns steel, and various other kinds of high grade carbon and alloy steels. Also, an attempt was made to manufacture barrel steel at Ishapore, as it was difficult to import it from Britain during the times of war. Thus, with the passage of time metal and steel factory outshone the bronze and iron industry.

It is difficult to portray a comprehensive account of all types of ordnance factories flourishing in India. However some reference can be provided, for example- Gun and shell factory of cossipore was very popular, ammunition factory of kirkee also held a prominent place, gun carriage factory of Jubbulpore, assembly factory of Rawalpindi were some of the famous factories run under the supervision of Director of ordnance factories and Manufacture. There was a meticulous system of inspection in these factories. Each factory was supervised and managed by a rich number of staff. Around 49 gazetted officers were allotted the duty of supervision. These officers were usually chemists, or qualified engineers.

The growth and prosperity of Indian ordnance factories can be calculated from one of the official documents recovered from the National Archives, Delhi estimating the number and types of War ammunition to be sent to the Amir of Afghanistan in order to repeal the alien attacks from Russia12. The document is dated 11th April, 1885 and contains a vivid description of the plan to pursue the transportation of armoury to Afghanistan. Following demands were mentioned- two thousand Snider Enfield and 5000 Henry Martini. The British authorities were also planning to use the used Sniders by collecting it from volunteers who have started to use Henry Martini. Along with guns and rifles, Bullocks and camels were also sent in colossal number. Later the demand was increased to ten thousand Martini for Amir with five hundred rounds of ammunition per arm and bayonets and accoutrements. Several other accompaniments were arranged to be sent. These are as follows:

a) A cross-belt with a pouch for ammunition. This was more ornamental than useful for ammunition could be carried in men's pocket or anywhere.

b) Waist belt with scabbard for the bayonet.

c) Sling for the rifle, which was a very useful thing but cannot be used comfortably, except by men who understood it.

d) Straps for great-coat

e) Ball bags were fixed on the waist belt and would be probably very useful with the belt.

f) Havresack was a very useful article. It was used to hold food, ammunition or anything else.

The above discussion regarding the Ordnance factory established by British closes with a strong assertion that British rule left no stone unturned to refurbish the degenerating Ordnance industry of Mughal India. Explicitly, their actions were emboldened by the idea of Imperialism nevertheless it emancipated Indians from the retarded and inert warfare practices.

Swadeshi Ordnance Factory and the Role of Revolutionaries

Allegations have always been reflected against the bureaucratic nature of Modern Indian

history which undermined the importance of different ideologies of freedom fluttering in the atmosphere of Indian National movement other than non-violence. History impassioned with the tints of subjectivity always fails to deliver the correct version of past. So the armed revolt proposed and pursued by revolutionaries like Aurobindo Ghose, Sisir Kumar Ghosh, Ullankar Dutt and others disgruntled the gentry folks of Indian National Congress who wanted Bloodless freedom13. It is quite disheartening to mention that Indian history books are replete with the episodes discussing the agenda taken up by these revolutionaries to attain freedom. However, a meticulous analysis of various private documents conserved in Archives, pamphlets circulated by secret societies working during those times and various British reports of Criminal procedure help us to draw a rough if not concrete picture of the weaponry and ammunitions used by these revolutionaries to inflict fear in the minds of British and Indian officials in favour of British rule.

In 1905, partition of Bengal, arrest of innocent men and women and ill treatment of Political leaders triggered the indignation of Indian educated masses. Various secret societies were working in Bengal and throughout India and practicing different methods to perturb the British authorities. This paper would take up the secret societies of Bengal, discussing the revolutionaries of other regions though important, is beyond the scope of this research paper.

In 1906, Jugantar group was started by Barindra Kumar Ghose which he scooped out of the Anushilan Samiti running in Calcutta. Jugantar vehemently criticised the government policies and summoned the youth to rise- Without blood, O Patriots! Will the country awake. This group went about setting up its centre and a bomb making factory at a garden house in the Maniktala area of Calcutta. They planned to kill Kingsford, who was notorious for his torturous ways in dealing with the cases of the Swadeshi agitationists. Kingsford was transferred to Muzaffarpur soon after the discovery of bomb in his mail. The Jugantar group deputed Khudiram Bose and Prafulla Chaki to kill him with the bomb created by Hemchandra Kanungo. Hemchandra Das Kanungo of Bengal and P.M Bapat of Maharashtra played an important role in the establishment of bomb factory in Bengal. They possessed such degree of Nationalism that Hemchandra sold his house to finance his travel to Paris14. Both Kanungo and Bapat in 1907 contacted a few Russian revolutionaries in Paris who immigrated to France after the revolution of 1905 and learned the use of explosives from them. The use of picric acid to manufacture bomb and different ways to destruct railway lines and bridges were learnt from Safranski's explosive manual they got from their Russian comrades in Paris. Before Hemchandra Kanungo it was Ullaskar Dutt who experimented with explosives in 1906 and was successful in producing high intensity bombs in Calcutta. It is quite interesting to note that women too were active members of the secret societies like- Anushilon Samiti and Jugantar. One revolutionary named Kalpana Dutta was involved in Bomb making factory and used to teach the new apprentices also. Bombs were made using a mixture of nitric acid and Corpus cotton. She worked along with Pritilata who enthusiastically participated in assassinations and looting raids. She even died as a martyr while on a mission to assassinate a British officer.

Some sources give very rare accounts of military training carried out by the members of Anushilon Samiti. Satish Pakrasi in his accounts entitled Agnijuger Katha has stated that members of the Anushilan Samiti would practise wielding of lathi and parade daily in a spot of clearing surrounded by bamboo grooves and mango and jackfruit trees. They used to meet there every evening and imagined themselves as sanatans of Anandamath dedicated to the cause of freeing their mother country from bondage.

The unrevealed and less talked about episode of Rodda Arms Heist is irrelevant since this

paper discusses the episode of swadeshi industries but it is important to note it here as it will help the readers to contemplate the various methodology adopted by Indians to enrich themselves with the suitable armoury to fight back the British. The Rodda Arms Heist was one of those few revolutionary activities that was carried out by a joint team of the Mukti Sangha of Dacca15. A group of Bengali revolutionaries pulled off a daring heist on August 26, 1914 in the heart of Calcutta and stole fifty German C96 Mauser pistols along with forty-six thousand cartridges imported for the British from Germany by RB Rodda & Co. without anyone realising what had happened.

The bomb plot of Zurich also holds a conspicuous place when discussing the influence of European association of Indian revolutionaries to ornament their weaponry. It was an incidence in which Indian Nationalists Virendranath Chattopadhyaya and Abdul Hafiz of the Indian Independence Committee collaborated with the German Foreign office and a band of Swiss based Italian anarchists led by Arc Angelo Cavadini and Luigi Bertoni to smuggle German manufactured bombs, weapons and poison into Switzerland and Italy in the summer of 1915.

Another blurred but important evidence discussing the military activities organised by Indian comes from the accounts of British regarding the activities of Shams Sunder Chakravarti. The report term him as one of the most persistent and violent agitator. He is said to be as dangerous as any person who has been considered and should be placed under restraint completely. Shams Sunder Chakravarty belonged to Pabna district and was 28 years old man. He joined the staff of Bande Mataram, where he worked in close touch with Aurobindo Ghosh, Barindra Kumar Ghosh, Abinash Bhattacharji and Sailendra Ghosh. He took active part in the volunteer movement and is a leading member of Bande Matram Samproday. He has organised quasi- military parades and Shams-fights in suburbs of Calcutta.

From the Government accounts of 26th May, 1908 we get to know about the various articles to carryout warfare activities found during the house search of revolutionaries. Among the various findings there were 394 copies of the Bartaman Rrnaniti, a book in Bengali on the Modern Art of War, containing a reference to the success of guerrilla methods of warfare. It was written by the accused Abinash Chandra Bhattacharji. In the introductory chapter, it was written that war is the order of creation in which there is reference to India followed by an intriguing passage- “fame is the reward of action, but the price of fame is very high. Fame cannot be obtained unless you offer all your bones and ribs by counting them like Dadhichi.” Later pages of this book contains the reference of swadeshi movement and proclaims that Bengalis can make themselves masters of the principles of War by study and circulation.

Another important episode of prominence was Dakshineshwar Bomb Case of 1925-26. The withdrawal of the Non-cooperation movement after the unfortunate event of Chauri-Chaura, failure of all negotiations with the British and the repressive measures taken by the Government to terminate the revolutionary activities demotivated these leaders to rely on the promises of Indian National Congress16. So, they rejuvenated their slackened activities and started recruiting new and young members into their group. Thus, in 1923 Jugantar group carried out several political dacoities and assassinations. Government officials were alarmed by the murder of Ernest Day, a British merchant by Gopimohan Saha in Calcutta on 12th January, 1924. This event was taken as a caveat by the British authorities and they ordered a number of search operations to veil the hidden ammunition factories of revolutionaries. It was during these search they came across the house of Debiprasad Chattopadhyay which was used by revolutionaries of Dakshineshwar as bomb factory. Bombs were manufactured here and transferred to other places. British authorities discovered other such factories

at Deoghar and Bihar. Dakshineshwar revolutionaries worked on three agendas- negotiations with the opponents of British mainly- Germany and Turkey for obtaining financial and military assistance, to take help from the Indian soldiers in British Indian army, and to see arrangements for taking the delivery of foreign arms at the eastern coast and their distribution all over the country.

Besides, the role of P.C Ray and the Bengal Chemicals cannot be belittled. It was in the chemistry laboratory of P.C Ray that revolutionary group of Jugantar used to make bombs17. He was called as a revolutionary in the garb of a scientist by the British as he believed that 'Science can afford to wait but Swaraj cannot' (Ray, 1924) and so he worked with the revolutionaries to make effective explosives.

The jigsaw puzzle of Indian war of Independence was in fragments and not in unison. The aforementioned details of the various factories working in Bengal are only a piece of the colossal cake shared with the readers in this research article. A deeper and more comprehensive study of these factories in different regions of India would help one to draw a better picture of the mind-set of Indian educated class who wanted to wage an armed struggle against the British and believed themselves capable of doing so.

It is the most conspicuous malfeasance of Modern Indian History that it is devoid of a structured account of military history of India. Details of the swadeshi ordnance factories are not part of the popular readings and are conserved in the murky cabinets of National Archives, Delhi. Details of various bomb making factories, poisons used by Indians to attack British and other categories of war ammunitions used by various secret societies of revolutionaries working in other parts of India is still inside the bars of concealment. This is the most conducive time to include these staple information regarding the status of ordnance factory in India while delivering the history of Indian National movement, as the new intellectual class is busy in declassification of history. These unsung episodes and dialogues would project a new picture of Indian modern history and would help the readers to introspect the causes which facilitated the victory of British over Indians.

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India Before Liberalization: A Study of Political Economy

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ABSTRACT

This paper examines the nature of India's political economy during the pre-liberalisation era (1950-1991), focusing on the leadership of Jawaharlal Nehru, Indira Gandhi and Rajiv Gandhi. Through an analysis of political and economic policies, the study highlights the evolution from stable democracy and planned industrialisation under Nehru, to populist and authoritarian tendencies during Indira Gandhi's tenure, and the incremental pro-business reforms under Rajiv Gandhi. The research draws upon key academic sources to critically evaluate how these leaders shaped India's economic trajectory prior to the watershed liberalisation of 1991. Findings reveal a complex interplay between ideology, institutional development, and policy pragmatism, ultimately setting the stage for the economic reforms that followed.

Key Words: Political economy, Mixed economy, pre-liberalisation, planning & authoritarianism

Introduction

Political economy, in literal terms, has been coined from two very popular buzzwords of modern times - Politics and Economics. This area incorporates the study of mutual interaction of politics and economy and how this interaction is responsible for development functions of a state. As defined by Pranab Bardhan (Bardhan, 1998), Political economy refers to the distribution of political and economic power in a given society and how that influences the directions of development and policies that bear on them.

The understanding of political economy of India sets a proper base for the further understanding one of the smaller and conflicting unit i.e. J&K. The Political Economy of India before 1991 (pre-liberalization era) begins with Nehruvian period. The Nehruvian phase was characterized as period of stability in both politics and economy. He adopted 'statist model of development' and emphasized on heavy industry. This era is always remembered as the strong base for today's politico-economic system having Nehru as creative colossus of the independent India. The high points of this phase were the self-reliance, import substitution and state directed and controlled economy. Based on the socialist models of planned economy, it was regulated and controlled economy. However, in contrast to the communist model of a command economy, it did not eliminate the significance of the private sector. Conversely, the state established a foundation for private sector development by advancing large-scale enterprise within the public sector. The regulated economy generated certain issues, namely sluggish growth, an excessive role of the state, and bureaucratic delays. The robustness of this economic paradigm resided in India's industrialization and its readiness to confront the challenges of globalization in subsequent periods.

In divergence to Nehru, Indira Gandhi's tenure was characterized by authoritarian inclinations and is regarded as a period of instability in both the political and economic history of the nation. Indira Gandhi implemented a closed economy model designed to legitimize populist politics, resulting in a 'period of stagnation.' The politics of redistribution influenced by populism, the professionalism of

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bureaucracy affected by personalistic politics, and the democratic spirit of the nation undermined by authoritarianism resulted in a setback. This era is frequently depicted as a vulnerable aspect of Indian politics. In the economic realm, Indira Gandhi favored populist policies over substantive reforms. Many of the actions she implemented under the guise of socialist ideas, such as bank nationalization and the 20-point Programme, were predominantly populist rather than ideologically driven.

In later period of her political career, she took a small swing from socialistic principles to some liberal ideas in 1980 to cover all wronging done by her. This shift from socialist to liberal economic policies was continued by her son, Rajiv Gandhi. It was under his leadership that there was a formation of 'state-capital alliance'. However, the turning point came in 1991 when India embarked on a path of economic liberalisation, marking a decisive shift from the preceding decades. This paper seeks to critically analyse the political economy of India before 1991, exploring the ideological, institutional and policy-driven factors that defined the era and assessing their impact on India's growth trajectory.

NATURE OF POLITICAL ECONOMY BEFORE 1991 (PRE- LIBERALISATION ERA)

For understanding the nature of political economy of India, one can start with defining year for India i.e., 1947- time of India's independence. From this point of time to present, India's political economy can be majorly divided into two eras by taking '1991' as 'watershed' year. The first era is called pre-liberalisation era (1950-91) and the second is called post-liberalisation era (1991 onwards). The first era called pre-liberalisation era constitutes the political economy under three main political figures - Pandit Jawaharlal Nehru, Indira Gandhi and Rajiv Gandhi.

Nehruvian Era (1950-64)

The Nehruvian era described as the 'crucible of modern India' is viewed as an era characterised by 'stable democracy' and 'progressive industrialisation'. Stable democracy as Nayyar argues was 'constructed by enlightened elite in accordance with its concept of a modern nation state' (Nayyar, 1998). Despite the fact that democracy was new to India and it was being experimented for the first time, it was relatively more stable than it was in the later years. As Kaviraj notes, “Nehru never had majorities of the size Indira or Janta enjoyed; his governance was far more effective than theirs” (Kaviraj, 1986).

It was a result of “the combination of a proto-democratic colonial inheritance and democratically inclined mass nationalist movement which provided the institutional preconditions for the emergence of democracy in India” (Kohli, 2009). In providing the base to stable democracy, the factors that operated included the leadership of Nehru, the institutionalisation of the Congress party and a professional bureaucracy. While Nehru remained committed to the idea of Democracy and help institutionalise it, the civil services having colonial base provided permanence as well as stability to administrative set up of the country. The single party domination of Congress (also named as “Congress system” by Rajni Kothari) meanwhile gave way to ideologically strong elite to build the support among the masses. With people still associating the Congress with the Indian national movement legitimacy was provided to this party.

Along with stable democracy, Nehruvian regime is known for progressive industrialisation. “In this phase, there was a vision, however imperfect, about the future of economy, polity and society” (Nayyar, 1993). As Rudolphs noted “Nehru led Congress governments were able to invest in the future because they could rely on Nehru's persuasive leadership, the effectiveness of the Congress party organisational at the centre and in the state” (Rudolph & Rudolph, 1987). Nehru's economic vision

was based on his socialistic ideas. Following the available socialist models, he formulated the idea of an economic model in which the state was to play the major role and it was to take the country towards 'commanding heights of the economy'. The model came to be known as the model of 'mixed economy' was to become the basis of progressive industrialisation of the country.

Though much critiqued in the later years , the model of mixed economy was based on the exigencies of the time and a very clear thinking of Nehru. What attracted Nehru to socialistic vision was the deep-rooted poverty and underdevelopment of the country. Addressing the Indian science Congress in late thirties, Nehru stated “Politics led me to economics and this led me inevitably to science and the scientific approach to all our problems and to life itself. It was science alone that could solve these problems of hunger and poverty, of insanitation and literacy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people” (Cited in Social and political thought in Modern India, IGNOU).

The above stated lines by Nehru depict his socialistic concerns for masses. He balanced his socialistic ideas with rightist members by using his approach of pragmatism. However, his concerns of poor and disadvantaged were still the dominant ones and he continued to call himself as 'Democratic socialist'. Keeping pragmatic approach in mind, Nehru gave prominence to production as

> he considered the need to accelerate production as the most important economic objective for the country. Equitable distribution though considered essential had only a second place in his strategy of economic development. Production had to be raised before equitable distribution could be considered (Chowdhary,1991).

In December 1954, Lok Sabha passed a resolution emphasizing 'socialistic pattern of society'. It was further reinforced in Jan, 1955 when Nehru on the personal level brought in motion the resolution about the loyalty towards socialism which resulted to the belief that “planning should take place with a view to the establishment of socialistic pattern of society where the principle means of production are under social ownership or control” (Frankel, 2005). “This resolution summed up Nehru's approach of pragmatism which he named as 'Democratic Socialism', quite distinct from socialism in strictly Marxist sense” (Chowdhary, 1991). By this creed of his own socialism i.e. 'Democratic Socialism', he hit the balance between Marxism and Capitalism and remained equidistant from both as never departed from poor nor arrived at capitalists.

Planning During Nehru

In 1950, planning commission was constituted under the leadership of Nehru. It was during this time the first five year plan was drafted and was based on Harrod-Domar Model. “The final version of the first five year plan published in December 1952 reflected Nehru's new authority over national question of economic and social policy” (Frankel, 2005). It laid stress on agriculture, power and transport. Following this the community development programmes (CDP) were started and envisaged as 'programs of intensive agricultural development'. The areas which were chosen under this programme showed asymmetrical criterion for selection not aimed to cover areas with less resources, irregular monsoons, arid conditions, technological advancements etc. However as Frankel notes:

> Nehru had been dissatisfied from the beginning with the narrow economic goals of the community projects. He particularly objected to the practice of “pick[ing] out the best and most favourable spots” for intensive development when the majority of agriculturalists were economically backward (Frankel, 2005)

Second five year plan also called Mahalanobis plan after its chief architect P.C. Mahalanobis, focussed on industrialisation in a planned manner mobilising 'internal economies of scale rather than trade' (Rahul Mukherji, 2010). This plan was similar to the soviet plan (1920), showing soviet influence on Nehru. Expressing Nehru's vision of Modern India, it focussed on rapid industrialisation particularly basic and heavy industries (such as iron and steel, heavy chemicals, heavy engineering and machine building industries), socialism and self-reliance.

Consistent with this plan, the industrial policy resolution of 1956 was passed. It accentuated the responsibility of public sector and acknowledged the foundation of socialistic pattern of society. Heavy industries were emphasised at the expense of agriculture and the poorer section of Indian society which was majorly dependent on agriculture suffered at the hands of lopsided land reforms and minimal extension programmes.

From the experience of first two five-year plans about worsening plight of agriculture sector, it was realised under the third five-year plan that agriculture should not be ignored as it is an important contributor in overall development of the economy. Its objective was to make India a 'self-sustaining economy'. This plan aspired to increase agriculture production, expand basic industries, optimum utilisation of labour power and reduce inequality in the distribution of income and wealth.

But due to ill fate of plan, the plan could not be very successful as there happened two wars-one with China in 1962 and other with Pakistan in 1965 and also there was very brutal drought in 1965-66. “Nehru used his considerable nationalist to prioritize growth of heavy industry and achieved considerable success” (Kohli, 2009).

The achievements during Nehruvian era can be counted as land reform legislations, ending of absentee landlordism, beginning of community development programmes, Foundation of local governments, legislation for the benefits of SCs and STs. Also industrialisation during Nehru's period saw fixed growth rate of 7% per annum. “There is no reason for doubting that the period of planning from 1951 to 1966, was one in which the industrial interest of big business generally prospered” (Corbridge and Harris, 2001). Also, one can see this situation in this way that there was no other option available to Nehru to increase the production which was the need of the time for recovering India out of prolonged economic backwardness as a result of British rule. To conclude about Nehru's phase one can, agree with Kohli that, “The story of industrialisation in Nehru's India is thus mixed, characterised by notable achievements but also stupendous follies” (Kohli, 2009).

Indira Gandhi's Period (1966-84)

Indira Gandhi era is often portrayed as 'age of populism' in political norms and 'era of stagnation, in economic standards. Referring to this phase, Kohli thus notes “The political economy of the Indira Gandhi era that followed is best viewed as one in which India's democracy became more populist and deinstitutionalised, economic rhetoric moved further to the left, and the gap between the state's developmental capacities and economic goals widened even further, to the detriment of industrial development” (Kohli, 2009).

This era is regarded as 'the most deviant phase of our political existence' (Kaviraj, 1986). The regime of Indira Gandhi was often witnessed as authoritative in character and perceived as a shift from Congress system to Indira system of 'Authoritative Democracy'. Authoritarianism in Indira Gandhi's personality was celebrated in such a way that D.K. Barroah came out with the awful aphorism 'India is Indira, Indira is India'. The contrast with Nehru's slogan, 'India is the Congress, the Congress is India', sums up the change which had come about in Indian politics (Corbridge and Harris,

2001). Untimely demise of Shastri led to arrival of Indira Gandhi in Indian politics with certain 'indistinctness and ambiguity'. According to Kaviraj, “The greatest qualification of Indira Gandhi at the time of her accession was her weakness and party leaders were too jealous of each other to accept the dominance of any one among themselves” (Kaviraj, 1986).

Indira's entry was not synchronized with accuracy of time but with terrible situation of India on various fronts. Strategically two wars with China and Pakistan, ill-timed death of two PMs - Nehru in 1965 and Shastri in 1966, the country's horrific drought in 1966, failure of third five-year plan made things complicated for Indira with the presence of envious as well as resentful party members. Various other destructive things were exit of first-generation leaders having strong ideological and mass base, and entry of second-generation leaders having ideological divergence and narrow base, 'erosion of political consensus', rise of regional politics as well as 'the ideology of nationalism had begun to wane'. Congress paid for this crisis with a loss in 1967 elections.

In this time of political as well as economic crisis, Indira Gandhi used authoritarian measures to control the deteriorating plight of Congress. But this created split in late 1969. Ideology was again used to justify the split. Mrs. Gandhi described factional politics preceding the split as unrelated to “mere clash of personalities, 'a fight of power' or 'a conflict between the parliamentary and organisational wings'. In seventies, to cope up with wrongs going on and to make direct connection with electorate, Indira Gandhi used populist policies to strengthen her domination over influential party men within the Congress leading to 'populist transformation of Congress party'. In the words of Kohli, “Politics in this period is depicted as increasingly a politics of survival rather than a politics of development” (Kohli, 1980).

In 1971 elections, Indira Gandhi gave the slogan of garibi hatao to woo the electorates and attain the power. Indira Gandhi promised redistribution without focussing the incompetence on production front which was opposite to Nehru's prioritization of production as the first and redistribution as the second goal. All these promises proved to be hollow with the huge price instability and grave food inflation. Thus removing garibi was a mirage and increasing food prices make poor people even dream about the basic needs. “It was joked that 'Garibi Hatao' meant not a 'war on poverty' but rather 'poor hatao' the abolition of the poor” (Corbridge and Harris, 2001)

The authoritarian wings of Indira Gandhi reached the zenith. Her populism and the general weakness of political organisation also meant that because other channels were not available and as demands increased in a worsening economic situation with steeply rising prices, opposition was expressed increasingly on the streets provoking a repressive response (Corbridge and Harris, 2001). The response surfaced as rise of JP movement with involvement of students on large scale, criticism by internal party members and formation of National Coordinating Committee against the unprofessional conduct of Indira Gandhi. To quote Corbridge and Harris:

> The struggle between Mrs. Gandhi and her makers in the syndicate unfolded in this context of political disorder, increasing social conflict and of the continuing 'crisis of planning' which had been marked first by the postponement of the Fourth five year plan and which was now showing up in the relative stagnation of the industrial economy as well as in agriculture. (Corbridge and Harris, 2001)

National emergency was declared for period from 1975-1977 to curb the rising voices of people against authority of Indira Gandhi. The emergency was justified as the tool to maintain political and economic stability in the country. Certain economic policies were also used to justify the emergency. It was during this period that twenty-point programmes regarding land reforms, bonded

labour, rural debt, agricultural incomes, reduced prices were introduced. This programme was meant to bring about social and economic changes. These policies had some impact on stabilising the economy. At that time, president of World Bank, Robert McNamara and director of IMF H.J. Witteveen acknowledged the economic stability during emergency. However, as Rudolphs noted that “Indira Gandhi and many of those in India who supported the 1975-77 emergency shared the view that in developing countries there is a positive relationship between authoritarian regimes and economic performance.” (Corbridge and Harris, 2001)

To cut the authoritarian wings of Indira Gandhi, she was thrown out of power by electorates in 1977 and country regained its democratic essence. But Janta government did not contribute much to the country's development due to lack of clarity in economic objectives and proved to be incapable in governing a country like India. To quote Kaviraj:

> much of its three years in power, the Janta government spent in debating what to do with Indira Gandhi rather than what to do with the country. It was the Janta Phase which actually showed to what extent Indira Gandhi dominated India Politics. (Kaviraj, 1986)

The leadership in opposition was so obsessed and troubled of Indira Gandhi's persona that they focussed their energies to keep her out of power rather than aiming in country's development objectives.

Democracy was weakened by authoritative and populist measures with implications like personalisation of Congress, politicisation of bureaucracy and waning of federalism. However, Atul Kohli describes Indira phase as stepping stone in consolidation of democracy. He supported his argument by the incidents like holding of elections, Indira's exit after emergency and inclusion of masses in democratic setup of India by promise of poverty alleviation.

In 1980s again came 'Indira wave” when she regained the power. Indira Gandhi realised that the populist politics based on slogans cannot sustain her in power. “After return to power in 1980, she increasingly prioritized economic growth and put the rhetoric of socialism on the back burner”. (Kohli, 2010). There were piecemeal reforms - submissive changes in policies often referred as 'reforms by stealth' by Rob Jenkins, Deepak Nayyar etc. These changes were pro-business and not pro-market thus supporting the existing business houses and not much room was left for entrepreneurs. “A process of state and capital alliance for growth was thus initiated and this process has been unfolding in fits and stands ever since”. (Kohli, 2009). This pro-business shift in economic policy burst the economic growth because of liberal policies getting support from both external and internal borrowings by the government, thus this growth was mainly 'debt-led'.

Indira Gandhi realized that for Garibi hatao (alleviation of poverty), production has to be preceded with redistribution. In the words of Kohli “The Indira Gandhi who returned to power in 1980 was considerably less populist than the one in the 1970s. She thus initiated an era especially marked by a more pro-business industrial policy resolution in 1982 that increasingly came to be characterised by growing silence on issues of deliberate poverty alleviation and by greater public attention directed towards the promotion of economic growth” (Kohli, 2009).

Pro-business shift included prioritization of economic growth, state-business alliance and cultivation of resourceful labour. To do so, MRTP was abolished, largest loan from IMF was settled, anti-strike laws to cultivate disciplined labour. The 'state-business alliance' made India highly interventionist state just to provide necessary environment for reforms to breed like East Asia model of

development. Thus this period saw alteration of 'Hindu growth rate' to growth spurt in Indian economy.

During the phase of Indira Gandhi, the planning process suffered a setback with postponement of fourth five-year plan. The existence of planning commission was questioned and role of planning commission was reduced to sheer advisory body. Three years 'plan holiday' was outlaid for 1966-68. It constituted three annual plans, first two formulated by lame duck planning commission and last by Gadgil Commission. All later five-year plans i.e. Fourth five-year plan (1969-74), Fifth five-year plan (1974-79), Rolling plan (1978-80) and Sixth five-year plan (1980-85) suffered at the hands of swinging regimes and governments during this phase.

One can conclude that professionalism of bureaucracy, federalism, organisational structure of Congress, essence of democracy, industrialisation suffered at the hands of Indira Gandhi's authoritarianism. “The arena of conflict shifted from the rich vs. poor to the centre vs. states. Dissent in democracy took the form of regional movements which turned to militancy and terrorism in Punjab, Assam and Kashmir.” (Nayyar, 1998)

Rajiv Gandhi's period

Rajiv Gandhi came to power by the advantage of 'sympathy wave' after the death of his mother Indira Gandhi.

> This victory Rajiv Gandhi freed government if only momentarily and artificially from coalition entanglements and interest group pressures. This freedom from politics as usual must have heightened the illusion that a sharp new beginning in possible. (Kohli, 2009).

Rajiv Gandhi made the contingent of his own political as well as economic advisors like Arun Nehru, Arun Singh, Manmohan Singh, and Montek S. Ahluwalia who were technocrats and no political icons. The beginning of Rajiv Gandhi's term of office suggested that he wished to strengthen some of the institutions that deteriorated in his mother's time. But the deinstitutionalisation, unofficial civil wars, and evidence of state violence and the “Criminalisation of politics that characterised the early eighties heavily encumbered Rajiv Gandhi and indicated that restoring the Indian state would be a formidable task” (Rudolph and Rudolph,1987).

Kohli notes that “The illusion of autonomy and with it, the euphoria of a new beginning lasted about six months” (Kohli,2009). After six months, reality hit hard Mr. Gandhi having lost assembly elections in various states in 1985.

> Rajiv's failure to rebuild the party ultimately made it impossible for him to deliver the other parts of his programme. His power lay in his ability to win the popular vote, and as soon as he began to be seen electorally vulnerable his command of the party faltered. (Corbridge and Harris, 2001)

Left with no option, forgetting the technocratic mindset for implementing liberalisation, Rajiv Gandhi traced back the footsteps of his mother. He tried to base himself on populist politics raising the slogan of 'Bekari Hatao' i.e. eradication of unemployment in AICC session in 1988. Also he tried to show his firm belief in socialism by giving 14-point programmes in the similar session of AICCC. Aiming at elimination of unemployment, the Nehru Rozgar Yojana was launched under the leadership of Rajiv Gandhi.

But Rajiv Gandhi's fame turned down in late 1986. One of the reasons can be stated as that “the Congress ideology continued to be radical in its symbols but substantive content served the

propertied interest" (Chowdhary, 1991). In totality one can agree with Mukherji that

> the relative decline of the Congress party since the mid 1980s and the rise of regional, backward caste, and minority group - based parties has been due largely to the Congress incapability to articulate and respond to the demands of an increasingly mobilized society . (Mukherji, 2010)

Assessing the achievements of Rajiv Gandhi in democratic setup of the country, it can be said that he brought about two important changes:

* Strengthening the federal character of the polity by reviving the belief in panchayats i.e. backed the initiative of decentralised planning and also by pushing states' chief ministers be active to operate on independent basis.
* Managing Transparency in party politics by 'intervening in the allocation of tickets for the state assembly elections in 1985 in order to introduce a new clean generation of politicians. Also he secured the passage of an anti-defection law to check that institutional malaise in Indian politics .(Corbridge and Harris, 2001)

Rajiv Gandhi continued with Indira Gandhi's pro-business strategy for development and thus came across severe contestations from various spheres of the country. He had to face severe opposition from party members for his actions of derailing the Congress objectives of socialism. Immediately a 20-point programme known as 'Charter of hope' was passed to show faith and loyalty of the party towards socialism. The technocratic germs in Rajiv Gandhi never let him stop the whole process of economic liberalisation which continued in the form that

> system of industrial licensing was relaxed, MRTP limits were raised, direct taxes on corporate and personal incomes were reduced, concessions were provided in indirect taxes on several items of luxury consumption, imports of a wide range of manufactured goods were liberalised, controls on technology imports were limited, and restrictions of operation of transnational corporations and banks were relaxed (Corbridge and Harris, 2001).

Not only this, the budget for year 1985-86 did not bring up the socialism in its agenda and this situation was not well taken up by senior Congress leaders having socialistic germs. Noting this shift in Congress policy, Frankel notes "The left inside the Congress party, as well as old style Congressmen attached to the socialistic pattern of society, resisted the departure from Nehru's policy of self-reliance and Indira Gandhi's pro-poor programmes. They echoed the criticism of the communist parties that Rajiv was pro-rich." (Frankel, 2005)

Thus the limited reforms by Rajiv Gandhi which were scores of times opposed in the name of socialism were not able to reverse the plight of India's economic environment. On the whole, the impact of Rajiv Gandhi on the economic policy was felt in favouring the private sector. (Corbridge and Harris, 2001). One can conclude that lacking the support of whole Congress party, Rajiv Gandhi was unable to come fully out of symbolic shell of socialism. One can also argue that the technocratic temperament of Rajiv Gandhi was incapable of filling the vacuum of charisma created by Indira Gandhi's demise. Thus reforms initiated by Rajiv Gandhi were partially successful when compared to 'big bang reforms' carried out by later Congress government.

Conclusion

The pre-liberalisation period of India's political economy was influenced by various leaders whose unique ideologies and policies significantly impacted the nation's developmental trajectory.

Nehru's dedication to democracy and state-driven industrialization established the groundwork for a contemporary Indian state, albeit within the limitations of a mixed economy. Indira Gandhi's administration represented a shift towards populism and authoritarianism, compromising institutional integrity while striving to rectify entrenched social imbalances. Rajiv Gandhi's tenure saw the inception of economic liberalization, however constrained by political and institutional obstacles. These eras collectively illustrate a complex interaction of ideology, pragmatism and political necessities, finally establishing the groundwork for the transformational reforms of 1991 and thereafter. The pre-liberalisation period with its accomplishments and deficiencies is crucial for comprehending the development of India's political economy.

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Role of Gram Nyayalaya Act in Strengthening Justice at the Grass root Level

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ABSTRACT

Access to justice remains a fundamental pillar of democracy and the rule of law. However, in India, rural population often faces significant barriers to legal recourse, including geographical distance, procedural complexities, financial constraints, and lack of legal awareness. Recognising this gap, the Parliamentenacted the Gram Nyayalaya Act, 2008, to decentralise the justice system and provide accessible, affordable, and expeditious justice to people at the grassroots level. The Act aimed to establish Gram Nyayalayas (Village Courts) as mobile courts functioning at the taluka or village level to adjudicate minor civil and criminal disputes, ensuring the timely resolution of cases with minimal procedural delays.

This paper critically analyses therole of the Gram Nyayalaya Act in strengthening justice delivery at the rural level. It explores the Act's objectives, operational framework, jurisdiction, and its impact on rural dispute resolution. The author highlights that despite its potential, the implementation of the Gram Nyayalaya Act has been marred by several challenges and which was also recently highlighted by the Supreme Court in its judgment passed in October, 2024. The author reached to the conclusion that nevertheless, the act has played a significant role in strengthening rural justice mechanisms by bringing the judicial process closer to the people.

Key Words: Gram Nyayalaya Act, Access, Justice, Supreme Court, Constitutional Provisions

Introduction

In the last quarter of the century, most common and civil law world democracies have witnessed an increasing concern of under-delivery on the front of access to justice. David Simmons, former Chief Justice of the Supreme Court of Barbados, observed that in the last twenty-fiveyears, throughout the common law world, traditional arrangements for the delivery of civil justice have come under scrutiny, challenge and change. The search for alternative processes to litigation in the resolution of disputes gained momentum and a great debate hasensured.

The age-old debate of access to justice has time and again acquired the attention of both legislature and judiciary for revisiting the level of achievement made so far and gaps that need to be filled especially in a pre-independence era. This concern resurfaced yet again very recently in the light of the Supreme Court's verdict in the case of Anita Kushwaha v.Pushap Sudan. In this case, the Supreme Court examined whether access to justice is indeed a fundamental right and the apex court held that- access to justice is indeed a facet of the right to life guaranteed under Article 21 of the Constitution.

Mahatma Gandhi aptly remarked that...unless the village life is realised, the nation as a whole cannot make a progress. Gram Swaraj or village self-rule was a pivotal concept in Gandhi's thinking.

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Gandhi compared Gram-Rajya to Ram-Rajya (i.e., self-rule by villagers, to the righteous polity of Lord Rama). The ideal village will be self-sufficient, he said,…the government of the village will be conducted by the panchayat of five persons" annually elected by adult villagers. The panchayats will be the legislature, judiciary and executive combined. Gandhi concluded his ouline of village government thus, and then is perfect democracy based upon individual freedom. The individual is the architect of his own government.

Panchayats, or traditional village courts, have long served as the foundational pillars of justice in India's rural landscape. In contemporary times, the formal court system plays a similarly crucial role, forming the backbone of the rule of law. Its institutional framework is vital for ensuring order, stability, and the effective functioning of a just and progressive society. However, faced with serious criticism for failing to guarantee access to justice for all-particularly the poor and marginalised - the Indian Parliament enacted the Gram Nyayalayas Act in 2008. The act has since faced persistent criticism for its inability to effectively deliver either substantive or procedural justice.

The paper, therefore, tries to outline that despite its noble intent, the implementation of the Gram Nyayalayas Act, 2008 has faced multiple hurdles in its implementation. The research methodology used in this paper is doctrinal research. The main sources of this research include the data collected from various publications viz., books, articles, essays, law journals, thesis and websites.

Objectives

1. To examine the significance of access to justice and how it remains a challenge in rural India due to various socio-economic and procedural barriers.
2. To critically analyse the provisions and purpose of the Gram Nyayalaya Act, 2008.
3. To identify and discuss the challenges and limitations in the implementation of the Act,
4. To suggest recommendations for improving the functioning and outreach of Gram Nyayalayas to ensure effective justice delivery at the grass root level.

Research Questions

1. What is the legislative intent and scope of the Gram Nyayalaya Act, 2008?
2. What are the key challenges and limitations faced in the implementation of Gram Nyayalayas?
3. How effective are Gram Nyayalayas in improving access to justice at the grassroots level?
4. What reforms or policy interventions can enhance the functioning and outreach of Gram Nyayalayas?

Accessing Justice through Gram Panchayayts: Historical Background

The expressionaccess to justice can be identified to focus on two major purposes- the legal system must be equally accessible to all and that it must lead to results that are individually and socially just. The historical perspective of justice through panchayats provides a comprehensive view of the unfolding of the dispute resolution mechanism at the village level in India through ancient, Mughal and British rule.Panchayats, which have existed in India for thousands of years, are a characteristic and distinctive institution of Indian civilisation. Literally the term means the "coming together of five persons," hence, a council, meeting or court consisting of five or more members of a village assembled to judge disputes or determine group policy.The ancient system of dispute resolution was based on the principle of quick justice enunciated in the Sukranitisarawhich states:

They are the best judges of the merits of case who live in the place where the subject matter of the dispute arises.

Indian culture and history of civilisation also stands a testimony to the system of justice and localised means of administration of justice. The origin of the administration of justice through participatory model and popularly known as 'People's Court' dates back to the Vedic age. To look for a detailed historic account of the societal framework and justice landscape, one must turn to Rig-Veda. As amongst the four Vedas, it is Rig Vedawhich enumerates the kind of social and political institutions that controlled the social order in various ways during the Vedic period. Exploring further, in the ancient context, Yagnavalkya mentions three kinds of courts of adjudicature namely, Kula- identified as the Panchayat of family or relatives, Sreni-this kind of Panchayat refers toPanchayat of the members of the same occupational group and Puga-refers to adjudicatory body ofPanchayat of different castes within a given territory, say a village. These panchayats had jurisdiction to decide almost every kind of dispute arising in the village community. And also they could decide both civil and criminal nature of matters. In Epic age there was a village headman calledGramini who presides and take care about the wellness of villagers. Above him was a Dasagrami, Vimsatipa, SatagramiorGramasatadhyaksha. They werein charge of ten, twenty and hundred villages. Above these all there was Adhipatiwho was in charge of one thousand villages. Traces of local self-government can also be found in both the Hindu and Mughal periods.

The village panchayats, which once thrived as self-governing institutions in ancient India, managed to persist into the modern era, including during British rule. Their continued relevance and effectiveness were notably acknowledged by Charles Metcalf. In his communication to the Select Parliamentary Committee on the East India Company's Charter in 1832, hementioned in clear terms:

> The village communities are little republics, having nearly everything they can want within themselves and almost independent of any foreign relations. They seem to last where nothing else lasts. Dynasty after dynasty tumbles down…but the village community remains the same...This union of the village communities, each one forming a separate state in itself, has…contributed more than any other cause to the preservation of the people of India through all the revolutions and changes which they have suffered, and is in a high degree conducive to their happiness, and to the enjoyment of a great portion of freedom and independence.

Later on, the Royal Commission on Decentralisation in 1907 recognised the important role of village panchayats in resolving disputes. The Commission highlighted the urgent need to grant these panchayats administrative authority and legal jurisdiction over minor civil and criminal matters. This was seen as essential for ensuring the prompt, harmonious, and efficient resolution of such cases at the local level. Almost two decades later, the time tested mechanism of village justice dispensation system was appreciated once again and put on record by the Privy Council in the case of *Sitannav. MarivadaViranna*. While affirming the award given by the Panchayat in a family dispute, Sir. John Wallis J of the Privy Council, observed:

> Reference to a village pinhead is the time honoured method of deciding disputes of this kind, and has these advantages, that it is generally comparatively easy for the panchayatdars to ascertain the true facts, and that, as in this case, it avoids protracted litigation which, as observed by one of the witnesses, might have proved ruinous to the estate. Looking at the evidence as a whole, their Lordships see no reason for doubting that the award was a fair and honest settlement of a doubtful

claim based both on legal and moral grounds, and are therefore of opinion that there are no grounds for interfering with it.

Thus, disputes in villages were not settled by royal courts which are situated mainly in cities, but locality within which the dispute arose either by the elders of the locality, or associations of traders and guilds or village panchayats. The traditional legal framework observed in ancient villages constitutes an essential component of the normative structure, firmly grounded in the principle of Dharmaand the disputes were settled also on personal law applicable to the parties. However, the breakup of these village institutions somewhat began under the British rule as the early British administrators started ignoring local indigenous legal system and imposed the process of adjudication in their courts on the pattern of their own British law courts of the period. Under the highly centralised system of the British administration, where all the activities were controlled and guided by directions from the central administration, village assemblies not having the sanction of British law finds no place, led to the death of village panchayats.

After India gained independence, the unique and significant role of panchayats, which had existed since the pre-colonial period, was carefully examined, acknowledged, and documented by the Law Commission of India in its 14th Report in 1958. This report offers a clear and concise overview of the village panchayats' function in resolving disputes. The report says:

> References to village panchayats abound in ancient literature and later historical accounts. In the structure of society as it existed in those days, the panchayat was the creation of the villagers themselves and was composed of persons who were generally respected and to whose decisions the villagers were accustomed to give unqualified obedience. It does not appear that these panchayats were brought into existence by the authority of the ruler. Except in matters of general importance, the ruler seems to have left the villagers to govern themselves and, among other things, the villagers assumed the responsibility for the settlement of disputes among themselves. It has, however, to be remembered that the disputes which these panchayats were called upon to determine were simple disputes between one villager and another; disputes that would otherwise have tended to disrupt the rural harmony. The village in those days was more or less self-contained and self-sufficient, the villagers being in a considerable measure dependent on them. In such a condition of affairs, it was not unnatural that the panchayats should have exercised a great measure of authority and commanded the willing allegiance of the people.

Again, there has been a reasoned argument for reviewing the role of panchayats in the context of facilitating justice delivery services to the rural poor. This came in the form of a notable observation from the Law Commission of India (LCI) in its 114th Report in the following words:

> Article 39A of the Constitution of India directs the State to secure that the operation of the legal system promotes justice, on a basis of equal opportunity, and shall, in particular provide free legal aid, by suitable legislation or schemes or in any other way, to ensure that opportunities for securing justice are not denied to any citizen by economic or other disabilities. This is the Constitutional imperative. Denial of justice on the grounds of economic and other disabilities is in nutshell referred to what has been known as problematic access to law. The Constitution now commands us to remove impediments to access to justice in a systematic manner. All agencies of the Government are now under a fundamental obligation to enhance access to justice.

> Article 40 which direct the State to take steps to organise village panchayats and endow them with such powers and authority as may be necessary to enable them to function as units of self government, has to be appreciated afresh in the light of the mandate of the new article 39A.

Constitutional Provisions and Access to Justice through Gram Panchayayts

Post-independence, most states established village panchayats and Nyaya Panchayats as separate bodies to uphold judicial independence. The Constitution of India, the basic law of the land, in its preamble, stands for securing justice to all its citizens. This aspiration is retained again in Article 39A, where the Constitution aspires to secure and promote access to justice to all its citizens, especially to the marginalised ones with, free legal aid by suitable legislation or schemes or in any other way.The initial draft constitution of India did not contain any reference to villages.The final version incorporated village oriented principles under Article 40 of the Directive Principles of State Policy. The Constitution's goal of equal justice to all underscores the importance of accessible justice, which was a key factor in the establishment of village panchayats. To advance this goal, the Constitution 42nd(Amendment) Act, 1976 inserted Article 39A, directing the State to ensure the legal system promotes justice based on equal opportunities and removes barriers caused by economic or other disadvantages. This mandate emphasises creating simplified procedures to address delays, reduce costs, and ensure justice is accessible, effective, and affordable. Article 40 further obliges the State to establish village panchayats, while Article 50 calls for the separation of the judiciary from the executive. This principle inspired states to create Nyaya Panchayats as independent judicial entities.

Gram Nyayalaya Act, 2008: From Nyaya Panchayats toGramNyayalayas

The law Commission, in its 114th Report, 1986 proposed the establishment of Gram Nyayalaya or village courts for providing speedy justice by a cost effective mechanism to the people in the rural areas.The report alerts one to their stated desire to move away from the Nyaya Panchayat model. The report came out with two objectives of Gram Nyayalaya the first and major one is the pending cases in subordinate courts, on the other hand the second one was the introduction of a participatory forum of justice.Thereafter, Gram Nyayalayas Act, 2008 was passed with the view of setting up an additional tier of justice delivery in addition to the existing Supreme Court, High Court(s), and Subordinate courts at the grassroots level naming “Gram Nyayalayas”.

Main Provisions of theGram Nyayalaya Act, 2008

The Gram Nyayalaya Act, 2008 contains 40 sections, divided into VIII chapters and two schedules, divided into III Parts each. The objects and reasons of the Gram Nyayalayas Act of 2008 succinctly depicts that access to justice is the true spirit of this statue as mandated by the Parliament in the following words:

> [T]o provide for the establishment of Gram Nyayalayas for the purposes of providing access to justice, both civil and criminal, to the citizens at the grass-roots level and to ensure that opportunities for securing justice are not denied to any citizen by reason of social, economic or other disabilities and for matters connected therewith or incidental thereto.

1. **Establishment of Gram Nyayalayas:** Every Gram Nyayalaya is the court of a Judicial Magistrate First Class and the Nyayadhikariwho acts as its presiding officer is appointed by the state government in consultation with the High Court of that state. The Nyayadhikari has same powers as any ofthe first class magistrates who work under the High Court.

2. **Appointment of Nyayadhikari:** The state government shall, in consultation with the high court, appoints, A Nyayadhikari for every Gram Nyayalaya (sec. 5). Any person who possesses the qualifications of a Judicial Magistrate First Class is eligible to be appointed as a Nyayadhikari (sec 6). Adhikari's salary and other allowances payable to and other terms and condition of service of Nyayadhikari shall be such which are applicable to the first class judicial magistrate (sec.7). Nyayadhikariis entitled to hold mobile courts and conduct proceedings in villages (sec.8).
3. **Jurisdiction, Powers and Authority of Gram Nyayalaya:** The Gram Nyayalaya would have jurisdiction over both civil and criminal cases as specified in schedule I and II of the act while the pecuniary jurisdiction in civil matters will be notified by the jurisdictional High Court.The I and the IIschedule can be amended by both the central as well as the state government.

(i) Criminal Jurisdiction

Section 12 of this Act provides that "Notwithstanding anything contained in the code of criminal procedure, 1973 (now Bhartiya Nayaya Sanhita, 2023) or any other law for the time being in force, the 'Gram Nyayalaya' may take cognizance of an offence on a complaint or on a police report and shall -

(a) Try all offences specified in part 1 of the first schedule; and

(b) Try all offences and grant relief, if any, specified under the enactments including in part II of that schedule.

(2) Without prejudice to the provisions of sub- section (1), the 'Gram Nyayalaya' shall also try all such offences or grant such relief under the state Acts which may be notificationed by the state Government under sub- section (3) of section 14.

(ii) Civil jurisdiction

Notwithstanding anything contained in the code of civil procedure code 1908 or for any other law for the time being in force and subject to subsection 2, the Gram Nyayalaya shall have jurisdiction to-

a) Try also proceedings of a civil nature falling under the classes of disputes specified in part 1 of second schedule,

b) Try all classes of claims and disputes which may be notified by the central government under subsection 1 of section 14 and by the state government under subsection 3 of the said section 2 provide that the pecuniary limit of the gram shall be such as may be specified by the high court, in consultation with the state government, by notification, from time to time.

4. **Summary Trial Procedure of Gram Nyayalaya:** Notwithstanding anything contained in sub-section (1) of section 260 (now sec 179 of Bharatiya Nyaya Sanhita, 2023) or sub-section (2) of section 262 of the Code of Criminal Procedure, 1973 (now sec. 184 Baharatiya Nyaya Sanhita, 2023) the Gram Nyayalaya shall try the offences in a summary way in accordance with the procedure specified in Chapter XXI (now XIV of theBaharatiya Nyaya Sanhita, 2023) of the said Code and the provisions of sub-section (1) of section 262 (now sec. 184) and sections 263 to 265 (now sec. 185 to sec.186 of the said Code (now Sanhita) shall, so far as may be, apply to such trial.
5. **Provision for Plea Bargaining:** A person accused of an offence may file an application for plea bargaining in Gram Nyayalayain which such offence is pending trial and the Gram Nyayalaya shall dispose of the case in accordance with the provisions of Chapter XIV of the Baharatiya Nyaya Sanhita, 2023.

6. **Conciliation and Settlement of Civil Disputes:** Section 26(1) of this Act said that "In every suit or proceeding, endeavour shall be made by the 'Gram Nyayalaya' in the first instance, where it is possible to do so, consistent with the nature and circumstances of the case, to assist, persuade and conciliate the parties in arriving at a settlement in respect of the subject matter of the suit, claim or dispute and for this purpose, a 'Gram Nyayalaya' shall follow such procedure as may be prescribed by the High Court."
7. **Appointment of Conciliator:** According to sec. 27(1) in every suit or proceeding, endeavour shall be made by the Gram Nyayalaya in the first instance, where it is possible to do so, consistent with the nature and circumstances of the case, to assist, persuade and conciliate the parties in arriving at a settlement in respect of the subject matter of the suit, claim or dispute.
8. **Application of The Bhartiya Sakshya Adhiniyam, 2023:** Section 30 of this Act provides that a 'Gram Nyayalaya' may receive as evidence any report, statements, document, information or matter that may, in its opinion, assist it to deal effectually with a dispute, whether or not the same would be otherwise relevant or admissible under the Indian Evidence Act, 1872 (now Bhartiya Sakshya Adhiniyam, 2023). Gram nyayalaya will not be bound by the rules of evidence given in the Indian Evidence Act, 1872 (Bhartiya Sakshya Adhiniyam, 2023),but will be directed under the principles of natural justice and any rule made by the High Court.
9. **Pronouncement of Judgment:** As per sec.22 (1) the judgment in each trial shall be pronounced in open court and the copy of the judgment will be supplied to the parties free of cost.
10. **Appeal:** Section 33 (1) of the Act provides that appeal in criminal cases to the extent provided in the Code of Criminal Procedure, 1973(now Bhartiya Nayaya Sanhita, 2023), shall lie to the court of sessions, which shall be heard and disposed of within a period of six months from the date of filing of such appeal and an appeal from the judgment of GramNayalaya in civil cases, to the extent provided in the civil procedure code, 1908, shall lie to the District Court which shall be heard and disposed of within six months from the date of filing of such appeal.

Critical Analysis of the Act

From the above discussion, it can be observed that from the British era to the present day, various initiatives have been undertaken to improve access to justice and minimize the cost of dispute resolution. One of the most significant among them was the formal recognition of village panchayatbased dispute resolution mechanisms. This initiative led to the establishment of village courts during British rule. After independence, these evolved into Nyaya Panchayats, which were set up throughout the country. However, from the 1970s onwards, Nyaya Panchayats witnessed a decline both in the number of cases being filed and in their disposal rates. To overcome this, the Parliament passed the Gram Nyayalayas Act in 2008. A careful examination of the Gram Nyayalayas Act reveals the following shortcomings:

1. Lack of Proper Implementation: Unless a sufficient number of Gram Nyayalayas are established in every district of States in line with the objectives of the Gram Nyayalayas Act, the purpose of the legislation will remain unfulfilled. Without their proper implementation, the rural poor will continue to lack access to a justice. In such a scenario, it would be challenging to accurately evaluate the true effectiveness of Gram Nyayalayas.
2. Deviation from Core Principles of Panchayat System:The structure established by the act largely departs from the core principles of the panchayat system. The Gram Nyayalaya Act follows an adversarial adjudication model, where professional judges preside over cases and legal

professionals represent the parties. Additionally, Gram Nyayalayas have broader jurisdiction in both civil and criminal matters compared to most Nyaya Panchayats. While civil disputes are intended to be resolved through conciliation first, the Act ultimately upholds the foundation of adversarial proceedings. This marks a significant shift away from the village panchayat's traditional approach of consensual and amicable dispute resolution.

3. Insufficient Infrastructure and Lack of Effectiveness of Gram Nyayalayas in Addressing Rural Judicial Needs:The Supreme Court in its judgment of October 2024, raised critical questions regarding the feasibility of setting up gram nyayalayas (village courts), as mandated by the Gram NyayalayasAct. The Supreme Court highlighted that even the regular courts in the country are struggling with insufficient infrastructure and many of them are forced to operate out of "godowns". It also recommended that the establishment of such courts be driven by state-specific requirements. A bench led by justice Bhushan R Gavai, along with justices Prashant Kumar Mishra and KV Viswanathan, voiced concerns about how state governments, already grappling with limited resources for regular courts, could fund additional Gram Nyayalayas effectively. Expressing concerns over the potential impact of Gram Nyayalayas on higher judicial bodies, the bench further observed that while the primary objective of these rural courts is to ease the caseload on district and civil courts, they may end up burdening high courts with appeals and writ petitions. Another key issue raised by the Supreme Court was the effectiveness of Gram Nyayalayas in addressing rural judicial needs, pointing out that while a judicial magistrate in a regular court typically handles thousands of cases over a few years, a Gram Nyayalaya magistrate in Karnataka managed to hear only 116 cases in four years.The bench suggested that increasing the number of regular courts and judicial officers might be a more effective way to address judicial backlogs, rather than establishing additional Gram Nyayalayasthat may not serve their intended purpose.
4. Inadequate Training of Nyayadhikari: It has been observed that Nyayadhikaris are appointed from the regular cadre of Judicial Magistrates of the first Class without receiving adequate training to fulfill the specific objectives of the Gram Nyayalayas Act. Moreover, they are assigned dual responsibilities, as they are also required to perform the duties of a regular judicial magistrate from the same location as the Gram Nyayalaya. This additional burden has negatively impacted the core functioning of the Gram Nyayalayas.

Conclusion and Suggestions

Several initiatives have been taken from time to time to improve and expedite the justice delivery system and for making it affordable and easily accessible to common man all across the country which includes simplification and bringing changes in procedural law, accepting and implementing the concept of Lok Adalat incorporating various ADR mechanisms such as arbitration, conciliation, mediation and extending the facility of legal aid to poor, women, children, to scheduled caste,scheduled tribe and other weaker sections of the society, establishment of fast track courts, and computerisation of courts etc.An initiative was also taken by our Parliament to provide access to justice for hundreds of millions of rural population through the promotion of Nyaya Panchayats (village courts) and then by enacting legislationwhich is theoretically provocative as well as practically important. The Act officially came into force on October 2, 2009, coinciding with Mahatma Gandhi's birth anniversary, symbolising his vision for equitable justice.However, in spite all these measures, no considerable relief came to be extended to the common man and easy access to justice, yet to be fulfilled. This further gets more relevant when the Supreme Court recently raised critical questions

regarding the feasibility of setting up Gram Nyayalayas (village courts), as mandated by the Gram Nyayalayas Act of 2008. Looking at the practical difficulties discussed above in this article the recent observation of the Supreme Court in October 2024 is noteworthy:

Proposing a more flexible approach to implementing the Gram Nyayalayas Act, rather than a uniform mandate across all states the Supreme Court suggested that the establishment and number of GramNyayalayas should be determined based on specific state needs.

Hence, the author puts forward the following recommendations, which could strengthen the existing framework of Gram Nyayalayas:

1. It is recommended that a dedicated cadre of judges be established specifically for Gram Nyayalayas, in line with the recommendations of the Law Commission, and that their functioning be kept separate from that of the regular judicial magistrate of first class.
2. Nyayadhikari should undergo specialised training, as this is crucial given that, in Gram Nyayalayas, they are allowed to bypass formal procedural laws and rely significantly on the practice of conciliation.
3. To enhance public awareness about Gram Nyayalayas and the legal rights of villagers and the general population, it is essential to organise awareness camps and programmes. Publicity should be carried out through accessible media such as newspapers, television, radio, and other communication channels that effectively reach remote areas. This will help ensure that people are informed about these courts and the legal assistance available to them.
4. Permanent Legal Aid cells should be set up in villages, which lack in development.

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BUSINESS STUDIES

Bibliometric Analysis on Environmental Transformational Leadership

Princee Verma* & Saloni Devi**

ABSTRACT

Scholars have increasingly explored environmental transformational leadership, environmental-specific transformational leadership and green transformational leadership, often considering these terms interchangeable. Research in this field has grown steadily, with a notable surge in 2022. This study examines the scientific literature on environmental transformational leadership using the Scopus database from 2013 to 2025, identifying 161 valid documents. The data was analysed using VOS viewer, revealing increasing scholarly collaboration. Most publications were in English, involving 144 authors from 49 countries and 192 universities. The findings highlight a significant rise in research interest and contributions from a diverse academic community.

Key Words: Environmental transformational leadership, Environmental-specific transformational leadership, Green transformational leadership, VOS viewer and Bibliometric Analysis.

Introduction

Environmental transformational leadership has garnered significant scholarly and practical attention for its role in promoting sustainability (Awan et al., 2022; Bahzar, 2019; Chen & Chang, 2012; Chen et al., 2014; Ismail, 2025; Kura, 2016; Mansoor et al., 2021; Robertson, 2017; Robertson & Barling, 2017; Sopiah et al., 2024; Tian et al., 2023; Zhang et al., 2020). Research has highlighted its impact on pro-environmental behaviour (Agrawal & Pradhan, 2023; Farrukh et al., 2022; Fatoki, 2023; Khan et al., 2025; Peng et al., 2020; Thanh Tiep Le et al., 2024; Wang et al., 2018), organizational sustainability performance (Althnayan et al., 2022; Yaroğlu, 2024), green innovation (Elshaer et al., 2022; Nadia Aslam Janjua et al., 2024; Singh et al., 2020) and competitiveness.

Despite this progress, limited attention has been given to the bibliometric landscape of the field, including trends, influential authors, and collaboration networks. A bibliometric analysis is essential to systematically assess the field's evolution, identify emerging themes, and highlight areas that warrant further investigation. This approach offers an objective, data-driven perspective on the development and trajectory of the research domain.

The findings of this study can guide future researchers toward unexplored topics, provide practitioners with insights into effective leadership strategies for sustainability, and support policymakers in evidence-based decision-making. Additionally, it fosters scholarly collaboration and institutional partnerships, further strengthening research on environmental transformational leadership.

2. Literature Review

Environmental transformational leadership (ETL), as defined by Chen & Chang (2013), refers

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to a leader's ability to motivate followers to surpass environmental performance expectations through the adoption of green management practices (Chen et al., 2014, 2023; Sun et al., 2022; Zhu et al., 2022). ETL integrates principles of transformational leadership within the context of environmental sustainability (Robertson, 2018). It is also known as green transformational leadership (Du & Yan, 2022; Mittal & Dhar, 2016) and environmental-specific transformational leadership (Graves et al., 2013; Li et al., 2020; Niazi et al., 2023; Robertson, 2017).

Robertson (2018) outlined four key dimensions of ETL. They are Environmental idealized influence, in which leaders serve as role models for eco-friendly behaviour; Environmental inspirational motivation, which inspires enthusiasm for sustainability goals; Environmental intellectual stimulation, encouraging innovation in environmental problem-solving and Environmental individualized consideration, offering personalized support for green initiatives (Asghar et al., 2022; Du & Yan, 2022).

Recent research underscores ETL's positive influence on employees' environmental responsibility (Du & Yan, 2022; Hamad & Khan, 2024) and organizational sustainability awareness (Liu et al., 2023; Li et al., 2022; Liu & Yu, 2023; Yaroğlu, 2024). These findings reinforce ETL's significance in enhancing pro-environmental behaviour, promoting green innovation and improving sustainability performance. A bibliometric analysis is therefore timely to map influential research, detect knowledge gaps and provide structured insights to advance theory and practice. Given its strategic relevance, ETL continues to be a critical leadership model for organizations pursuing sustainability.

3. Data and Methodology

3.1 Background

This section employs bibliometric methods, rooted in library and information science, to analyse and classify scholarly publications (Broadus, 1987; Ghorbani et al., 2021; Pritchard, 1969; Xu & Yu, 2019). These techniques are widely used to evaluate academic output across journals, institutions, countries and thematic areas (Albort-Morant & Ribeiro-Soriano, 2016; Blanco-Mesa et al., 2017; Cancino et al., 2017; Martínez-López et al., 2018; Merigó et al., 2019; Valenzuela et al., 2017, 2019).

Bibliometric analysis quantifies research trends by examining variables such as subject domain, time span, geographic distribution, keyword frequency, authorship and citation patterns (Li et al., 2023; Tay, 2022; Rojas-Sánchez et al., 2022; Rusly et al., 2019). In management studies, it has emerged as a rigorous alternative to traditional literature reviews (Brika, 2022; Boţa-Avram, 2023; Kalantari et al., 2017). Key metrics include publication sources, author affiliations, h-index, and citation impact (Ahmi & Mohammad, 2019; Kalhor et al., 2022; Hottenrott & Lawson, 2017), offering structured insights that enhance research visibility and guide future inquiry.

3.2 Implementation

Building on established methodologies, the study employed both descriptive and network-based bibliometric analyses. Descriptive metrics included total publications, citations per paper and citation impact, assessed using the h-index and g-index (Ding & Cronin, 2011; Egghe, 2006; Garner et al., 2017; Hirsch, 2005; Kamrani et al., 2021; Tsay, 2009). The h-index served to measure productivity and citation influence, while the g-index addressed skewness by emphasizing highly cited works.

All indices were computed using VOS viewer's default configuration, ensuring transparency and reproducibility. Network analysis explored co-authorship, keyword co-occurrence and co-citation

networks, uncovering thematic structures, research collaborations and disciplinary linkages. Data were sourced from Scopus and Web of Science—both premier academic databases offering comprehensive metadata on authorship, keywords, affiliations and document types (Chadegani, 2013; Guleria & Kaur, 2021; Kirby, 2023).

3.3 Search Strategy and Parameters

The literature search was conducted using a title-based query: TITLE ("Environmental Transformational Leadership" OR "Green Transformational Leadership" OR "Environmental-Specific Transformational Leadership") The search covered the years 2013 to 2025, with 2013 marking the first appearance of scholarly work on this topic and 2025 representing the current year under review.

A total of 847 documents were initially identified—499 focusing on Green Transformational Leadership, 291 on Environmental-Specific Transformational Leadership and 57 on Environmental Transformational Leadership (ETL). After screening titles, abstracts and full texts for relevance, 237 studies were shortlisted. Upon removing 76 duplicates, 161 papers were retained for final analysis. The dataset included all document types and was limited to English-language publications to ensure consistency and accuracy in the review process.

4. Results

The analysed studies represent diverse document types and sources, reflecting the field's scholarly growth over time. The results examine language distribution, subject domains, keyword patterns, geographic contributions, authorship trends and citation performance. Data are presented primarily in terms of frequencies and percentages.

Annual publication growth is detailed by reporting the number of documents published each year, along with their respective percentages and cumulative totals as of March 2025. Citation metrics further highlight the field's intellectual influence, and the top 10 most cited papers in the area of web accessibility are identified for their academic impact.

4.1 Evolution of Publication

As illustrated in Figure 1, the volume of publications on environmental transformational leadership remained modest in the early years, with only minor fluctuations. A notable upward trend began in 2020, followed by a substantial increase in 2022. The publication output reached its peak in 2024. Although 2025 is still ongoing, preliminary data already indicate an upward trajectory compared to the previous year. A considerable number of studies have been published and indexed in both the Scopus and Web of Science databases, reflecting sustained scholarly interest in the field. The first known study in this domain was published in 2013 by Chen Y.-S. and Chang C.-H., titled "*The Determinants of Green Product Development Performance: Green Dynamic Capabilities, Green Transformational Leadership and Green Creativity"*.

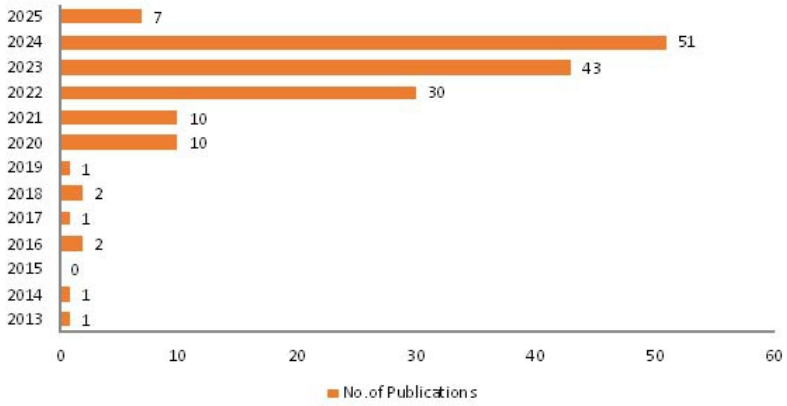

Figure 1: The growth of environmental transformation leadership publications, 2013-2025 (n=161).

4.2 Documents and Source Type

In this study, five distinct document types related to environmental transformational leadership were identified: journal articles, book chapters, conference papers, review articles and an erratum. As shown in Figure 2, journal articles constituted the overwhelming majority, accounting for 151 publications (93.8%). Book chapters followed with 4 publications (2.5%), while conference papers, reviews and the erratum comprised 3 (1.9%), 2 (1.24%) and 1 (0.62%) document, respectively. Together, these non-article types represented approximately 6.2% of the total output, with each contributing less than 5% individually.

Figure 3 further illustrates the distribution of publication sources, with journals emerging as the dominant source type, contributing 98% of the total documents.

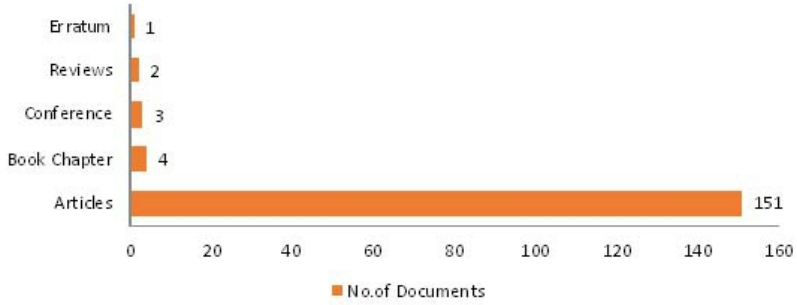

Figure 2: Document Distribution of environmental transformation leadership publications, 2013-2025 (n=161).

Figure 3: Source Distribution.

4.3 Language of Documents

The majority of the retrieved articles i.e. out of 161 were written in English.

4.4 Subject Area

The present study categorizes the published articles according to their respective academic disciplines. The majority of research on environmental transformational leadership falls within the fields of business and management, comprising 94 articles (58.4%). Psychology and behavioural sciences follow with 17 articles (10.6%), while tourism and hospitality contribute 13 articles (8.1%). Both technology and innovation, and healthcare and nursing, account for 8 articles each (5.0%). Operations and supply chain management represent 5 articles (3.1%). Environmental studies and topics related to economics, policy, and business law each comprise 7 articles (4.3%). The smallest share belongs to engineering, construction, and architecture, with just 2 articles (1.2%). These distributions are visually summarized in Figure 4.

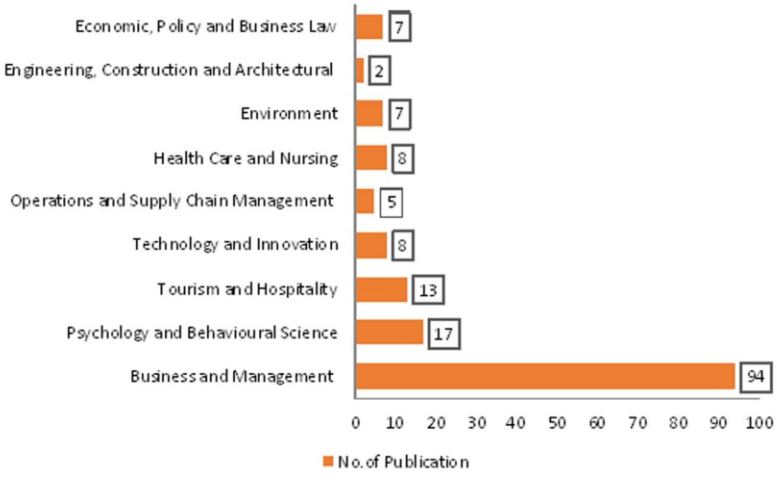

Figure 4: Subject Area Distribution.

4.5 Geographic Distribution of Publication and Affiliation

According to Table 1 and Figure 5, China emerged as the leading contributor with 54 publications, followed by Pakistan (31), Saudi Arabia (19), Malaysia (12), and both India and Egypt with 10 publications each. However, in terms of total citations, Italy and France occupy the top positions, despite having fewer publications, with 1,259 and 1,198 citations respectively. This suggests that while publication volume is high in some countries, research impact as measured by citations is concentrated in others.

Table 1: Total Publication and Citations of Country

Country	Total Publication	Total Citations
China	54	2216
Pakistan	31	1235
Saudi Arabia	19	436
Malaysia	12	246
Italy	5	1259
Russian Federatio	4	1359
United Arab Emir	3	1267
France	1	1198
India	10	125
Egypt	10	436

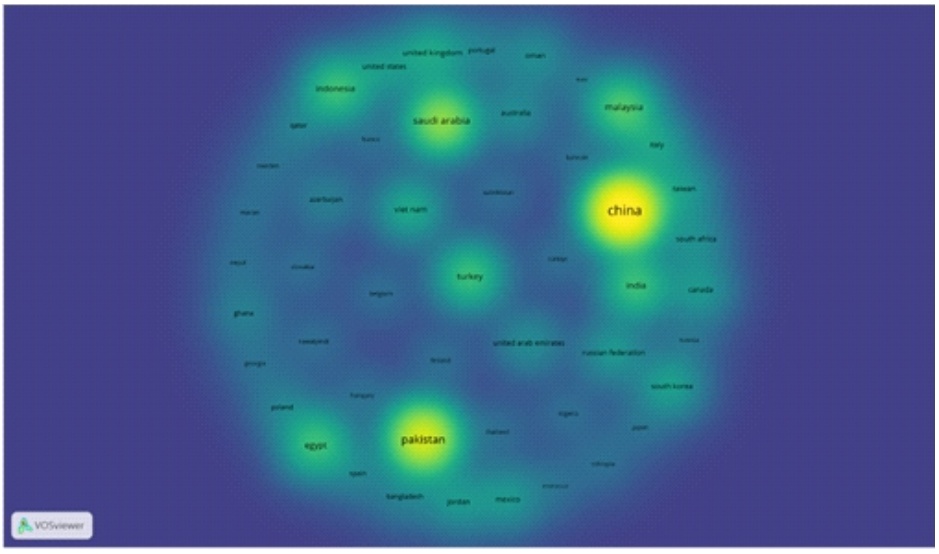

Figure 5: Countries Density Visualization with Citations Source: VOS viewers.

4.6 Most influe al institutions with a ninimum o one public tion

Table 2 nd Figure 6 present the top te institutior contributi g to publications on environmental t nsformational leadersl p. The Beij g Institute f Technolo ranks first in terms of publication count and citation volume, rollowed by tne Harbin institute of Technology and Wuhan University of Technology, among others. Conversely, institutions such as the University of Milano, University of Rome, Abu Dhabi University, National Research University Higher School of Economics, and the Paris School of Business exhibit a high citation impact despite having fewer publications. These findings highlight that research on environmental transformational leadership is globally distributed and not limited to any specific geographic region.

Table 2: Influential Institution.

Affiliation	Country	TP	TC
Shenzhen University	China	2	81
Beijing Institute of Technology	China	2	138
Harbin Institute of Technology	China	2	63
Wuhan University of Technology	China	2	28
The Superior University	Pakistan	2	28
Sichwan Police College	China	2	3
Southwest Petroleum University	China	2	3
Istanbul Topkapi University	Turkey	2	2
University of Milano	Italy	1	673
University of Rome	Italy	1	673
Abu Dhabi University	Abu Dhabi	1	673
National Research University Higher School of Economics	Russia	1	673

Notes: TP =Total Publication, TC=Total Citation

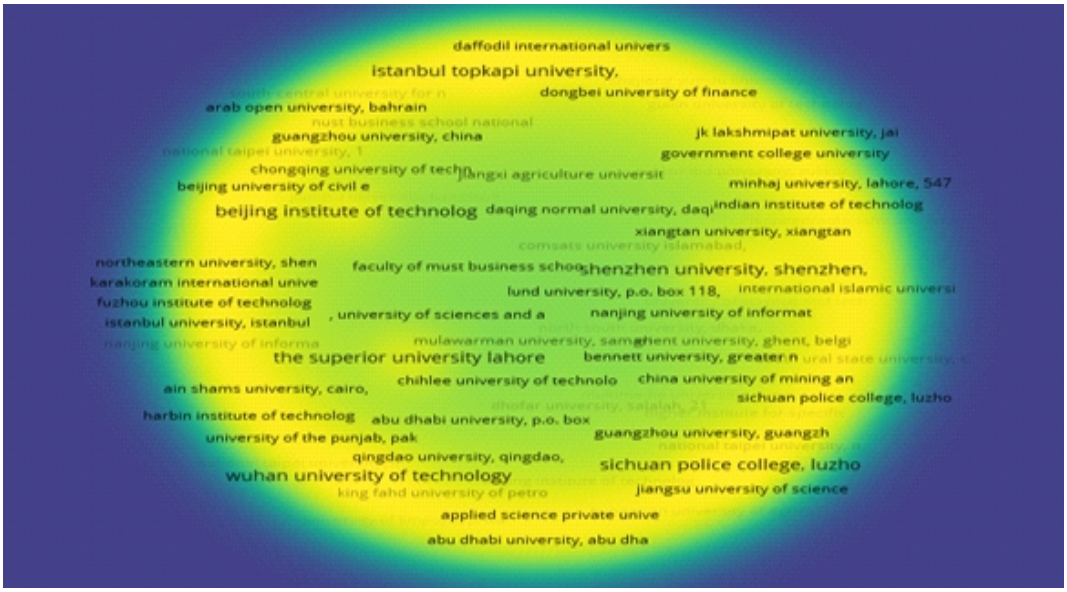

Figure 6: Influential Institution Density Visualization with Citations Source: VOS viewers.

4.7 Authorship Analysis

This study identifies the most influential authors in the field of Environmental Transformational Leadership, based on their number of publications, citation metrics, and collaborative impact (Table 3, Figure 7). Sarstedt M. leads in scholarly impact with an h-index of 103 and an i10-index of 193. Notably, Chen Y.S. (Total Link Strength: 9,874) and Ringle C.M. (Total Link Strength: 9,586) demonstrate strong collaborative networks. Other prominent contributors include Robertson J.L., Hair J.F., Barling J., Bass B.M., Chang Ch., and Paille P., whose citation counts range from 6,866 to 9,387. The increasing citation rates of recent publications further indicate a growing academic interest and momentum in this emerging research area.

Table 3: Author Analysis

Auhor	TP	NCP	TC	TLS	C/P	C/CP	H	i10
Sarstedt M.	1	1	156	10,000	156	156	103	193
Chen. Y.S.	1	1	178	9874	178	1039	74	124
Ringle C.M	1	1	148	9586	148	1039	44	82
Robertson. J	1	1	166	9387	166	1039	16	16
Hair J. F.	1	1	140	8627	140	432	12	27
Barling J.	1	1	144	8053	144	432	21	108
Bass B.M.	1	1	138	7861	138	202	47	93
Chang Ch.	1	1	131	7519	131	202	51	97
Paille P.	1	1	105	6866	105	164	43	81
Singh S.K.	1	1	107	6704	107	164	49	80

Notes: TP= Total number of publications; NCP=Number of cited publications; TC=Total citations; TLS= Total Link Strength; C/P=Average citations per publication; C/CP=Average citations per cited publication; h=h-index; and i10= i10-index.

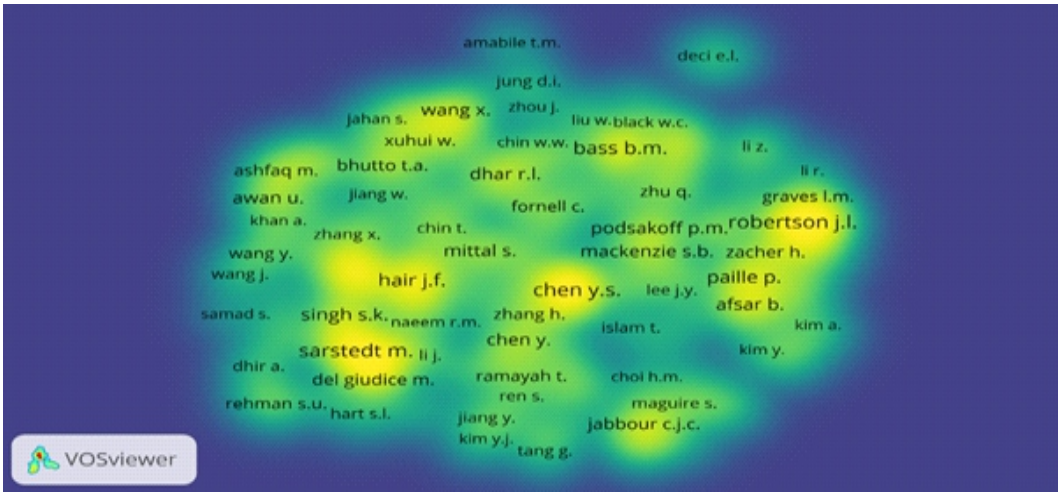

Figure 7: Density of Visualization of Authors with Citations Source: VOS viewers.

4.9 Keyword Analysis

VOS viewer was employed to map authors' keywords and construct bibliometric networks. Figure 8 presents a visual representation of keyword associations, utilizing color coding, font size, node (square) size, and link thickness to indicate the strength and frequency of connections. Keywords sharing the same color reflect thematic similarity and co-occurrence. The analysis considered keywords that appeared at least 10 times in SCOPUS and Web of Science-indexed

publications from 2013 to 2025. Notably, terms such as green transformational leadership, environmental-specific transformational leadership and environmental performance represented in orange, exhibit strong interconnections.

Beyond the core term environmental transformational leadership, other frequently used and thematically significant keywords include green innovation, green human resource management (HRM), pro-environmental behaviour, transformational leadership and green organizational identity. Table 4 lists the ten most frequently

Table 4: shows the top 10 keywords used in environmental transformational leadership studies.

Rank	Keywords	Occurrences	Total Link Strength
1	Green Transformational Leadership	91	379
2	Green Innovation	25	119
3	Environmental Performance	16	76
4	Green Creative	16	62
5	Environmental Specific Transformational Leadership	14	53
6	Green Human Resource Management	12	51
7	Pro-Environmental Behaviour	8	30
8	Environmental Transformational Leadershi	8	29
9	Transformational Leadership	7	28
10	Green Organisation Identity	6	26

Figure 8: Network Visualization Map of the Author Keywords of environmental

transformation leadership publications, 2013-2025 (n=161) Source: VOS viewers.

Meanwhile, green transformational leadership and leadership, are among the keywords with the highest occurrences after removing the core keywords specified in the search query, which is environmental transformational leadership.

4.8 Citation Analysis

Harzing's Publish or Perish software was utilized to generate citation metrics for the retrieved data. The dataset, initially collected from the database, was imported into the software to compute a comprehensive set of citation indicators. The citation metrics, summarized as of March 2025, are presented in Table 5. The summary includes the total number of citations, citation distribution by year, average citations per paper, and citations per author, offering valuable insights into the scholarly impact of the retrieved literature.

Table 5: Citations metrics.

Metrics	Data
Publication Years	12
Citation Years	12
Papers	161
Citations	7742
Maximum Citations	1198
Minimum Citations	0
Citations/Years	645.16
Citations/Papers	48.09
Authors/Papers	0.89
Hirsch h-index	33
Egghe g-index	618.94
PoP hI, norm	0.1745
PoP hI, annual	3.3

5. Discussion

This study provides a comprehensive analysis of environmental transformational leadership research, highlighting key trends and insights. Publications have grown consistently since 2013, with a sharp rise in 2022 (30 papers), 2023 (43 papers) and 2024 (51 papers), while 2025 (7 papers so far) indicates continued momentum. A total of 161 documents (2013–2025) have accumulated 7,742 citations, averaging 645.17 citations per year, 48.09 per paper and 0.89 authors per study. China leads in publications and citations, surpassing the USA, UAE and Canada. This dominance can be attributed to China's increasing policy focus on environmental governance, substantial investments in

green technology and innovation and its strategic push to become a global leader in sustainability practices. The prominence of Chinese authors and institutions also reflects broader governmental support for climate-related research and academic incentives aligned with national green development goals. These patterns are consistent with global movements toward environmental leadership, where countries like China are positioning themselves at the forefront of sustainable development discourse. Journals dominate as the primary source, with English as the main language. Business and management are the primary disciplines, but psychology also contributes to understanding leadership and environmental behaviour. Keyword analysis highlight's themes like “green transformational leadership”, “environmental performance” and “green innovation,” emphasizing sustainability. Top-cited papers focus on green innovation, environmental performance, and leadership's role in sustainability. This research establishes a strong foundation for future studies, reinforcing leadership's critical role in driving environmental sustainability across organizations globally.

6. Conclusion

The bibliometric landscape of Environmental Transformational Leadership demonstrates a field experiencing rapid evolution and increasing academic relevance. The consistent growth in scholarly output, especially after 2021, highlights a rising global commitment to integrating leadership with environmental sustainability. China leads in both publication volume and citation impact, highlighting the field's international significance. Articles remain the dominant document type, with English serving as the primary language of dissemination, promoting broader academic collaboration.

The interdisciplinary nature of the research spanning business, management, psychology and sustainability underscores the integral relationship between leadership and environmental performance. Core themes such as green transformational leadership, environmental-specific leadership and green innovation align with global sustainability goals. Highly cited studies focus on green innovation and leadership's influence on organizational environmental performance, indicating a strong scholarly interest in actionable, results-driven research.

7. Limitations

Despite its contributions, this study presents certain limitations. First, the analysis is limited to data available up to March, 2025 and ongoing research may yield additional insights. The reliance on bibliometric methods may exclude emerging or non-indexed sources, thereby narrowing the scope. A language bias favouring English could also limit representation from non-English speaking regions. Furthermore, citation-based indicators, while useful, may not fully capture the qualitative depth or societal relevance of the work. Disparities in publication output across countries and institutions may reflect broader academic inequalities, potentially marginalizing contributions from underrepresented regions. Lastly, focusing solely on Scopus-indexed publications excludes data from other significant databases such as Google Scholar and Dimensions.

8. Future Research Directions

Future studies should explore the convergence of environmental transformational leadership with emerging technologies such as blockchain, artificial intelligence and renewable energy systems. There is also a need to examine cross-cultural perspectives to develop globally inclusive leadership frameworks. The influence of communication strategies and storytelling on shaping environmental leadership narratives warrants deeper investigation. Moreover, the impact of environmental leadership on supply chain sustainability, stakeholder engagement and corporate ecosystem

resilience offers fertile ground for further inquiry. Finally, future research should examine the alignment and potential tension between environmental leadership and financial performance to guide the development of balanced, sustainable business strategies.

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Strategic Marketing Initiatives in enhancing the performance of Higher Education Service Scope

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ABSTRACT

Purpose—The study attempts to measure the association of SDL with customer participation and customer satisfaction, leading to value creation. It also tries to investigate the relationship between customer participation and value creation.

Methodology—522 research scholars from the University of Jammu (UOJ) and Guru Nanak Dev University (GNDU) were contacted for data collection.

Findings –The study established a significant relationship between SDL and customer participation and satisfaction. Customer participation and value creation were also found to be positively associated with each other.

Research Limitation- The study is limited to research scholars' perception and needs to be explored with respect to other stakeholders to understand this relationship more deeply.

Key Words: Higher Education, Value Creation, Customer Participation, Customer Satisfaction, Service Dominant Logic

Introduction

Conceptual Framework

Service-Dominant Logic (Vargo and Lusch, 2004) is a comprehensive framework based on the interaction and collaboration between service providers and service users is the ultimate source of creating value, not the mere exchange of goods (Leem 2021). Based on it, the behavioural competencies are key determinants of an individual's behaviour (Lusch & Vargo, 2008) and therefore, greatly influence how individuals conduct their activities and simultaneously judge the conduct of others. The co-creation of value and the exchange of knowledge are important to service dominant logic (SDL). The basic principle of SDL requires behaviours that can be measured against such underlying competencies to create value (Leem 2021; Karahasanovic & Culén, 2021; Tran, Mai, and Taylor, 2021).

Based on social construction theories, Edvardson, Tronvoll, and Gruber (2011) remark that value creation results in a social system when various actors integrate and collaborate. In simple words, providers, consumers, and other stakeholders in the service chain participate and interact to create value for the organisation (Liu & Tsuar, 2014; Hsiao, Lee & Chen, 2015). This interaction among organisational members promotes the development of collaborative behaviours within organisations.

As such, the bottom line of the Service Dominant Logic paradigm by Vargo and Lusch in 2004 is 'service'. The central characteristics of SDL are aimed at solving the dichotomy between service and product, with knowledge being the core objective. Lusch and Vargo, (2008); Gronroos, (2008),

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Silva and Marques (2024) state that this knowledge is the basis for the exchange of competencies. SDL further asserts that nowadays services are a source of competitive advantage and are based on the application of competencies for the benefit of another (Vargo and Lusch, 2004; Nariswari and Vargo, 2024). SDL postulates that in the present era, value is created collaboratively by an organization and its stakeholders, including customers, employees, suppliers, and partners (Vargo and Lusch, 2008; Karpen, Bove, and Lukas, 2009; Chahal and Mahajan, 2014; Silva and Marques, 2024). Thus, the proposition that the value of a service is realized at the moment it is consumed is now well established, in contrast to the traditional view that value is created by producers (Vargo & Lusch, 2004; Nariswari and Vargo, 2024).

By applying the service marketing concept, that is, SDL in higher education institutions, there are certain categories of benefits, such as increased customer participation, increased customer satisfaction, which are very important for the well-being of higher educational institutions. Lusch, Vargo, and O'Brien (2007), Maglio and Spohrer (2008), Payne, Storbacka, and Frow (2008), Yazdanparast, Manuj, and Swartz (2010), and Cabiddu, Lui, and Piccoli (2013), Zuhroh and Rini (2024) have all examined the SDL framework, highlighting its impact on enhancing organizational outcomes and customer experiences. They state that co-creation involves joint efforts between providers and customers to generate value through mutual engagement. Based on the above discussion, the study focuses on the strategic marketing initiatives that are SDL in enhancing the performance of higher education through increased customer participation and customer satisfaction that consequently leads to value creation (Bovill, Jarvis, & Mpamhanga, 2025). SDL emphasizes value co-creation through interaction between providers and beneficiaries. Research scholars actively co-create knowledge through academic inquiry, collaboration with faculty, conferences, and publications. This co-creation aligns with SDL's principle: "Value is co-created by multiple actors, always including the beneficiary" (Vargo & Lusch, 2008). Moreover, in the higher education context, research scholars are recipients of academic services—supervision, mentorship, library access, and research funding. They further experience and evaluate these services, which makes them suitable respondents for understanding how value is perceived, co-created, and delivered (Lusch & Vargo, 2014; Bovill, Jarvis, & Mpamhanga, 2025).

Review of Literature

Service Dominant Logic

Organizational competencies are the basis of SDL (Gummesson, 2008; Maglio and Spohrer, 2008; Edvardsson, Tronvoll, and Gruber, 2011). Lusch and Vargo (2008) opine that the application of organizational competencies, namely collaborative and absorptive competencies, is fundamental for the benefit of all stakeholders in the organization. Thus, leveraging collaborative competencies fosters interactive processes between organizations and stakeholders that ultimately develop value for the organization. Further about absorptive and adaptive competencies, Lusch and Vargo (2008) argue that these competencies are essential for firms to enhance their responsiveness to market needs and capitalize on emerging opportunities.

Customer Participation

Dong, Evans, and Zou (2008) and Saxena (2010) state that customer participation refers to the participation of customers in an organisation's defined parameters in producing and delivering services. It refers to the actions and resources supplied by customers for service production and delivery (Akaka, Huotari & Vargo 2021; Chatterjee et. al., 2021; Bovill, Jarvis, & Mpamhanga 2025). If

customers do not fulfill the required action properly, the delivery of service will not succeed. However, customers may choose to cooperate with service providers, make suggestions to the service organization, and help other customers. This enhances customers' relationship with the organisation and also improves the quality of the product or service by involving them in more interactions with the service provider (Flint, Blocker and Boutin 2008, Hoyer et al. 2010, and Hsieh 2011). The SDL concept connotes that co- creation of value is inherently customer-oriented and relational, that is, it reflects a strong and deeper relationship between a provider and a customer (Flint, Blocker & Boutin, 2008). Chan, Yim, and Lam (2010) and Pires, Dean, and Rehman (2015) state that participating customers are involved in service co- creation, that is, they can contribute more to creating value. Examples of customer participation include providing feedback, offering suggestions, sharing their knowledge, preferences, and experiences, and assisting other customers, which, in turn, enrich the service design and delivery process. Researchers such as Flint, Blocker, and Boutin (2008), Hoyer et al. (2010), and Hsieh (2011) assert that customer participation fosters stronger relationships between consumers and service providers, thereby enhancing service quality and customer satisfaction. Customer participation thus transforms passive consumption into an interactive engagement, leading to personalized service experiences and enhanced perceived value (Akaka, Huotari & Vargo 2021). By adopting SDL principles, organizations can better facilitate participative roles for customers, thereby driving greater customer engagement and loyalty.

Customer Satisfaction

Wong (2011) and Mustafa et al. (2012) state that customer satisfaction is a feeling derived from the consumption or use of goods or services. Thus, the third concept of this study is a measure of how products and services supplied by a company meet or surpass customer expectations. Oliver (1980) conceptualizes customer satisfaction as a post-consumption evaluation, wherein customers compare their actual experiences with their anticipated outcomes. Customer satisfaction thus should be given proper attention by service providers since it reflects the quality of service provided and consequently helps the organizations to strengthen brand loyalty and organizational image (Allin 2014; Akaka, Huotari and Vargo 2021 and Chatterjee et. Al., 2021). The link between customer satisfaction and organizational performance is well-documented by Combs et al. (2006); Pantouvakis (2011); Goi, Kalidas, and Yunus, (2024) and Bovill, Jarvis, & Mpamhanga (2025) as they contend that satisfied customers contribute to increased employee productivity, higher service effectiveness, and improved organizational outcomes.

Value Creation

Service-dominant Logic represents a paradigm shift in understanding value creation and competitive advantage. By prioritizing operational resources, emphasizing co-creation, and fostering collaborative relationships, SDL offers a robust framework for enhancing organizational performance and customer experiences. The integration of customer participation and satisfaction within the SDL framework underscores the relational nature of modern service exchanges (Goi, Kalidas, and Yunus, 2024). Organizations that embrace SDL principles are well-positioned to navigate the complexities of today's dynamic business landscape, delivering superior value to stakeholders and achieving sustainable success (Leem 2021; Tran, Mai & Taylor 2021; Rosak, Żywiołek, & Shahbaz, 2024; Bovill, Jarvis, & Mpamhanga 2025).

Hypotheses Development

Based on the above discussion and background, the paper attempts to present the

development of a psychometrically sound measure of SDL and to examine its relationship with customer participation and customer satisfaction (research scholars) in creating value for higher educational institutions. Per se, against this backdrop, we frame the following hypotheses,

H1 SDL significantly impacts customer participation.

H2 SDL is a significant predictor of customer satisfaction.

H3 Customer satisfaction significantly contributes to value creation.

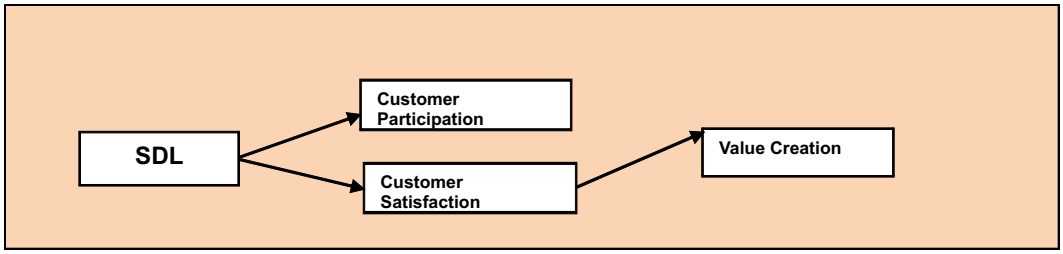

Figure 1: Research Model Depicting the Hypothetical Relationship.

Research Methodology Sample

The data for the study was collected with the help of questionnaires from research scholars of two higher educational state-level institutions, namely, the University of Jammu and Guru Nanak Dev University. Approximately 500 and 450 research scholars of all the academic departments of both the universities were contacted for final data collection. Out of 950 questionnaires distributed, a total of 522 questionnaires were received, and the response rate came out to be 54.94% per cent.

Methodology

Before analysing the data, the response score for negative items is reversed. 24 outliers were identified and subsequently removed from the sample of 522 respondents, making the effective sample size 498 respondents. Moreover, the skewness and kurtosis tests suggest that the majority of the values are within the acceptable range. This further confirms that the data is normally distributed. The data purification and finalisation are done using EFA, item analysis, and CFA.

Results And Findings Sdl

SDL comprising twenty items are grouped in two factors namely, absorptive competencies and collaborative competencies after three runs of EFA. The construct explicates 63.715% of variance. The KMO=.804 and BTS (chi- square=3149.220, df= 66 and p= .000) are adequately recorded after five iterations. The communality and factor loading values are also as per the threshold criteria.

Following this, item analysis is applied to twenty items to examine the internal consistency of the overall scale. The overall alpha value of the SDL construct is magnificently recorded as .866. The CITC values range between .358 and .746, while SMC values range between .521 and .667. Further scale statistics reveal an overall mean of 47.84 and an overall variance of 67.009, with an item mean of 3.412 and an item variance of 1.149. All twenty items of the two factors, as identified under EFA, are retained.

After item analysis, CFA is applied to the SDL construct. Eleven items are deleted due to low SRW values. Nine measured indicators that are retained reflect good and significant SRW, ranging between .522 and .883. The model shows good model fitness as all values of fit indices are within the

acceptable range (χ2/df= 4.719, SRMR= .042, RMSEA= .077, GFI= .980, AGFI= .939, NFI= .967, RFI= .928, IFI= .973, TLI= .943, CFI= .973. The critical ratios are also above the threshold criterion of 1.96.

Table 1: SEM Results of SDL, Customer Participation, Customer Satisfaction &Value Creation

Variable	Hypothesis	p-value	CR Range	SRW	Model-fitness	Accept/ Reject
SDL- CP	H1	.000	3.869-9.020	.714	χ^2/df=4.144, RMSEA=.055, GFI=993, AGFI=.996, NFI=.911, CFI=.922	Accepted
SDL – CS	H2	.000	4.587-7.006	.652	χ^2/df= 3.031, RMSEA=.061, GFI=996, AGFI=.924, NFI=.935, CFI=.923	Accepted
CS – VC	H3	.000	5.393-12.272	.705	χ^2/df=4.021, RMSEA=.066, GFI=910, AGFI=.963, NFI=.983, CFI=.989	Accepted

Customer Participation

While applying EFA, fifteen items of customer participation are condensed to thirteen items under two factors, namely, organisation participation and individual participation. The KMO (.763) and BTS (chi- square= 2084.296, df= 55 and p= .000) values indicate that the data are suitable for EFA. The factor loading values are ranged between .540 and .887 while communality values are ranged between .590 and .793. The construct explains 64.564% of the variance. In the next stage, all thirteen items of customer participation recorded high Cronbach alpha value of .823 with SMC ranging between .510 and .644 and CITC between .361 and .720. The overall mean is found to as 38.04 and overall variance as 47.308 with item mean as 3.458 and item variance as .084. All the values reflect overall scale properties.

The application of CFA on thirteen items of customer participation resulted in the deletion of four items due to low SRW values. However, precautions are taken before deleting them to retain construct validity. All the fit indices (χ2/df =3.787, SRMR= .041, RMSEA= .075, GFI = .985, AGFI = .948, NFI=.967, RFI= .919, IFI=.976, TLI=.939, CFI=.976) are as per the criteria. Further, SRW values for all the items are above the cut-off criterion (.521 and .878), along with critical ratios ranging between 5.278 and 12.218.

Customer Satisfaction

During EFA, twenty-nine items of customer satisfaction are reduced to twenty items grouped under four factors, namely, learning environment, teaching environment, university environment, and procedural environment arrived after eight iterations. At this stage, items related to the administration environment were deleted from the construct. The retained twenty items of the construct explain 68.999% of variance, with acceptable KMO (.783) and BTS (chi-square= 5963.307, df= 21 and p= .000) values. The values of factor loading (.558 to .856) and communality (.528 to .818) are as per the set criteria.

The application of item analysis on twenty items of customer satisfaction resulted in high cronbach alpha value of .870. CITC for the construct ranged between .363 and .613 and SMC ranged

between .534 and .746. Further, the value of item mean (M=3.196) and item variance (V=1.195) reflect the psychometric properties of the scale. At this stage no item is identified for further deletion.

A four-factor solution of customer satisfaction that includes learning environment, teaching environment, university environment, and procedural environment dimensions is used for CFA. The twenty retained items yielded good model fitness ($\chi 2/df$ = 4.373, SRMR=.035, RMSEA= .074, GFI =.959, AGFI=.917, NFI=.900, RFI= .945, IFI=.917, TLI= .970, CFI= .916). The SRW (.542 to .879) and critical ratio (8.808 to 16.576) values are also satisfactorily achieved.

Value Creation

The application of EFA, on four value creation dimensions that is, teaching (eleven items), research (seven items), coordinated services (six items) and administrative services (twenty one items) resulted in deletion of two items of teaching, one item of coordinated services and three items of administrative services. The amount of variance explained by the thirty-nine retained items is between 61.868% and 71.380% for the four factors. The KMOs of all four dimensions, teaching, research, coordinated services, and administrative services, are .763, .825, .658, and .795, respectively.

Item analysis applied on refined four dimensions (teaching, research, coordinated services and administrative services) resulted in Cronbach alpha value of .803, .822, .819 and .915 respectively. The values of CITC and SMC are as per the criteria in all the four dimensions. Further item mean and item variance along with overall mean and overall variance reflect psychometric characteristics of the four sub-dimensions. No item is identified for deletion in this stage.

The overall value creation model is also examined by taking into consideration the summated mean of retained items of respective four dimensions namely, teaching, research, coordinated services and administrative services, The CFA on the value creation resulted in good model fitness ($\chi 2/df$= 2.617, SRMR=.044, RMSEA= .076, NFI=.975, RFI=.941, IFI=919, TLI=.958, CFI=.923). The four dimensions recorded significant SRW values ranging from .511 to .873.

Hypothetical Relationship of SDL with Customer Participation, Customer Satisfaction, and Value Creation

The SEM relationship between SDL and customer participation resulted in good model fitness that is ($\chi 2/df$=4.144, RMSEA=.055). The relationship between SDL and customer satisfaction model reflects acceptable model fitness ($\chi 2/df$

=3.031, RMSEA = .061) with a moderately attained SRW value (.652). Similarly, the relationship between customer satisfaction and value creation also records acceptable model fitness ($\chi 2/ df$ =4.021, RMSEA = .066) with SRW and critical ratio recorded as .705 and 5.393 (Table 1). Hence, all the hypotheses are accepted.

The overall result reveals significant relationships of SDL with customer participation and customer satisfaction. Further, customer satisfaction is also predictive of value creation. Among the two constructs, SDL is predicting customer participation more significantly (SRW=.714) than customer satisfaction (SRW=.652), thus accepting hypotheses H1 and H2 (Table 1). In addition to this, H3 about customer satisfaction and value creation (SRW = .705) is also being significantly accepted. Thus, SDL is found to significantly contribute towards customer participation and customer satisfaction in the higher education sector, leading to value creation.

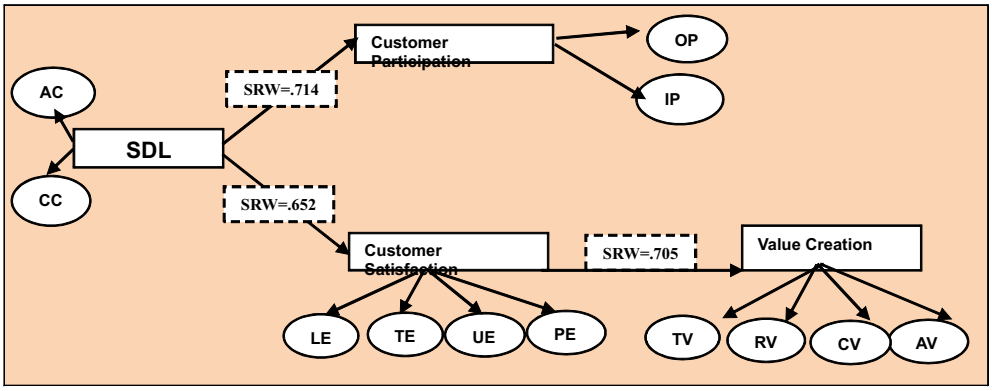

Figure 2: SEM Model Depicting the Hypothetical Relationship.

Implications

Theoretical Implications

Lusch and Vargo (2008) emphasised the adoption of absorptive and collaborative competencies to understand SDL. Enhanced collaborative competencies coupled with absorptive competencies are required to enhance the relative value proposition in the organisation as proposed by Lusch et al. (2007); Leem (2021); Karahasanovic & Culén (2021), Tran, Mai, and Taylor (2021). SDL has evolved as a two-factor solution for research scholars. The items included in absorptive competencies relate to free flow of communication, regular feedback, providing adequate information, and flexibility to departmental changes. The other dimension, that is, collaborative competencies, includes items like participative management, unbiased behaviour, recognition, and collaborative behaviour. Hence, the conceptualisation of SDL either as a bi-dimensional concept needs to be further explored and validated in future studies.

The study underscores the concept of value creation in the education sector to be four-dimensional, comprising teaching, research, coordinated services, and administrative services for research scholars teaching dimension includes programmes and courses offered, specialised programmes and courses, and faculty as a brand. Research dimension includes items relating to researchers as image builders, updated software, research equipment, and ethical contribution of researchers. Coordinated services involve items like universities' efforts to control the quality, conducting refresher courses, and updating libraries. Further positive word of mouth, conduct of refresher courses, and performance appraisal of various stakeholders are some of the items included in the administrative services dimension of value creation. Thus value creation concept requires further examination and validation in the future in other service sectors.

Practical Implication

SDL competencies are average recorded for research scholars of UOJ and GNDU. Collaborative competencies of scholars are exhibited in the form of commitment towards research, recognition of performance by getting research work published and participating in seminars, conferences, and workshops regularly for knowledge enhancement, and participating in departmental activities like taking classes, etc. Further knowledge exchange among researchers and other stakeholders regarding non-research issues like providing new ideas to ensure improved departmental performance, easy acceptability of new changes regarding policies and procedures in the department, such as UGC guidelines related to publications, PhD / MPhil statutes, scholarships,

etc., reflects scholars' absorptive competencies. To further improve the level of SDL based behaviour of researchers, impartial and equitable working environment with equal chance of participation to each scholar should be created and developed by encouraging scholars to collaborate and interact in departmental activities to make them feel to be attached to the department can be significant strategy. It will ultimately provide satisfaction to researchers regarding the performance of the universities and hence lead to value creation.

Conclusion

In applying SDL to contemporary environments, several best practices emerge. First, organizations must cultivate a customer-centric culture that prioritizes relationship building over transactional exchanges. This shift requires reconfiguring internal processes to facilitate open communication and collaboration with scholars. Second, organisations should invest in training programs that develop employees' relational and problem-solving skills, enabling them to effectively engage in co-creation activities. By integrating SDL principles into their strategic frameworks, organizations can enhance their adaptability and responsiveness to dynamic market conditions.

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ARTS & HUMANITIES

Chains of Inequality: Manual Scavenging and the Violation of Human Rights in India

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ABSTRACT

This paper examines manual scavenging in India as a violation of human rights and a breach of the country's constitutional commitments to its people. Although manual scavenging is prohibited by legislation and condemned by international conventions, it continues to be enforced upon Dalits due to structural caste discrimination and institutional neglect. The paper analyses the violation of key constitutional provisions alongside international treaties to which India is a signatory. It underscores that, despite strong national constitutional provisions and international conventions, a significant gap persists in practice due to caste discrimination, institutional apathy, and inadequate implementation of existing legal frameworks. Ultimately, this paper argues that manual scavenging is not merely a public health or sanitation issue; it is a test of India's constitutional morality and its commitment to international human rights. The eradication of this practice requires not only legal enforcement but also profound societal transformation rooted in dignity, equality, and social justice.

Key Words: Manual Scavenging, Human Rights, Dalits, Caste Discrimination

Introduction

India, the world's largest democracy, is founded on modern constitutional principles of equality, liberty, and social justice. However, it faces a troubling paradox: the continued existence of manual scavenging. While government surveys report around 58,000 manual scavengers, Wilson (2023) contends that the actual number exceeds 770,000 workers engaged in this degrading practice (BBC News, 2023). This issue primarily affects Dalits, with over 77 per cent of these workers belonging to this marginalised community (Fathima, 2024). This situation reveals stark disparities between India's democratic ideals and social realities. Despite the nation's claim to promote “Sabka Saath, Sabka Vikas” (Together with everyone, progress for all), and to uphold inclusive growth and human rights, it permits a caste-driven system that relegates the most marginalised citizens to degrading labour. Manual scavenging exemplifies a democracy hindered by a centuries-old social hierarchy that progressive laws have yet to dismantle. The contradiction between India's democratic identity and its caste-based social order exposes a troubling reality: the cycle of inequality remains a persistent tool of exclusion in a society that purports to uphold human rights.

Manual scavenging is the “disposal of human excreta and other wet waste from dry latrines, open drains, sewers, and septic tanks” (Singh, 2009, p. 521). This profession is among the most humiliating and perilous. It is deeply entrenched in the caste system and continues to be a part of today's social landscape, highlighting the occupational hierarchy sustained by caste through centuries of subjugation. Manual scavenging was regarded as impure labour, relegating it to the lowest social strata, especially the Dalits—Valmiki sub-caste. During the colonial period, these roles

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became institutionalised with the development of municipal sanitation systems, cementing caste-based occupational roles in urban governance (Rao, 2009, pp. 118–19). This shift transformed caste oppression into an authorised form of economic exploitation, connecting caste identity with labour and sustaining marginalisation across generations (Teltumbde, 2018, p. 37).

Dirks (2001) contends that the British colonial state reinforced and redefined the caste system, making it more rigid and hierarchical than in pre-colonial India (Dirks, 2001, p. 149). After independence, the constitution aimed to dismantle caste-based discrimination by ensuring dignity and banning the practice of untouchability. Legal frameworks, such as the "Construction of Dry Latrines (Prohibition) Act, 1993 (1993 Act), and the Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013 (2013 Act)", alongside initiatives like the Swachh Bharat Abhiyan (SBA), were introduced. However, enforcement remains ineffective. Institutional apathy, lack of political will, and caste prejudice permit manual scavenging to continue despite bans (Wilson, 2020).

This gap between constitutional principles and social reality has resulted in fundamental human rights violations. Manual scavenging undermines human dignity and exposes workers to hazardous conditions. Without protective gear, they face toxic gases, infectious diseases and life-threatening injuries, often leading to death. Agencies attempt to conceal these deaths or provide minimal compensation to families of the deceased amid social indifference and institutional neglect. These conditions violate both Indian constitutional provisions and international conventions.

Review of Literature

Manual scavenging, the practice of manually cleaning excreta, persists in India despite legislative efforts to abolish it. This ongoing issue reveals caste discrimination, policy failures, and human rights violations. This literature review synthesises key works to highlight shortcomings in laws, enforcement mechanisms, and societal attitudes that sustain this practice, especially affecting marginalised Dalit communities. By analysing Indian legal frameworks alongside international human rights conventions, it explores why reforms have failed to eradicate manual scavenging, focusing on the intersectional vulnerabilities linked to caste, gender, and economic marginalisation.

The PEMSR Act of 2013, in conjunction with its previous act from 1993, sought to eliminate manual scavenging and support the rehabilitation of workers.. However, scholars like Koonan (2021) and Teltumbde (2018) argue that these laws remain ineffective due to weak enforcement, bureaucratic neglect, and political indifference. Koonan (2021) highlights that inadequate grassroots-level monitoring and accountability mechanisms allow the practice to continue. Similarly, Wilson (2020) points out that political reluctance to challenge caste-based labour norms undermines legislative intent.

The Swachh Bharat Abhiyan (2014), while promoting improvements in sanitation infrastructure, has inadvertently perpetuated reliance on manual labour (Gatade, 2015). Gatade further critiques the initiative, asserting that its success cannot be deemed genuine as it is disconnected from caste issues. Bhasin (2022) argues that its emphasis on infrastructure over worker protections has worsened the exploitation of manual scavengers. The lack of alternative livelihoods and rehabilitation programs keeps workers trapped in this occupation (Singh, 2012).

Manual scavenging is deeply tied to India's caste system, with Dalits—especially women—facing the compounded effects of caste, gender, and economic vulnerability (Chakravarti, 2003; Wilson, 2020). Dalit women confront discrimination and lack access to health, safety, and social security, despite constitutional provisions and international labor standards (Guru, 1999). Ambedkar

(1948) foresaw that abolishing untouchability would require dismantling systemic caste hierarchies, a goal that remains unfulfilled. Teltumbde (2018) argues that social stigma and caste-based labour divisions normalise manual scavenging, with societal acceptance further entrenching Dalit marginalisation.

Research Methodology

This study aims to examine how manual scavenging violates the principles of the Indian Constitution and international conventions, thereby maintaining societal inequality. It investigates the legislative framework, human rights violations, and social contexts of manual scavenging in India using secondary sources such as reports and regulations. The research reviews key constitutional provisions affected by this practice, particularly focusing on the constitutional guarantees of dignity, equality, and the prohibition of forced labour. The study also considers international human rights treaties, highlighting their shortcomings in preventing caste-based discrimination. Furthermore, it examines the intersection of national and international principles that fail to curb this inhuman practice.

Analysis: Key Human Rights Provisions Violated by Manual Scavenging

Manual scavenging in India vividly highlights ongoing human rights violations grounded in deep-rooted caste hierarchies and institutional structures neglect. Even with both domestic and global human rights obligations, the ongoing issue of manual scavenging highlights how social inequalities can weaken legal safeguards. Johan Galtung's theory of structural violence is relevant here, as it emphasises the invisible systems that perpetuate inequality and suffering in marginalised communities rather than focusing solely on direct, visible harm (Galtung, 1969, p. 171). In this context, manual scavenging acts as a form of structural violence, sustained not only by an overt social hierarchy but also by various economic, social, and cultural factors that deny Dalits equal access to dignity, opportunity, and equality due to the entrenched caste system.

B.R. Ambedkar famously described the caste system as the instrument of 'graded inequality' in which Dalits are systematically dehumanised and relegated to the most degrading, inhumane forms of labour, which he described as the “Division of labourers” rather than merely “Division of labour” (Ambedkar, 2014, p. 42). This argument is further reflected in Guru's work, "The Archaeology of Untouchability," which describes this practice as a denial of human dignity institutionalised through structural and institutional exclusion (Guru, 2009, p. 50). Consequently, manual scavenging exists at the intersection of human rights denial and caste oppression, exposing the disparity between legal frameworks and the lived realities of the oppressed. In this context, the following sections will analyse how this practice infringes on fundamental rights such as life, dignity, health, equality, and freedom from discrimination, thereby highlighting the stark contradictions between India's constitutional guarantees and the experiences of its most marginalised communities.

Manual scavenging in India exemplifies ongoing human rights violations rooted in deeply entrenched caste hierarchies and institutional structures neglect. Despite robust domestic and international human rights frameworks, the practice continues, highlighting how social inequalities undermine legal safeguards. Johan Galtung's theory of structural violence emphasises invisible systems that perpetuate inequality and suffering in marginalised communities beyond direct harm (Galtung, 1969, p. 171). Similarly, B.R. Ambedkar's concept of graded inequality frames the caste system as a mechanism that dehumanises Dalits by relegating them to degrading labour, described as a “division of labourers” rather than a “division of labour” (Ambedkar, 2014, p. 42). Guru's work further underscores this as a denial of human dignity through institutionalised exclusion (Guru, 2009,

p. 50).

Overview of Manual Scavenging in India

Manual scavenging continues to be a problem in India, despite laws prohibiting it. This practice perpetuates caste-based discrimination and leads to serious human rights violations, primarily affecting Dalit communities. It exposes workers to hazardous conditions and social exclusion, highlighting failures in policy enforcement and societal attitudes. This overview discusses the scale, risks, and challenges of eradicating manual scavenging.

Official estimates significantly underreport the manual scavengers in India. The SECC, 2011, listed about 58,000 manual scavengers, while the Safai Karmachari Andolan (SKA) estimates the number to be over 770,000, with 77% belonging to Dalit communities, particularly the Valmiki sub-caste (BBC News, 2023; Fathima, 2024). The discrepancy in these figures arises from systemic denial and poor data collection.

Manual scavenging remains prevalent in different parts of India. In cities, manual labour is commonly used for sewer maintenance, while rural regions often rely on dry latrines, reinforcing caste-based roles (Singh, 2014, p. 45). Workers in this occupation face severe health risks and fatalities. Between 2010 and 2020, SKA reported 1,760 deaths from toxic gas exposure and sewer accidents, compared to the government's reported total of just 323 deaths from 1993 to 2020 (The Wire, 2021). A tragic incident in Tamil Nadu in 2019 saw 17 workers die in a single month, highlighting the dangers of this work (The Indian Express, 2019).

Manual scavengers often suffer from chronic health conditions, including respiratory diseases and skin infections, as well as psychological trauma resulting from social stigma (Human Rights Watch, 2014; Saha et al., 2019). The PEMSR Act, 2013, aims to eliminate manual scavenging and rehabilitate workers, but enforcement is weak. Ongoing violations have been reported, with local governments outsourcing sanitation tasks to private contractors who frequently bypass mechanisation requirements (Frontline, 2022). By 2024, only 10,000 scavengers had been reached by the NAMASTE scheme (The Hindu, 2024). Furthermore, the Swachh Bharat Abhiyan (SBA) has increased reliance on manual labour where sewage infrastructure is inadequate, emphasising toilet construction over worker protections (Gatade, 2015, p. 30). As of 2024, only 15% of urban local bodies had adopted mechanised sanitation (ILO, 2024).

Dalit women make up 80% of manual scavengers and face discrimination due to their caste, gender, and economic vulnerability (ILO, 2024; Chakravarti, 2003, p. 115). The lack of gender-sensitive rehabilitation programs further perpetuates their marginalisation. Teltumbde (2018, p. 37) argues that societal acceptance of caste-based roles normalizes this exploitation, undermining constitutional guarantees.

The persistence of manual scavenging reflects a failure to confront caste prejudice, economic deprivation, and institutional neglect. Despite existing legal frameworks and international commitments, this practice violates fundamental rights to life, dignity, and equality. To eradicate manual scavenging, we need to enforce the 2013 Act rigorously, provide comprehensive rehabilitation, and undergo societal transformation to dismantle caste hierarchies.

Violation of the Right to Life and Health

Article 21 of the Indian Constitution enshrines "the right to life and personal liberty" (Bakshi, 2023, p. 83), which the Supreme Court has extended to include the right to live with dignity. A severe violation of this right is evident in the practice of manual scavenging. This practice not only endangers

the lives of those who perform it but also deprives them of their dignity, as they are required to handle human waste without any protective gear. As a result, they face serious health risks, including respiratory diseases and cholera, among other illnesses. Many scavengers die from accidental asphyxiation or poisoning due to dangerous gases and frequently encounter physical dangers when trapped in manhole sewers.

In the case of “Safai Karamchari Andolan v. Union of India” (2014), the Supreme Court unequivocally declared manual scavenging a infringment of Article 21, asserting that it subjects workers to "inhuman conditions" (Supreme Court of India 2014, para. 14). Official statistics from the Union Government claim 323 manual scavenger deaths between 1993 and 2020 (Wire,2021). However, the Safai Karamchari Andolan (SKA) disputes this, documenting 1,760 deaths between 2010 and 2020 alone, based on grassroots data collection (The Wire, 2021). This discrepancy underscores the systemic underreporting of fatalities, which SKA attributes to the lack of centralised monitoring and accountability. For instance, in 2019, Tamil Nadu reported 17 deaths in a single month, yet only a fraction was officially recorded (The Indian Express, 2019). These preventable deaths reflect what scholar Ashis Nandy terms “institutionalised violence,” where systemic neglect and apathy normalise harm against marginalised groups, particularly Dalits (Nandy, 1980, p. 67).

Violation of the Right to Life and Health

Article 21 of the Indian Constitution enshrines the "right to life and personal liberty" (Bakshi, 2023, p. 83), a right that the Supreme Court has expanded to include the right to live with dignity. Manual scavenging profoundly violates this right, endangering lives and stripping workers of dignity by forcing them to handle human waste without protective gear. This exposes them to severe health risks, including respiratory diseases, cholera, and skin infections. Many scavengers die from accidental asphyxiation or poisoning due to toxic gases in sewers or face physical dangers when trapped in manholes.

Violation of the Right to Dignity and Equality

Articles 14 and 15 of the Indian Constitution guarantee “equality before the law and prohibit discrimination based on caste, sex, and other grounds” (Bakshi, 2023). The activity of manual scavenging is inherently connected to caste discrimination, thereby breaching the basic rights to equality and dignity that are protected by the Constitution. Dalit workers in this profession are subjected to dehumanising conditions, often being treated as subhuman due to their caste. This stigmatisation as "impure" reinforces their social exclusion, with many being denied access to public spaces like temples and wells, further marginalising them from mainstream society. As Ambedkar (1936) argued, this practice exemplifies the graded inequality that perpetuates caste-based oppression, violating the rights to equality and dignity guaranteed by Articles 14 and 15.

The violation of constitutional rights is compounded by the gendered nature of manual scavenging. Dalit women, who are often employed in this degrading labour, not only face the humiliation of caste-based discrimination but are also subjected to lower wages and verbal and physical abuse from dominant groups. Scholars like Chakravarti (2003) note that Dalit women experience triple marginalisation—through caste, class, and patriarchy—which denies them equal opportunities and basic dignity. This intersectional oppression underscores the complex discrimination that Dalit women engaged in manual scavenging experience..

Moreover, the state's failure to enforce anti-discrimination laws, such as the 1993 and 2013 Acts, exacerbates these violations. In particular, the lack of implementation of these laws allows

manual scavengers to continue facing systemic exclusion and denial of dignity, directly violating the constitutional guarantee of equality

Violation of the Prohibition of Untouchability

Article 17 abolishes “the practice of untouchability”. Ambedkar described untouchability as a social evil that dehumanises the untouchable community by forcing them into degrading occupations, such as leather work and manual scavenging (Ambedkar, 1948, p. 92). Manual scavenging directly reflects the practice of untouchability, which is deeply embedded in caste beliefs about purity and pollution. The ongoing existence of manual scavenging, primarily performed by the Dalit community, illustrates how the concept of untouchability has not only persisted but also evolved into a more normalised and institutionalised system of exploitation and exclusion.

While these workers are frequently called sanitation workers, especially those who clean sewers, septic tanks, and dry latrines, they are, in fact, participating in manual scavenging—a socially ingrained form of caste-based labor. This work has been passed down through generations within specific families, resulting in limited occupational mobility. Wilson has consistently argued that the Indian state's failure to eradicate manual scavenging amounts to a 'state-sponsored practice of untouchability' (Wilson, 2020). The lack of protective gear, the absence of rehabilitation programs, and the institutional indifference toward deaths occurring in sewers further illustrate how untouchability persists not only on a social level but also through state policies.

A 2014 Human Rights Watch report documented that Dalit scavengers across India—particularly in Uttar Pradesh—face routine exclusion from public spaces, including temples, wells, and community events, due to their caste and occupation. This social ostracism reinforces their status as "impure", directly contradicting Article 15's prohibition on caste-based discrimination (Human Rights Watch, 2014). This ongoing social exclusion underscores the systemic nature of discrimination that continues to plague manual scavengers, particularly Dalit women. It reflects the state's failure to uphold the constitutional rights of its citizens.

Violation of the Rights to Freedom from Forced Labour

Article 23 bans human trafficking, begging, and various forms of forced labour, such as manual scavenging. This coercive practice is deeply entrenched in caste hierarchies and economic pressures. Often, Dalits are compelled to engage in this demeaning work due to generational bondage and systemic discrimination. Numerous families have participated in this degrading work for generations, as their chances for upward mobility in employment continue to be restricted. Refusing to perform such tasks often results in physical abuse and social ostracism (Singh, 2009, p. 522). This situation represents a form of "modern slavery," where human rights violations severely restrict individuals' life chances.

Article 24 prohibits the employment of children in hazardous occupations, yet many children accompany their parents in manual scavenging due to poverty and caste discrimination prevalent in educational institutions. This often forces them to drop out of school, impairing their health and perpetuating the cycle of caste-based labour. In this context, the notion of 'consent' becomes meaningless as individuals find themselves trapped in exploitative conditions.

The persistence of this practice is in direct opposition to several constitutional mandates. Article 38 obliges the State to enhance the well-being of its people; nonetheless, manual scavenging hinders this objective. Articles 39(e) and (f) mandate the prevention of undignified work and exploitation, yet manual scavengers operate in unsafe conditions that violate these protections. The

right to work, as stated in Article 41, is denied due to inadequate rehabilitation efforts. Article 46 requires the protection of Scheduled Castes from exploitation, but manual scavenging perpetuates their marginalisation. Moreover, Article 47's health objectives are compromised as workers are exposed to toxic conditions. The National Commission for Scheduled Castes (as outlined in Article 338) has not succeeded in abolishing this practice, while local governments continue to engage Dalits in manual scavenging. These violations underscore a systemic failure to uphold human dignity.

Violations of International Human Rights

Manual scavenging represents a clear violation not only of the legal obligations of the Indian government but also of various international human rights agreements and treaties. The Universal Declaration of Human Rights (UDHR), which serves as the cornerstone of the global human rights framework, clearly asserts in Article 1 that "no one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment." Article 3 establishes the "right to life and security," while Article 5 states that "no one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment." Engaging in manual scavenging is inherently degrading and inhumane, violating these core principles, as scavengers are systematically deprived of these rights, illustrating the structural violence they endure. Moreover, Manual scavenging in India violates multiple provisions of the ICCPR and the ICESCR, perpetuating systemic caste-based injustice.

Under the ICCPR, manual scavenging resembles modern slavery, violating Article 8: prohibition of forced labour. Predominantly affecting Dalits and other marginalised groups, the practice is often driven by debt bondage and social coercion. Article 26: The guarantee of equal protection is also breached, as caste-based discrimination denies manual scavengers equitable legal safeguards. India, a party to the International Convention on the Elimination of All Forms of Racial Discrimination (ICERD) since 1968, has resisted equating caste with racial discrimination, despite the Committee on the Elimination of Racial Discrimination's interpretation of "descent" to include caste (CERD 2002).

Manual scavenging also infringes on the ICESCR. The absence of protective gear and exposure to hazardous conditions, such as toxic gases in septic tanks, violate Article 7: right to safe working conditions, as noted in reports by the International Labour Organisation (ILO 2017). Article 12's right to health is undermined by scavengers' exposure to infections, toxic waste, and psychological trauma from stigmatization, with studies reporting high rates of diseases like tuberculosis among workers (Saha et al. 2019). These violations reflect India's failure to progressively realize ICESCR rights, despite ratification in 1979.

The persistence of manual scavenging underscores systemic caste prejudice, contravening India's international obligations and domestic laws, such as the SC/ST Act 1989. Effective enforcement, rehabilitation, and social reform are critical to ending this practice and upholding human rights.

The Intersection of Global and National Failures

The human rights crisis surrounding manual scavenging exemplifies a significant intersection of national betrayal and global indifference. India's constitutional promises are undermined by the realities of implementation. This situation reveals a dual failure: a national framework struggling to align with a legal system entrenched in social hierarchies, alongside a global community that fails to hold India accountable for its commitments to international treaties.

Article 2 of the ICESCR mandates that states gradually fulfill economic and social rights. Yet,

India's reports to the United Nations often overlook the harsh realities faced by manual scavengers, focusing instead on broader economic achievements or initiatives like the Swachh Bharat Abhiyan (Clean India Mission). This selective representation obscures the plight of Dalit workers who lose their lives in sewers and the exploitation of women scavengers, effectively shielding India from international scrutiny.

The Universal Periodic Review conducted by the Human Rights Council does consider caste-based discrimination, yet manual scavenging frequently goes unnoticed on a global scale. This neglect highlights a deficiency in the international human rights framework, which often overlooks systemic violations associated with caste. As a result, India evades the accountability necessary for meaningful reform. The International Labour Organization (ILO) has established guidelines on occupational safety (Convention No. 155), yet these remain unenforced in India. Although the Swachh Bharat Abhiyan promotes the construction of toilets, it neglects to address the hazardous working conditions of manual scavengers, revealing a political culture that prioritises global image over accountability. This situation echoes Ambedkar's critique of elite denialism.

Anderson (2012) argues that the West's reluctance to confront caste-based atrocities is rooted in postcolonial deference to India's sovereignty. This is reflected in the UN Human Rights Council's tepid responses, including India's objection to a 2016 UN report framing caste as a human rights issue. Omvedt highlights that caste functions as structural violence akin to racism, pointing to the global framework's failure to address these inequities.

Despite constitutional provisions like Articles 14, 17, and 23—guaranteeing equality, abolishing untouchability, and prohibiting forced labour—a combination of caste prejudice and implementation failure hinders progress against manual scavenging. For instance, the 1993 Act aimed at abolishing manual scavenging, but only received Presidential assent in 1997. Initially, only five states enacted the law, while others displayed little interest until 2005. States had to be compelled to adopt the law, and it was not until 2010 that Delhi recognised it following Supreme Court directives, with several states remaining reluctant even after this intervention.

The global reluctance to challenge India's caste system exacerbates this paradox. India presents an image of progress internationally, citing achievements such as the construction of 100 million toilets under the Swachh Bharat initiative. However, this effort has inadvertently increased manual scavenging in areas lacking adequate sewage infrastructure, where communities continue to depend on manual labour for sanitation. Although the ILO has set safety standards that prohibit manual scavenging, there has been little pressure on India to automate sanitation processes. This divergence persists largely due to India's economic influence, with the international community hesitating to address caste as a human rights issue, deeming it too culturally sensitive.

Conclusion

The continued existence of manual scavenging in India highlights a major breach of human rights and the nation's promise to eliminate caste-based systemic violence. The individuals involved in this labour—mainly Dalits—are unseen victims in a society that holds onto antiquated social hierarchies. Their lives, marked by indignity, illness, and premature death, illustrate the pervasive inequality created by caste, poverty, and neglect. Despite constitutional guarantees, manual scavenging continues to violate basic human rights and dignity, reflecting a deep-seated social, economic, and moral crisis. Legislative initiatives, such as the 1993 and 2013 Acts, alongside policies like the SBA and NAMASTE, have failed to dismantle these chains of inequality.

A fundamental shift is necessary—one that recognises manual scavenging as a form of systemic violence (Nandy, 1980, p. 67). This shift must involve accurate data collection, accountability, and intersectional justice, particularly for Dalit women. The persistence of manual scavenging is a reflection of deep-rooted indifference, evident in the lack of investment in mechanised sanitation solutions. Advocacy groups, such as the SKA, have accused the state of underreporting data (Wilson, 2020). Achieving justice requires accountability at all levels.

Public awareness campaigns are crucial for challenging social norms that perpetuate caste-based labour practices. The nation must improve sanitation infrastructure through modern technologies to eradicate manual scavenging. Economic conditions are also vital, as many workers are driven to this profession by poverty (Chakravarti, 2003, p. 115).

Manual scavenging constitutes a human rights violation, revealing a moral crisis where the worth of some lives is overlooked. Despite existing legislation, India has not fulfilled its constitutional and international obligations. Breaking the chains of inequality requires a transformation in structures and mindsets. The state must create a narrative where dignity is universal and caste no longer dictates one's fate. India's response today will shape the freedom of future generations.

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Forging Identity through Commemoration: Spatial Narratives and Memory Politics of Banda Singh Bahadur War Memorial

Neha Pandey*

ABSTRACT

This paper argues that the Banda Singh Bahadur War Memorial at Chappar Chiri, Punjab, functions as a strategic site where a cohesive Sikh identity, rooted in the Khalsa ethos, is actively constructed and reinforced. Drawing on Henri Lefebvre's triadic model of space and Anthony D. Smith's ethno-symbolism, the study examines how the memorial's spatial organization, symbolic iconography, and portrayal of the Battle of Chappar Chiri collectively materialize Sikh collective memory. It further reveals how state-sponsored commemorative practices appropriate this site to consolidate Sikh identity and assert political legitimacy within India's post-colonial nationalist narrative. The paper shows how the state appropriates sacred geographies to consolidate political legitimacy and cultural belonging by narrativizing historical memory through this memorial. Finally, the paper demonstrates that memorials are dynamic instruments in the formation of collective identity and the mobilization of historical consciousness.

Key Words: Banda Singh Bahadur War Memorial, Commemorative Landscape, Collective Memory, Ethno-symbolism, Sikh Identity, Spatial Politics

"Why should landscape be any less dramatic than the event?"

- Frederic Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism*

Introduction

In the article *Between Memory and History: Les Lieux de Mémoire*, Pierre Nora postulates the concept of lieux de mémoire (sites of memory), which refers to physical or symbolic places where collective memory is preserved after a direct link to the past has been severed. These are sites "where memory crystallizes and secretes itself" and they function as repositories where historical consciousness is actively constructed and maintained (7). It can be argued that memory, once organically embedded in everyday practices, is now externalized and institutionalized through lieu de memoire such as monuments and memorials. However, memorials do not simply commemorate the past but actively shape and construct historical narratives. In the process, they reinforce specific collective identities and ideological frameworks. As Owen J. Dwyer and Derek H. Alderman posit, "These sites are produced by and are in turn productive of, partisan views of collective memory and urban space—ostensibly tied to the past yet fundamentally implicated in the shaping of alternative futures"(166). Their argument highlights the political stakes involved in memorialisation, suggesting that such spaces are actively mobilised to authorise particular historical trajectories and social imaginaries.

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Anne Murphy in her book *The Materiality of the Past: History and Representation in Sikh Tradition*, notes that since the early twentieth century, there has been a shift towards a territorialized understanding of Sikh history with increased attention given to geographical markers of historical memory as opposed to individual artifacts (15). This shift reflects a broader need to anchor Sikh identity within physical landscapes, linking the community's historical and political consciousness to the place. It is most visible in the evolving iconographic and visual culture of Panjab, where locations associated with Sikh gurus and warriors are identified and marked through large-scale monumental projects. By inscribing historical significance onto Panjab's geography, these structures solidify the community's connection to the past and shape the present identity and socio-political discourse. Under the aegis of Shiromani Akali Dal, memorial projects such as Virasat-e-Khalsa at Anandpur Sahib (2011), Jang-e-Azadi Memorial at Kartarpur in Jalandhar, Punjab State War Heroes' Memorial and Museum in Amritsar, along with Baba Banda Singh Bahadur War Memorial in Mohali, have been constructed. These projects reflect a sustained effort to institutionalize a Khalsa-centric narrative of Sikh history, embedding collective memory within a strategically curated monumental landscape. This paper analyses the Banda Singh Bahadur War Memorial at Chappar Chiri, Punjab, as a commemorative landscape where memory, identity, and spatial politics intersect. It argues that the memorial functions as a socially produced space and forms part of a broader pattern of state-sponsored memorialization that materializes collective identity through myths, symbolism, and spatial form.

Erected to honour the Sikh saint-warrior Banda Singh Bahadur, the Memorial recreates the decisive Battle of Chappar Chiri in 1710, in which Banda Singh Bahadur defeated the Mughal governor of Sarkar-i-Sirhind, Wazir Khan. This victory led to the sack of Sirhind and the subsequent establishment of Khalsa Raj, extending from Lahore to Delhi. The battle represents a pivotal moment in the effort to establish Khalsa Raj following the martyrdom of Guru Gobind Singh. Banda Singh Bahadur emerged as a leader in the shifting political terrain of the eighteenth-century Panjab, particularly after the execution of the sons of Guru Gobind Singh at Sirhind in 1705 and the Guru's death in 1708. Originally a disciple of Guru Gobind Singh, who gave him the title of “Banda,” he took up the task of avenging the execution and establishing the Khalsa Raj. His victory at the Battle of Chappar Chiri is significant not only as an act of retribution but as the first step towards the sovereign Khalsa Polity.

The period from 1708 to 1716 represents a crucial phase in the emergence of the Khalsa and the eventual realisation of the principle, *Raj Karega Khalsa(the Khalsa* shall rule). The struggle initiated by Guru Gobind Singh was extended for eight years by Banda Bahadur, which led to the establishment of the first independent sovereign state under Sikh rule, with its seal and coins. During this period, Banda Bahadur seized control of the territory between the Jamuna and Sutlej rivers, displacing Mughal officials and appointing his administrators to govern the region. This episode underscores the intense and prolonged struggle for autonomy and justice faced by the Sikh community during this era. (Grewal 88). Banda Singh Bahadur was martyred on June 19, 1716, in Mehrauli, near the Qutub Minar, under the orders of the Mughal ruler Farrukh Siyar. Following a period of prolonged torture, Banda Singh Bahadur, his young son Ajay Singh, and 40 other Sikh soldiers were executed, their deaths symbolizing unwavering faith and resistance in the face of tyranny.

Despite his pivotal role, Banda Singh Bahadur remained largely under-acknowledged within Sikh memory. As Ganda Singh in his book points out, much of the historical representation of Banda Singh has been shaped by Persian sources, which offered erroneous and slanderous portrayals. Moreover, due to the lack of credible sources and internal "conflict between the Bandei and the other

Khalsa", obscured his recognition as both martyr and founder of the first sovereign Khalsa rule (4) In the present commemorative landscape, where statues and memorials have become means for communities to assert their histories, often in ways that consolidate homogenized identity and appropriate historical narratives for contemporary agendas, Banda Singh Bahadur has been reclaimed and monumentalised.

Theoretical framework

In his book The Production of Space, Lefebvre asserts that “(social) space is a (social) product”(35). He argues that space is not a neutral backdrop or receptacle for social activities; rather, it becomes a stake and a medium for conflicting social representations and strategies. Space was conventionally understood as a dualism of the abstract and the physical, i.e., as a mental space (the world of ideas, plans, and representations) and a material, physical one (as constructed or natural environment). However, Lefebvre problematises this duality by adding a third dimension: lived space. He contends that space needs to be thought of in its entirety, not just in terms of how it is conceived and perceived, but how it is lived and imbued with meaning by social practices, memory, and symbolic associations. Lefebvre introduces the triad of space: conceived, perceived, and lived space, which exists in dialectical relationship, forming the social space. Conceived space refers to the discourse surrounding a space that exists even before its physical manifestation. Perceived space is the tangible, structured environment- the layout, architecture, spatial arrangement, and the symbolic elements embedded within it. Lived space is the experiential domain wherein communities emotionally engage with space and assign meaning based on memory, myth, and collective identity. The triadic model of space provides a theoretical framework for understanding how historical narratives are embedded within the material landscape, transforming sites of memory into dynamic spaces of identity formation. The present study analyses the Banda Singh Bahadur War Memorial as a socially produced space, shaped through the dynamic interaction of conceived, perceived, and lived spatial dimensions.

The research also draws on A.D. Smith's ethno-symbolist framework, which posits that ethnies are neither static nor pre-established entities but are continually reproduced through the cultivation of shared myths, memories, and symbolic traditions. The concept of the myth–symbol complex, first introduced by John Armstrong, refers to the ways in which ethnic communities preserve their identity through enduring symbols, myths, and historical memories. Anthony D. Smith expands this idea, incorporating it into his ethno-symbolist framework to explain the long-term persistence of national and ethnic identities. For Smith, such symbolic assets, such as origin myths, sacred landscapes, heroic people, visual motifs, rituals, and language, are not mere passive residues of the past but are continuously reinterpreted and mobilized by elites to create a shared sense of belonging and historical connection. Elites take on the task of symbolizing and institutionalizing these symbolic components, embedding them in the collective psyche through visual culture, ritual commemoration, architecture, and other material culture (Smith 24). In so doing, the myth-symbol complex becomes a potent vehicle through which ethnic identity is maintained and recreated according to the needs and ideological exigencies of the present. This framework is used to analyse how the memorialization of Banda Singh Bahadur and the Battle of Chappar Chiri contributes to the symbolic consolidation of Sikh ethnohistory. The memorial serves to rearticulate the past in the present, foregrounding themes of sovereignty, martial masculinity, and communal pride within the contemporary state-sponsored memory politics. In doing so, it facilitates the construction of a homogenized Sikh identity rooted in the Khalsa ethos. It also carves out a distinct Sikh visual and commemorative landscape, asserting the centrality of Sikh contributions within the broader narrative of Indian history and reinforcing a sense of

historical legitimacy in the nationalist historiography.

Spatial Politics and the Production of Memorial Space

Banda Singh Bahadur has been commemorated at multiple locations, including statues at Nabha House, *Ajitgarh,* and Mandi House in Delhi, where he is depicted as a warrior, as well as at the *Gurudwara Shahidi Asthan* in Delhi, which celebrates his martyrdom. However, the memorial in question is particularly relevant as it projects a distinct narrative. It functions as more than a site commemorating a historical figure. It highlights the sovereignty of Khalsa Raj and leads to the construction of a social space where historical memory is not only preserved but experienced.

Henri Lefebvre conceptualizes conceived space as the domain of planners, architects, and ideologues—the space of maps, representations, and discourses (38). It is the abstract dimension where meaning is projected before it takes physical form, "constructed out of codes, symbols, and abstract representations" (Lefebvre 239). In the case of the Banda Singh Bahadur War Memorial, the site of Chappar Chiri was already saturated with symbolic significance before its materialization. The battle fought here in 1710 is remembered not merely as a military victory but as an act of retributive justice for the execution of Guru Gobind Singh's sons, an event deeply etched in Sikh collective memory. The discourse surrounding the Battle of Chappar Chiri and its role in the assertion of Khalsa sovereignty has traditionally circulated within historical narratives and popular memory. Banda Singh Bahadur's legacy was preserved through oral traditions and cultural works such as Rabindranath Tagore's poem Banda Bir and Dev Threeke Wala's Baba Banda Singh Bahadar Vaar, which reinforced his image as a Khalsa sant sipahi. Even before state intervention, the site constituted a symbolically charged geography, imagined and remembered as sacred and a witness to Sikh triumph. According to Lefebvre, this pre-material symbolic association constitutes a form of conceived space described as the "symbolic properties of space, properties inherent in that space's practical occupation"(Yuncu et al. 290). What the state did, then, was not to create meaning ex nihilo, but to appropriate, amplify, and formalize an already symbolically charged landscape. The conceived space is also the domain of planning—the architectural blueprint and ideologically charged design that decides how the social space manifests. In the Banda Singh Bahadur War Memorial, this meant an intentional spatial approach to reinforce the symbolic narrative inherent within the site. The memorial was designed to recreate the Battle of Chappar Chiri in spatial and visual specificity, bringing a significant moment from Sikh history into the present and embedding it within the physical environment.

While conceived space operates at the level of ideological planning and symbolic projection, it is through perceived space, constituted by material and spatial practices, that this blueprint takes shape. The memorial's spatial architecture translates abstract narratives into physical form, guiding the visitor's interpretation of the site. The most prominent architectural feature of the Memorial is the presence of Fateh Burj. Known to be the largest tower in India, it is symbolic of Sikh victory. Its grand presence dominates the landscape, ensuring it is visible even before one physically enters the memorial complex. Victory towers (such as Qutub Minar) have long been associated with the Mughal dominion. Fateh Burj subverts this symbolism and reinstates the form as a testament to Khalsa sovereignty. The Khanda crowning the tower also inscribes the Sikh principle of miri-piri, foregrounding the inseparability of spiritual and temporal authority.

The statues of Banda Singh Bahadur, along with his five generals, namely Baj Singh, Binod Singh, Daya Singh, Kahan Singh, and Raam Singh, are placed on the top of the mounds that mirror the topography of the battlefield. These statues are not immediately visible upon entry, compelling the visitors to navigate the meandering path to witness each statue. The architectural sequencing creates

a pattern of gradual discovery that reflects the unfolding of historical events and the interactive engagement with the battlefield. While each of these figures holds individual historical significance, their spatial arrangement around Banda Singh Bahadur evokes a deeper symbolic resonance. The number and formation of the generals subtly allude to the Panj Pyare, the five beloved ones first initiated into the Khalsa by Guru Gobind Singh, thereby invoking a foundational moment in Sikh history. This compositional strategy reaffirms the Khalsa ethos of collective leadership and the primacy of shared spiritual and martial purpose. The symbolism is further intensified by the orientation of the statues towards the Fateh Burj, suggesting the supremacy of larger Sikh sovereignty over the individual commemoration.

Building on the symbolic and spatial design, the lived space emerges as the layer where meaning becomes affect. Brian S. Osborne explains that material rendering of social memory within a mythologized landscape transforms it “from an external phenomenon to be engaged visually, to a terrain of internalized symbolic meaning” (13). Such commemorative landscapes, he argues, serve as emotional prompts for action in the present, and their form and symbolism help us understand their role in cultural practice and as instruments of power. The Memorial demonstrates how geography turns into emotional space by incorporating historical context directly into its structural design. The life-sized statues realistically maintain their powerful presence, portraying the figures as historically situated and human, rather than distant or mythologised. The statues' elevated placement on high mounds directs the viewer's eyes upward, intensifying their presence.

The affective aspect is further strengthened through the memorial's dedicated focus on Khalsa identity through sartorial portrayal. The statues of Banda Singh Bahadur and his five generals are shown in complete Khalsa attire, emphasizing the clear visual indicators of the Khalsa. At the centre of this identity is rahit, the Khalsa code of conduct, which mandates carrying weapons and keeping uncut hair. Banda Singh himself reinforced these practices during his short rule, insisting that Khalsa warriors embody this discipline as a marker of their sovereign distinctiveness. As Jeevan Deol notes, such embodied practices “inscribe a collective narrative onto the body of each Singh,” connecting individual embodiment to the broader historical and political construction of the Khalsa (25). This stress on Khalsa embodiment was later codified and standardised during the Singh Sabha reforms in the colonial period, ensuring that a homogenised Khalsa identity became dominant in Sikh representation. In this sense, the body becomes a living archive that materialises memory and reaffirms one's belonging to a sovereign religio-political community, the Khalsa Panth (Shani 277). By representing these elements, the memorial not only commemorates the legacy of Banda Singh Bahadur but also situates it within a continuum—from the Khalsa sovereignty asserted in 1710, to its colonial codification, to its monumental reaffirmation in the present.

Memory Politics and the Role of the State

The symbolic elements discussed in the previous section are not simply visual or aesthetic. They serve an ideological function as they contribute to producing a collective identity. As A.D. Smith points out, various combinations of elements “have played, and continue to play, a vital role in shaping social structures and cultures, defining and legitimating the relations of different sectors, groups, and institutions within a community. By these means, they have ensured a degree of common consciousness, if not cohesion, even in periods of crisis and rapid change . . ."(25). In this context, the Banda Singh Bahadur Memorial re-enacts a symbolic repertoire to construct a shared consciousness of modern Sikh self-understanding. By embedding specific historical narratives within the landscape, the memorial materialises what may be termed a sacralised ethnoscape: a symbolic terrain imbued

with religious and ethnic meaning. With the loss of significant Sikh shrines post-Partition, Sikh institutions invested in new monumental projects in East Punjab to compensate for the lost sacred geographies. Especially under the leadership of the Shiromani Akali Dal (SAD), such memorial projects assert a unified, Khalsa-centred identity, thereby consolidating collective memory as a means of political legitimacy and social cohesion. This consolidation facilitates the formation of what Smith defines as an ethnie—"a named and self-defined human community whose members possess a myth of common ancestry, shared memories, one or more elements of common culture, including a link with a territory, and a measure of solidarity, at least among the upper strata" (36).

Building on Smith's framework, Giorgio Shani offers a more spatially grounded perspective by situating Punjab as the symbolic homeland of the Sikhs. He identifies it as a spatially fixed and politically mobilized site, central to the articulation of Sikh identity. Shani contends that Sikh religio-political elites, particularly the SGPC and SAD, have played a key role in institutionalising an orthodox conception of Sikh identity centred on Khalsa ideals. This continuity is rooted in the earlier schism between the Bandai Khalsa and Tat khalsa (true khalsa), who accused Banda Singh of exceeding the authority granted by Guru Gobind Singh. Harjot Oberoi, in The Construction of Religious Boundaries, illustrates that in the colonial period, Tat Khalsa reformers invoked this history to construct a homogeneous Sikh identity by standardising religious practices, codifying scriptural interpretations, and formalising theological norms to distinguish Sikhs from other communities (310). Institutions such as the Shiromani Akali Dal (SAD) and the Shiromani Gurdwara Parbandhak Committee (SGPC) continue this legacy by projecting a singular, martial Khalsa identity through commemorative aesthetics and spatial design. Within this framework, Banda Singh Bahadur's legacy was subordinated to the homogenised version of Khalsa. The Memorial can be seen as a postcolonial extension of this ideological project that erased the plurality and historical schism in favour of a singular Khalsa identity in the present, while simultaneously advancing the ideological goals of the SAD and SGPC.

William J. Glover, in his examination of the Khalsa Heritage Complex, places the Banda Singh Bahadur War Memorial within a wider network of monumental initiatives launched by the SAD. He observes that these projects—comprising the Khalsa Heritage Complex and the memorials to the 1764 Sikh mass killing at Kahnuwan Chhamb—constitute a "delimited monumental landscape" that uses a common architectural vocabulary of towers, ponds, and landscaped parks. They are not innocuous design decisions; they "annotate a history of perseverance" in the face of "intense (genocidal) violence" perpetrated against the Sikh people (Glover 445). With the presence of such spatial motifs, the Banda Singh Bahadur War Memorial creates a visual rhetoric of Sikh resilience and martyrdom and espouses a politically oriented reading of history.

However, the SAD does not confine its efforts to constructing Sikh memory. As Pashaura Singh notes, the Akalis "have rather emphasized [their] place within the community of nations that constitute the Indian political milieu" (16). Through commemorative initiatives, the SAD and the SGPC project Sikh resistance as part of a continuous historical struggle that affirms the distinct existence of the Khalsa and the community's rightful place within the Indian national narrative. This is significant in the genealogy of Sikh resistance. From the martyrdoms of Guru Arjan (1606) and Guru Tegh Bahadur (1675), the militarisation of the Khalsa under Guru Gobind Singh, Banda Singh Bahadur's resistance against Mughals, and the collective traumas of the Chhota (1746) and *Wadda Ghallughara* (1762) during Abdali's invasions, culminating in the consolidation empire of Ranjit Singh in the nineteenth century. Furthermore, these episodes are linked to colonial resistance, such as Sikh participation in the Ghadar Party, the INA, and sacrifices at Jallianwala Bagh. The narrative presents Sikh history as a

succession of martyrdoms and resistance against oppressive regimes (Mughal, Afghan, British), followed by the assertion of a Khalsa-centred ethos in the postcolonial present.

Through commemorative projects, the SAD seeks to both reaffirm its role as the political custodian of Sikh identity and claim a place for Sikhs within the broader Indian national narrative. The museums and memorials, therefore, serve a dual function: they celebrate Sikh heroism and sacrifice while asserting the community's rightful place in the nation's history. Kanika Singh in her article 'It Is a Gurdwara, Not a Memorial.': The Politics and Aesthetics of Sikh Memorials for 1984 asserts, “the questions of Sikh identity and the community's place in the Indian nation-state have been key questions influencing Sikh politics in the decades following independence… These issues find expression in the popular culture, commemorative practices, and the museums of the Sikhs” (2). By monumentalising Sikh contributions, particularly in battles against external aggressors, these memorials assert the role of Sikhs as protectors of the nation, claiming both historical legitimacy and national relevance.

Conclusion

The Banda Singh Bahadur War Memorial thus emerges as more than a commemorative site. It is a space where ideological hegemony, Sikh sacred discourse, and identity politics intersect. By privileging a Khalsa-centric ethos, the memorial consolidates a homogenised vision of the Sikh community, smoothing over historical schisms while foregrounding ideals of martyrdom and sovereignty. At the same time, it legitimises the authority of institutions like the SAD and SGPC, who deploy commemoration as a means of political continuity. The memorial also functions as a medium to embed Sikh historical experience within the broader narrative of the Indian nation, resisting the marginalisation of Sikh contributions and reasserting their place in Indian historiography and visual culture.

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Poetics of Love and Intimacy in Anna Akhmatova's Love Poetry

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ABSTRACT

Anna Andreyevna Gorenko (1889-1966), one of the major representatives of the canon of Russian poetry, was a poet concerned not only with fashioning her poetry but also(with) fashioning her image as a poet, and as a cultural icon for posterity. She excelled in connecting her material surroundings to a profound melancholic ideal of love, thereby earning her the title of the "black angel". This mysterious quality to her poetry often poses a problem to the translator and consequently to the reader; however, her poetry, supplemented with her biography, can help understand Akhmatova's deeply personal poetics. In this paper, I have examined some important translated pieces of Akhmatova across all the published volumes to analyse how her narrator is fashioned as a lover, sometimes jilted and sometimes angry, but always aiming to evoke the desired effect from the reader—(not only) that of creating sympathy but also of establishing a connection with the narrator and therefore,(with) the author.

Key Words: Russian Poetry, Poetics of Intimacy, Anna Akhmatova, Love poetry

Introduction

While research on Russian modernism has been confined "to privilege the metaphysical over the physical", this has led to almost an "eradication of sex" (Presto, "Introduction" 4). Although this has called attention to the study of body and sexual love in the Russian symbolists, especially the women poets, the early poetry of the Russian love poet and "The Stray Dog's "black angel" (Reeser 1), Anna Akhmatova, is deeply concerned with connecting the material to the metaphysical and the physical to the spiritual. Mikhailova and Snigireva examined the use of the word "mystery" (тайна) and its image in her poetry, concluding that Akhmatova's poetry is created along the fine line between the impermissible and the unrestricted, the secret and the explicit, and the mystical and the rational (577). This becomes especially difficult when reading the English translation of Akhmatova's poetry. Spivak explains how "the politics of translation takes on a massive life of its own if you see language as the process of meaning-construction" (397). Translating Akhmatova's poetics of intimacy into an English one is a difficult task unto itself, one that rids itself of the rhythm of the original. As Spivak asserts that language is not the be-all and end-all of translation, a text often develops a meaning of its own that transcends language, which is why one cannot study Akhmatova without understanding one of either her biographical or cultural/historical contexts.

Rather than renounce poetry, which in her father's opinion was a masculine profession, she chose to renounce her lineage (Gorenko) and honoured her maternal grandmother by adopting her surname, Akhmatova. Akhmatova, thus, belongs to the curious tradition of women writers who

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consciously choose to fashion their own image, thus, in a way, establishing a path for future women artists. Akhmatova was her own muse, and was functional to no one else; taking instead her lover to be not only her muse and inspiration, but also, function. It is only fitting that Akhmatova was one of the generation of poets that moved away from symbolism, wherein women poets or artists merely fulfilled roles like “wife-function” or “muse-function” (Presto, “Women in Russian Symbolism” 135), and often fitted into “mythologies of women which de-emphasized their role as artists and creators” (ibid). In her poetry, Akhmatova displays a heightened, feminized self-awareness of being in love, often confronting her love and her lover and then, overcoming that love. Nature and other events are merely the setting of her poetry, she is her own subject to which other materials act as mere accessories. “Throughout her long and productive poetic career” states Marting, “Anna Akhmatova was vitally and essentially concerned with the expression of her experience as a woman poet and a lover” (3) whereas Anatolyevna believes that hers is “[t]he ideal of a woman striving for love as a moral value” (10).

Harrington states how Akhmatova's “success rests on the extent to which she was sensitive to cultural expectations of writers, composing her poetry and creatively shaping her biography to create the impression of herself as a unique, extraordinary individual” (“Golden Mouthed Anna” 65) and to that very end, I argue that the individual she creates (and bares to the reader) in her love poetry is a woman in love who is betrayed, abandoned and has a tumultuous relationship with love, and therefore, is an individual that the reader is intimate (rather, intimated) with. Akhmatova utilises the symbolist tradition of “neo-Romantic notion of zhiznetvorchestvo (life creation)” (67), that aimed at a philosophy of life-as-art, thus, presenting their life as an aesthetic. She skilfully “plays to the tendency, prevalent among contemporary readers, to identify the persona directly with the poet” (Harrington “Melodrama” 244) but merely as an aesthetic device. It is also to be noted that beginning from her first volume, Akhmatova seems to be consciously using elements of Romanticism, especially that of a subjective-self finding melancholy within and without.

In Evening (1912), the 22-year-old Akhmatova fashions a narrator who talks of a sad and unrequited love, with a hint of betrayal and a lack of human control. Choosing evening to be the pervading theme is because it is “a time of awakening, of keen perception and sensibility, of precocious maturity for the sensitive individual with susceptibility to love and suffering from its peripeties” (Keitchen 169). She speaks of “simple earthly happiness and about simple intimate and personal sorrow. Love, love's parting, unrequited love, love's betrayal, clear and serene confidence in the lover, feelings of grief, of loneliness, of despair -all the things that everyone might feel and understand, though perhaps less deeply and personally than the poet…” (Strakhovsky 2). Although the volume begins on a somewhat optimistic note of the bewitching powers of love, the tone soon takes a dark turn. Love is a “[s]nake…bewitching the heart” (Kline 9), which might appear like a peaceful dove cooing or has the transitory brilliance of a “bright flash in frost, [D]rowsy night-scented stock” but is “far from peace and joy” (ibid).

Akhmatova attaches to love a melancholia, arising from unfulfilled desire and enslavement to one's lover. This tragic love is juxtaposed with images of longing, and yearning for a love that strips away one's individuality and ends in parting.

I'm sad. I'm in love with you.

Strange to recall soul's longing,

Suffocating, delirious death.

Now I'm simply a plaything,
Like the green parrot, my friend.
If you wish to, look in my eyes;
There's no hint of pain in my heart;
But I dislike the hour before sunset;
Wind from the sea; the word 'depart'.
(At Tsarskoye Selo)

Images that would otherwise evoke romance or intimacy are surrounded by a melancholic air, and although the lovers are resting on the pillows, and are not asleep, nothing suggests that they are engaged in acts of romance:

Now the pillow's
Hot on both sides.
A second candle
Dies, the ravens cry
Endlessly.
No sleep all night,
Too late to think of sleep…
('Now the pillow's,')

Akhmatova uses the tragic Shakespearean character, Ophelia to suggest how princes from tales can be devoid of chivalry, evoking the reader's relationship to Ophelia's tragic abandonment and transferring it to her narrator.

As soon as the narrator accepts her lover's proposal, she feels regret for, love becomes a force of nature that drives away the “memory of sunlight” ('Memory of sun ebbs from the heart.' 15) and (drowns) overwhelms her with winter. Yet the narrator's lover mockingly calls her a “frail snow-girl” who is likely to melt in March. In 'A grey cloud in the sky overhead,' the narrator informs the reader of how she became his before winters ended and before “the swift weeks' flow, his short-lived insubstantial love!” (Kline 16) passed. Love is a transitory, fleeting emotion that passes with changing seasons, leaving the narrator feel cheated by destiny and joy. For the narrator of her poetry, death needs to follow love for the lovers to fulfil their unrequited love.

The theme of exhaustion also prevails: the narrator no longer wishes to belong to this world; it is as if her soul has had its fill of suffering and has transcended the material realm. Her soul has acquired a “bitter, intoxicating taste” and she is unwilling to negotiate with her lover ('Drink my soul, as if with a straw'). Her body seems to suffer from fatigue as well to the extent that the passers-by think her a widow. She is resigned to no happiness and addressing the earth says, “ready [T]o be yours again, earth” (Kline 20), feeling too “tired [T]o think of sleep”. There is no longer any expectation of love being returned for her lover has abandoned her for “[O]ther eyes, he left to see…” (Kline 23). Although the narrator seems to have closed the door on her lover's return, his is the only face that she cannot overcome; her lover resembles the page she keeps opening in the book of her life ('Imitation of Innokenty Annensky'). However, Ketchian notes that: “Although in most poems of Akhmatova the

female persona is the one to suffer, in a sizable number of poems the speaker herself inflicts pain on the man and even causes his death inadvertently, as in the pieces “I clenched my hands under the dark veil” (# 7), “Over the Water” (#45), “I both cried and repented” (#54) and By the Very Sea.” (167).

This theme of abandonment continues in her next volume, Rosary (1914) and the narrator seems to cope with it with bitterness, often culminating in death. In 'My imagination, obediently,' she talks of her body weakly wasting away even though her blood beats with the passion of love. Her love persists and her lover makes his presence felt in her poetry. She seems to accept that her lover is with another, and might be happy but she also begs him not to return. She asks her heart: “…Is it for death you wait?” ('Here we're all drunkards and whores,') because her house seems to be quiet with no one awaiting her. In '…And no-one came to meet me', the narrator is Cinderella, lamenting her stolen shoe and her replaceability:

My heart's bitter too

Knowing soon, soon,

My little white shoe

Will be tried by everyone.

Although there is trust in love, the lover is no longer an object of adoration. The narrator can only hope that her tragedy is remembered for posterity in the glory of the art it inspires. Love maybe transitory, but the narrator is an artist: she wishes for immortality in her work, joy and love being out of her reach. “[S]he notices everything anew so that her internal world is not merely framed by the external world, but they combine into one solid and organic wholeness of life” (Strakhovsky 6). Like Aurora Leigh, the narrator's lover does not appreciate her poetry, but ironically supplies her material for her the latest of her “mad songs” ('For the last time, we met,'). Exhausted by her lover, she realises the power of man who doesn't have to beg for affection, unlike a woman. This tragic and melancholic manner of portraying her love made her widely popular with “the younger generation simply idoliz[ing] her” (Strakhovsky 4) and what is more is that she expects the reader to understand her plight and to fill in the blanks of her succinct, acmeist verse.

In White Flock (1917), the narrator of the poems sees a surge in her power, as if being without love has renewed her innocence:

Insomnia, my nurse, is elsewhere.

I'm not brooding by cold ashes.

And the curved hand on the tower clock,

Is no longer a deadly arrow.

How the past loses power over the heart!

Freedom is near. Everything's simple,

See how the sunlight falls across

The wet ivy this spring.

('My voice is weak, but not my will')

She imagines herself to be a sad but powerful muse who yearns but is miraculously strong. Her

love has also transcended from worldly, physical one to a metaphysical one:

Let him not long for my eyes,

Prophetic and unchanging,

He will have a lifetime of verse,

The prayers of my proud lips. ('Oh, and the day was cold,')

She has (gave up) surrendered the idea of being with her lover and does not wish to be disturbed anymore. Instead, this volume contains dedications to friends, events and places and yet at times, he makes an appearance and she begrudgingly acknowledges hope of meeting again:

I secretly conjure the future,

When evening shines clear and blue,

And foresee the inevitable meeting,

A second meeting, with you. ('I rarely think of you now')

She has entered a period of mourning, recalling her lover in nostalgic thoughts and also recalling how she suffered and yet loved through betrayal and abandonment. The lover has moved from the physical realm to her memory, perhaps even like a “mournful tale” ('Like a white stone in a well's depths').

In Plantain (1921), narrator is more concerned about transcending her mortality than earthly love or desire and speaks repeatedly of going home or to heavens. To her, “[e]arthly fame is smoke” ('Earthly fame is smoke,'), and not what she desires anymore. She has offered all her love and fortune to her lovers who are either long dead or in love with someone else. Her heart does not desire any physical comfort or flattery but longs for an innocent union blessed my God in paradise. The earth has not given her any joy with respect to love and on earth it is that she meets lovers who are good to her only in dreams:

Ah, in dreams you won't mistake my name,

Or gently sigh, as you do here.

('You should appear less often in my dreams')

There is a finality in her tone when she announces that it might be the “[l]ast poem of mine, earth has lost its magic…” ('Now no one will listen to my songs.') as she seems to have acknowledged her lover's swallow like tendency of flying away. She knows that she will no longer meet her lover and her heart still sometimes trembles over being separated from her lover.

In 1922, when Akhmatova published her work, Anno Domini MCMXXI, her narrator is even more attracted to the idea of transcending earthy love and advices others to do the same:

Don't taunt your heart with earthly joys,

Don't cleave to your wife and home,

Take the bread from your child's mouth,

So you can give it to a stranger.

('Don't taunt your heart with earthly joys,')

Yet, there are some poems that allude to her lover. Her love still seems to hold her captive and is a trial by steel and flame. She realises that she is stuck somewhere in between earth and heaven, all because of being captured by her lover. Once more the painful pangs of love and disappointment have returned to haunt and punish her. Her sadness is still entrenched deep within her to the point that she has to take it to the grave. Some (residual) remnant resentment is also visible as she recalls how her lover hates her poetry as well as having a family with her. It is unescapable however; it is her fate to be in love and to be sad for her and her lover's "Souls have been welded as one" ('Why do you wander, restless?'). Still, she refuses to be the kind who tend to, "praying and sobbing, throw myself [U]nder the horses' hooves" ('Ah! You thought I'm the kind too,'), or search for magical rituals that can help bring her lover back. She swears never to return to him. The narrator is happy to bid farewell to her lover and does not wish ill to his bride or his newly formed union, instead she goes on to claim a garden of heaven. Jealousy is no longer an emotion that haunts her for she has already made a familiar bed of sobbing and prayer for herself and does not wish to return to him. Although her lover might weep for her, they have "achieved a peace, [A]nd immaculate days…" ('A cast-iron fence,'). In her poem, 'Lot's Wife,' Akhmatova writes, "On your journey, every step will show that freedom isn't gained by flight alone, a path of wounds may lead to a radiant throne." The narrator seems to be advising on how to handle heartbreak that can be a path to self-discovery and growth. Taking the time to reflect on the relationship and what went wrong can helps recognize patterns and behaviour that led to the separation.

Her collection, Reed (1924-1940) contains a tribute to a lover who promised return in the spring of 1916 but it has been sixteen spring and she still hasn't seen him. It is supposedly about Gumilyov, her husband, who was executed in 1921. Another poem in the collection called 'Parting' talks of how she has managed to recover from her lover's hold, she no longer faces any betrayal or longs to prove her innocence to him. She has been freed from resentful memories and only remembers the time they cherished each other. She is finally able to celebrate him:

I drink to you –

To eyes, dead and cold,

To lips, lying and treacherous,

To the age, coarse, and cruel,

To the fact no god has saved us.

In 'This remorseless black separation', a poem from The Seventh Book (1936-64), she speaks as if she is capable of bearing the burden of separation and would rather meet her lover in dreamland. 'Thunder' is a brilliant example of how Akhmatova conveys political censorship along with a reflection on the intense emotion of falling in love, flooding the senses of a person with desire and passion until they can hardly think of anything else. Although, this poem is also a commentary against Stalin's rule in the Soviet Union, it also talks about the blinding excitement of a new love affair.

'Requiem', arguably one of Akhmatova's most famous poems, although discusses the pain and trauma in the aftermath of Stalin's purges, also portrays the pain that comes with losing a loved one in general. Anderson states how the work was "born of an event that was personally shattering and at the same time horrifically common…It is thus a work with both a private and a public dimension, a lyric and an epic poem" (181). The narrator seems to reflect deeply on how one loses love and loved ones over the course of life, which evokes a universal ethos and shared experience of grief that the readers gain

access to. This work is also representative of the entire body of her love poetry in its complexity, intricacy and multifaceted nature. Although deeply personal in nature, the intense love and loss that the narrator of her love poetry faces are shared by the entire humankind. Several of her poems are embedded in the specific cultural and historical context in which they were written but once again, they come back to describe a universal experience of love and loss, which explains her status both as a canonical and popular poet.

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OMG, We Need to Talk! A Conceptual Analysis of India's Sex Education Through the Lens of 'OMG 2'

Sahin Sahari*

ABSTRACT

In India, sex education is a deeply controversial and stigmatized subject, despite its critical role in adolescent development. While the country ranks top 10 among the highest in terms of online consumption of pornographic content, open discussions about sexual health, masturbation, menstruation, and reproductive rights are still considered as taboo subject in India. The Bollywood film 'Oh My God 2' which was released in 2023, serves as a powerful socio-religious commentary on this paradox, raising fundamental questions about India's hesitation to adopt comprehensive sex education. This paper examines how the film challenges societal taboos, institutional negligence, and cultural misunderstanding surrounding sexual health and awareness.

Key Words: Bollywood movie; Oh My God 2; Sex education.

Introduction

The Paradox of Sex Education in India

In India, sex education struggles between traditional beliefs and modern life (Alter, 2011). Ancient texts like the Kamasutra and sculptures at Khajuraho once showed openness toward sexuality (Pant, 2024). Today, many in India feel discussing sex is embarrassing and wrong. This discomfort leads schools, teachers, and parents to either skip sex education or offer information that is insufficient and based on fear (Kumar et al., 2017). As a result, teenagers may misunderstand important issues, become easy targets for exploitation, or face mental health problems. According to the National Family Health Survey (NFHS-5), despite increasing internet penetration, young people in India continue to lack proper knowledge about contraception, sexually transmitted infections (STIs), and consent (International Institute for Population Sciences [IIPS] & ICF, 2021). This educational gap has serious consequences, as studies suggest that a lack of comprehensive sex education contributes to rising cases of adolescent pregnancies, unsafe abortions, and gender-based violence (Singh et al., 2020).

The 2023 film OMG 2 sheds light on these pressing issues through a courtroom drama that questions the societal reluctance toward sex education. Directed by Amit Rai, the movie follows Kanti Sharan Mudgal (Pankaj Tripathi), a deeply religious shopkeeper in Ujjain whose son, Vivek, becomes the victim of misinformation and bullying. After being misled by his peers about the size of his genitalia, Vivek obsessively engages in masturbation, only to be humiliated when a video of him is leaked online. Instead of addressing his confusion with education and support, his school expels him, branding his behaviour as obscene. The narrative takes a turn when Kanti, initially devastated and ashamed, realizes the real issue is the absence of proper knowledge and guidance. Encouraged by a

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divine messenger (Akshay Kumar), he takes legal action against the school, challenging the broader system that continues to suppress discussions on sexual health.

This movie aligns with existing research that emphasizes the importance of structured sex education programs. The World Health Organization (WHO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) advocate for Comprehensive Sexuality Education (CSE), which has been proven to reduce risky sexual behaviour and improve adolescent well-being (World Health Organization [WHO], 2018; UNESCO, 2018). Studies from the Netherlands, where CSE is integrated into school curriculum from an early age, show significantly lower rates of teenage pregnancies and STIs compared to countries that resist implementing such programs (Ferguson et al., 2008). India's hesitancy in adopting a similar model, despite evidence of its effectiveness, raises concerns about whether cultural apprehensions are being prioritized over public health. Beyond policy, the film highlights the role of parents and teachers in shaping children's understanding of sexual health. A study published in the 'Indian Journal of Public Health' found that most Indian parents avoid conversations about puberty, menstruation, and contraception, often dismissing children's questions or responding with fear-based narratives (Chandra-Mouli et al., 2017). This lack of dialogue leads adolescents to turn to pornography, peers, or the internet, where misinformation is widespread. OMG2 cleverly integrates humour to present these uncomfortable discussions in a way that is engaging rather than preachy. Related to this, research in media psychology suggests that entertainment can be an effective tool for changing perceptions, as films that address taboo topics with sensitivity and relatability have a stronger impact on public discourse (Moyer-Gusé, 2008).

The courtroom setting in OMG2 further reinforces the tension between progressive and regressive mindsets in Indian society. Kanti's legal battle places him against the defence lawyer Kamini (Yami Gautam), who argues from a traditional standpoint, reflecting the opposition that sex education often faces in reality. This film subtly critiques the hypocrisy of a country that consumes vast amounts of pornography yet refuses to educate its youth on sexual well-being (Statista, 2024). Similar arguments have been made by researchers who point out that suppressing sex education does not reduce sexual curiosity but rather leads to misinformation, risky behavior, and unhealthy attitudes toward relationships (Chandra-Mouli et al., 2017).

At the policy level, India's approach to sex education has been inconsistent. The Adolescent Education Programme (AEP), introduced in 2005, faced severe backlash, with multiple states banning it on the grounds that it was against Indian values (NACO, n.d.). Even today, textbooks in many states exclude crucial topics or frame them in ways that reinforce shame rather than awareness (Khubchandani, 2014). Meanwhile, countries that have embraced structured sex education, such as Finland and Canada, report not only lower instances of teenage pregnancies but also improved understanding of consent and healthier relationships (Van Reeuwijk & Kågesten, 2020).

Objective of the Study

The primary objective of this study is to analyze the role of the Bollywood film 'OMG 2' in highlighting the need for comprehensive sex education in India. It examines how the film challenges societal taboos, institutional negligence, and cultural hypocrisy surrounding sexual health and awareness.

Methodology of the Study

In this study, the researcher used film-based qualitative inquiry because it allowed for analyzing real-world issues through fictional narratives (Marcus, 2005). The primary data source was the

Bollywood film OMG 2. The film-based analysis focused on the movie's narrative, dialogues, and courtroom arguments, highlighting how it challenged societal taboos (Rosenstone, 2006). This research followed academic fair use principles. The film content was used solely for critique and educational analysis purposes, with no reproduction for commercial or distributive intent.

India's Sexual Stigma and the Lack of Comprehensive Sex Education

Sexual stigma, as proposed by Goffman (1963), operates through social labelling that constructs certain behaviours as deviant. In the OMG2 film, masturbation; an act acknowledged by science as a normal part of adolescent development–is treated as a moral failing. Kanti's son, Vivek, is publicly humiliated, expelled from school, and subjected to severe emotional distress, which nearly drives him to suicide. This aligns with the psychological concept of “sexual guilt” (Byers, 2011), where negative societal messaging around natural sexual behaviours contributes to “self-doubt” and “mental health struggles” in young individuals (Yahia Albobali & Madi, 2021). The absence of structured sex education in Indian schools exacerbates this issue. Studies by UNESCO and the Population Foundation of India confirm that students in India often receive little to no formal education on sexual health, leading to myths and misconceptions (UNESCO, 2018; Population Foundation of India, 2022). The film's courtroom drama highlights this deficiency, as Kanti argues that his son was punished for the school's failure to educate him properly. His legal battle against the school and medical practitioners who misled his son highlights the institutional negligence that spreads through Indian society.

Religion, Cultural Hypocrisy, and the Misinterpretation of Ancient Texts

A compelling argument in OMG2 is the reinterpretation of religious texts. Kanti references Hindu scriptures to demonstrate that sexuality was historically understood and respected as a natural part of life. He cites the four Purusharthas; Dharma (righteousness), Artha (prosperity), Kama (desire), and Moksha (liberation)–arguing that Kama is not a sin but an essential pillar of human existence. However, British colonial influence, particularly through Lord Macaulay's Victorian-era educational reforms, imposed a prudish and restrictive approach to sexual discourse in India. As a result, sex, once acknowledged in religious and philosophical traditions, became a topic of shame and suppression. This aligns with Foucault's (1976) theory of the “repressive hypothesis,” which argues that societies exert power by controlling discussions on sexuality. In contemporary India, the censorship of sexual discourse; exemplified by the 27 cuts imposed on OMG2 by the Central Board of Film Certification (Sharma, 2023)–reveals an enduring discomfort with open conversations about sex, even when presented in an educational context.

Legal and Social Dimensions: Victim Shaming and the Courtroom as a Space for Debate

The film also highlights the systemic biases within India's legal and educational institutions. The character of the prosecuting lawyer (played by Yami Gautam) engages in victim shaming; a tactic frequently observed in real-world courtrooms when dealing with sexual misconduct cases. The reluctance of Indian schools to introduce sex education stems not only from cultural conservatism but also from institutional fear of controversy and backlash. This institutional resistance is vividly portrayed in a scene where Kanti's son, Vivek, approaches his school's biology teacher with concerns about the male reproductive system. Rather than addressing his doubts with sensitivity, the teacher reacts with hostility, cutting him off and yelling, “Go, go! You shameless boy!” This moment encapsulates the stigma surrounding open discussions on sexual health, reinforcing a culture of silence and misinformation. The Population Foundation of India reports that over 70% of Indian

parents oppose sex education in schools, citing concerns about moral corruption (Population Foundation of India, 2020). However, some empirical research suggests that comprehensive sex education reduces instances of teenage pregnancy, sexually transmitted infections (STIs), and sexual violence (Kirby, 2007). Related to this context, OMG2 serves as a critical intervention in the ongoing debate about sex education policy in India.

Policy Recommendation for Education Policymakers

If OMG 2 teaches us anything, it is this: silence around sexual health is not innocence, it is neglect. For too long, India's educational policies have either ignored or cautiously tiptoed around the issue of sex education, leaving young people to rely on peers, pornography, or shame-filled whispers. To break this cycle, education policymakers must make comprehensive sexuality education (CSE) a mandatory, normalized part of the national curriculum, not as an afterthought, but as an essential tool for dignity, safety, and well-being. Countries like the Netherlands have long shown that when sex education includes not just anatomy but values like respect, consent, and gender equity, it transforms lives (Haberland & Rogow, 2015). But effective education starts with safe, informed, and empathetic adults. Teachers must be trained not only in facts, but in how to respond to students' curiosity without judgment. According to a UNICEF report (2019), such teacher preparedness makes the difference between open dialogue and reinforced stigma. Policymakers must also go beyond textbooks. They should support interactive digital platforms, storytelling tools, and community-based approaches that connect with youth on their terms, especially in rural or conservative areas. Initiatives like India's "TeenBook" or South Africa's digital storytelling programs prove that listening to youth voices makes education relatable and effective (Goldfarb et al., 2021; Chandra-Mouli et al., 2020). Importantly, the responsibility does not lie with schools alone. A collaborative framework linking the Ministries of Education, Health, and Women and Child Development can ensure that sex education intersects with mental health, gender violence prevention, and reproductive justice.

Conclusion: The Path Forward for Sex Education in India

OMG2 is more than a courtroom drama movie. It is a mirror to Indian society's deep-seated contradictions. This film successfully challenges the notion that sex education corrupts youth, instead arguing that ignorance is far more dangerous. Kanti's battle against misinformation, institutional negligence, and societal hypocrisy reflects the urgent need for policy-level interventions. In OMG2, there is a thought-provoking scene where Kanti has a conversation with a sex worker to highlight society's deep-seated hypocrisy regarding sex education. During their discussion, Kanti presents him with a thought-provoking question–asking in which group she would want to see her son: "Among those who respect women and understand sexual health responsibly" or "Among those who exploit women due to ignorance and misinformation"

This moment serves as a powerful critique of the prevailing mindset that shrouds sex education in taboo while allowing misinformation to spread. The sex worker, who is often perceived as an outsider by society, provides a raw and unfiltered perspective–emphasizing that proper knowledge is essential for fostering respect, consent, and responsibility. This exchange becomes a crucial turning point in the film, reinforcing the urgent need for institutional and cultural reform in how India approaches sex education. Despite being in 2025, sex education is still not a mandatory part of the school curriculum in India. This starkly contrasts with the legalization of prostitution following the Supreme Court's verdict (Rajagopal, 2022), highlighting the paradox in India's approach to sexuality–where commercial sex work is legally recognized, yet structured education on sexual health remains neglected (Sahari, 2024). Until structured reforms are implemented, films like OMG2 serve as crucial interventions,

pushing the nation to confront its most uncomfortable yet essential truths. The real question it raises is whether India is willing to acknowledge the reality of its youth's experiences or continue to ignore them in favour of preserving an illusion of cultural purity.

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