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# Insight

**Sovarani Memorial College Journal**

**An International, Printed, Referred, Peer Reviewed,  
Annual, Multidisciplinary, Research Journal**

**Volume – XVI, 2024**



**Sovarani Memorial College**  
**Jagatballavpur, Howrah**  
**West Bengal, India**

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**2024**

**Volume – XVI**



**Sovarani Memorial College**

**Jagatballavpur, Howrah–711408**

**West Bengal, India**

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## Message of GB President



It is a matter of great pleasure that the 16<sup>th</sup> volume of *INSIGHT Sovarani Memorial College Journal* of our dear institution, Sovarani Memorial College is going to be published soon. The ongoing process of the publication of this annual multidisciplinary research journal of international repute in such a remote and rural institute where a larger section of the student body comprises the minority is truly a matter of pride to us. I also have come to know that along with the passage of time the *INSIGHT Sovarani Memorial College Journal* has grown not only in respect of volume but also in its substance and the quality of articles. I express my heartfelt gratitude and best wishes to those writers, scholars and intellectuals who have endeavored to enrich this journal with their thoughtful penning. My special thanks go to the respected Editor-in-Chief and all the honorable members of the Editorial Board whose untiring effort is the publication of this volume.

The key of success of a higher education is to cater intensive and overall spread of knowledge and education. Hope *INSIGHT Sovarani Memorial College Journal* will fulfill this completeness to students, research scholars and academicians throughout the globe. Once again, I would like to thank all who are directly and indirectly associated with this journal. Let *INSIGHT Sovarani Memorial College Journal* be more upgraded with the blessings of Maa Tara.

May everyone's welfare be.

With Thanks,

*Tapam Chatterjee*





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### PREAMBLE

It is incredibly delightful that Volume XVI of '**INSIGHT-Sovarani Memorial College Journal**'-2024 with ISSN will be published shortly. To accomplish and encourage the research works, our academic institution has been chronologically and methodically upgrading its status by launching a journal exclusively to publish research scholars' papers and articles. It will indeed add to or enrich the academic literature as well as the position of our college. Due to the relentless endeavours of all the members of the Editorial Board of our college, it has now been recognised as an International Standard, peer-reviewed, Annual, Multidisciplinary Research Journal.

My warm wishes to all be extended. I am also thankful to the dedicated and devoted faculty members and paper contributors who have performed such noble tasks to improve this periodical and the institution's expansion and growth. Praying for the best wishes, overall achievement, and a bright future, I express gratitude to all.



(Dr. Mahadeb Paul)  
Teacher-in-charge

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Date: 3rd November 2024

Dear Chief Editor,  
*Insight*, Kolkata, India.

I am writing to express my gratitude and enthusiasm upon receiving your invitation to join the Editorial Board of the peer-reviewed Journal "*Insight*." I am delighted to accept the position.

I am excited about the opportunity to contribute to the scholarly work of "*Insight*" and to collaborate with fellow board members. I am committed to promoting high-quality research and fostering an environment that encourages intellectual exchange within the academic community.

I look forward to actively participating in the editorial process, reviewing submissions, and contributing to the growth and success of the journal. I am confident that my experience in teaching, research, and administration for over 30 years in India, China, and the UK will complement the existing expertise on the Editorial Board.

Please let me know if there are any specific onboarding procedures or documents I need to complete. I am more than willing to dedicate my time and effort to support the journal's mission and uphold its standards of excellence.

Warm Regards,

*Yuktेश्वर Kumar*  
Dr. Yuktेश्वर Kumar



## Editor's Desk

निरंजनो निराकार एके देवो महेश्वरा ।  
मृत्युमुखात् गतं प्राणं बलादाकृष्य रक्षते ॥

We are very glad to announce that the 16th volume of 'Insight Sovarani Memorial College Journal' An international, printed, referred, peer reviewed, annual, multidisciplinary research journal of the Sovarani Memorial College, Jagatballavpur, Howrah, West Bengal, India is going to be published under the patronage of the present authorities and with the sincere cooperation of all the members.

This journal is multilingual, the languages being English, Bengali, Sanskrit, and Arabic. The contributions are of varied in nature and we hope that each of them possesses some merit of its own. We are sincerely grateful to all the authors who have contributed to the 16th volume of Insight.

We are particularly happy to have received words of hope and encouragement from our respected TIC Dr. Mahadeb Paul. I thank the TIC for his guidance and trust.

I am thankful to all my colleagues Prof. Suresh Mandal, Prof. Koushik Tarafdar, Dr. Chaitali Pal and so on.

We are also thankful to Sadesh, Kolkata for their sincere cooperation and assistance.

Last but not the least, I am extending my heartfelt gratitude towards the authors and the members of the executive editorial board without whose support it would not have been possible to publish the journal.

Thanks to all.

ॐ त्र्यंबकं यजामहे सुगन्धीं पुष्टिवर्धनम् ।  
उर्वारुकमिव बन्धनान् मृत्योर्मुक्षीय मामृतात् ॥  
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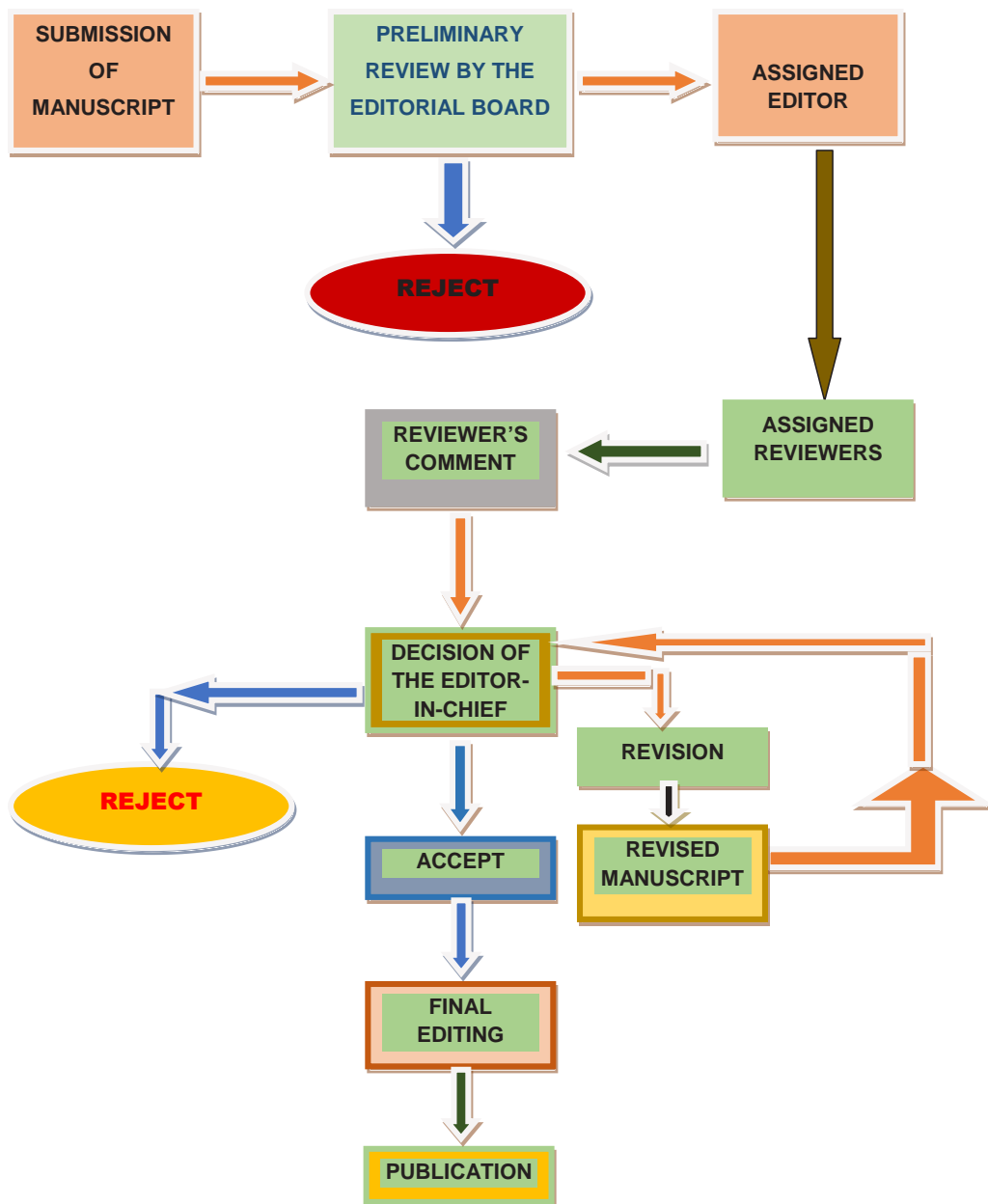
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# INSIGHT

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# A REVIEW ON THE ANTIMICROBIAL PROPERTIES OF $\text{CoFe}_2\text{O}_4$ NANOPARTICLES

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## ***Abstract***

Researchers have been very interested in cobalt ferrite nanoparticles and nanocomposites because of their unique features, which include high pollutant adsorption capacities, good photocatalytic, and antibacterial activities. An evaluation of the most recent developments in the use of  $\text{CoFe}_2\text{O}_4$  nanoparticles as an antibacterial agent is given in this review study. These NPs have unique characteristics that make them attractive as a possible treatment for a variety of microbial diseases, especially those that are resistant to antibiotics. This work includes an extensive analysis of the many uses, characterisation methodologies, and synthesis processes of  $\text{CoFe}_2\text{O}_4$  NPs in antibacterial contexts. In addition, the paper discusses the difficulties and potential opportunities in this field as it explores the fundamental mechanisms by which  $\text{CoFe}_2\text{O}_4$  NPs exert their antibacterial effects on various microbial strains. The review's main conclusions highlight  $\text{CoFe}_2\text{O}_4$  NPs' significant potential as an effective and promising antibacterial and antifungal agent.

**Keywords:** CoFe<sub>2</sub>O<sub>4</sub> nanoparticles, Synthesis, Characterization, Antibacterial activity, Antifungal activity.

## 1. Introduction

One of the biggest problems facing medicine today is the rise of microorganism strains that are resistant to antibiotics [1, 2, 3]. To address this issue, there has been a significant increase in the application of nanotechnology-based strategies. Because of their special qualities and adaptability, iron-based Magnetic Nanoparticles (NPs) have attracted a lot of interest for use in a variety of applications. As a result, they are widely used in many different fields. CoFe<sub>2</sub>O<sub>4</sub> nanoparticles have a one-order higher magneto-crystalline anisotropy compared to other reported metal ferrites. Additionally, they have reasonable saturation magnetization, mechanical hardness, a great magneto-strictive coefficient, exceptional chemical stability, and high coactivity [4]. Another advantage of CoFe<sub>2</sub>O<sub>4</sub> nanoparticles is that they have a one-order higher magnetocrystalline anisotropy than previous reported metal ferrite nanoparticles with the same saturation magnetization. As a result, magnetic CoFe<sub>2</sub>O<sub>4</sub> nanoparticles have a substantially shorter relaxation period than other metal ferrite nanoparticles of comparable size [4, 5]. Iron oxide nanoparticles have a high specific surface area, allowing them to interact with bacterial surfaces. Furthermore, due to their small size, they can speed up particle uptake by bacterial cells. Iron oxide nanoparticles are produced using a variety of physicochemical processes [6,7]. Significant antibacterial activity is indicated by metal ferrite nanoparticles. Cobalt ferrite nanoparticles have demonstrated a high degree of biocompatibility among these metal ferrites, and their antibacterial activity makes them a suitable choice for antibacterial applications in the industrial and medical domains [8]. In humans, other species, and mice, cobalt ferrite nanoparticles (NPs) elicit harmful effects (cytotoxicity and genotoxicity) [9, 10]. CoFe<sub>2</sub>O<sub>4</sub> NPs induce oxidative stress in liver (both in mice and humans), kidney, colon, human lungs, lymphoblasts, and primary mouse dendritic cells [9, 10]. These interactions with other organic materials and the type of toxicity are dictated by their physicochemical features and distinctive compositions [11]. Iron oxide particles are previously known to be non-hazardous magnetic materials, and MRI contrast agents have

been proven to be safe for human usage [12]. In this review, the principal focus is made upon the antibacterial properties of cobalt ferrite nanoparticles and the given data concern to the features of its activity, ways of action, efficiency against the various bacterial strains, as well as potential medical and the environmental applications.

## **2. Synthesis methods**

For the production of nanoparticles, a variety of preparation methods have been used, including co-precipitation, hydrothermal, mechanochemical, sol-gel process, solvothermal approach, thermal decomposition, and microwave. (a) Co-precipitation: distilled water is mixed with metallic nitrates, and then basic material is added to cause the precipitation of NPs. (b) Hydrothermal: After mixing and adding the metallic nitrates to distilled water, they are treated in an autoclave and NPs are deposited. (c) Microemulsion: By employing the proper surfactant, NPs are created in an emulsion.

### ***2.1. Co-precipitation***

Chemical synthesis is the most widely utilized approach for NP preparation because it can produce NPs in large quantities and at a relatively low cost in a relatively simple manner. In this sense, a conventional technique for producing NPs for chemical synthesis is co-precipitation. Large volumes of NPs can be easily dispersed in aqueous solutions using this approach. By adding the base in an inert atmosphere, this approach causes the precursor materials to co-precipitate in a solution at ambient temperature or at a high temperature. The co-precipitation approach offers many advantages, chief among them the potential for scaling up and obtaining huge amounts of NPs. Co-precipitation is therefore the primary chemical process utilized in industry to create thousands of kilograms of nano-sized NPs. The distribution of NPs particle size, morphology, and crystalline quality are the co-precipitation method's main obstacles [13].

### ***2.2. Hydrothermal reactions***

High-pressure reactors or autoclaves, where the temperature can reach

200°C and the pressure is typically greater than 125 atm, are used to conduct hydrothermal processes in the aqueous phase. In these circumstances, water serves as a reactant, which accelerates the kinetics of the hydrolysis reaction and increases the solubility of the precursor materials, which exhibit greater mobility because of the reduced viscosity of the water. It also improves the homogeneity, crystallinity, and accelerates the Ostwald ripening of the product (magnetic nanoparticles). Numerous NPs with good crystallinity and water solubility are synthesized using this technique. This method often yields water-dispersible NPs with strong crystallinity and magnetic responsiveness, although occasionally the NPs' particle size is too big for certain uses and interferes with colloidal stability. Also, there is a tendency for the reaction time to lengthen. As a result, it is difficult to regulate the formed magnetic nanoparticles' aspect ratio and size [14]

### ***2.3. Microemulsion***

A microemulsion is a colloidal suspension that exhibits thermodynamic stability. With the use of surfactants, two immiscible liquids can coexist in a single phase in this approach. One of the microemulsion solvents used to prepare the solution by dispersing the immiscible solvents is water or oil. Aqueous droplets are encircled by surfactant molecules, which create "micelles" that function as nanoreactors. Afterwards, magnetic nanoparticles develop within the micelles, enclosing the particles and limiting their nucleation, development, and agglomeration. Lastly, a second emulsion is added to the solution to aid in the precipitation of the nanoparticles. This process has the benefit of easily controlling the size of the nanoparticles (NPs) by regulating their size to sub-nanometer sizes. Nonetheless, the microemulsion process produces a wide range of shapes and sizes. This synthesis approach for NPs has a small working window and a low yield when compared to other methods. Nonetheless, a number of studies have produced encouraging findings that could lead to the process being scaled up for an economic or environmental facility [15].

### ***2.4. Sol-gel***

Because the sol-gel technique allows for form and size control, it has been

widely employed to produce metal oxides with nanostructures for industrial and engineering applications. This method also has the advantages of high surface to volume product ratio, low temperature chemistry, and reproducibility. This approach prepares the sol by adding the appropriate chemicals to the precursor solution, which causes polymerization or hydrolysis processes. Polymer addition or sol condensation is used to carry out the gelation process. To prepare nanoparticles, the solvent is simply allowed to evaporate. The primary benefits of this approach over alternative approaches include low-temperature chemistry and cost, easy experiment setup, and primarily highly controlled synthesis [16].

### **3. Properties of Cobalt Ferrite Nanoparticles**

Cobalt ferrite nanoparticles exhibit several properties that make them suitable for antibacterial applications:

#### ***3.1. Magnetic Properties***

Cobalt ferrite NPs possess high coercivity with normal saturation magnetization; working in the superparamagnetic region at nanometer dimensions. This property makes it useful in the separation of mixtures with the use of magnetic fields apart from carrying medication with the use of magnetic fields and magnetic resonance imaging (MRI) [17].

#### ***3.2. Chemical Stability***

These nanoparticles are anti-oxidation and corrosion, thus can maintain a stable chemical property when they are surrounded in different chemical solutions. They're essential for the long-lasting antibacterial action that these products must be maintained [18].

#### ***3.3. Surface Functionalization***

Cobalt ferrite nanoparticles contain targeted functional groups on their surface and possess improved biocompatibility. It has been mentioned that functionalization assists in its interaction with bacterial membranes and also improves the overall antibacterial character of the material [19].

#### 4. Photocatalytic application of $\text{CoFe}_2\text{O}_4$

$\text{TiO}_2$  is the most well-known and widely utilized photocatalytic substance. It possesses exceptional photocatalytic activity and is able to absorb UV light. Additionally, it is an affordable and non-toxic photocatalyst [20, 21]. The widespread use of  $\text{TiO}_2$  photocatalyst on a significant scale is hampered by the difficulty of effectively recovering powder  $\text{TiO}_2$  from treated water. Studies have shown the potential use of spinel ferrite NPs based photocatalysts, such as  $\text{CoFe}_2\text{O}_4$  and  $\text{CuFe}_2\text{O}_4$  NPs in combination with PMS or by modifying the surface with appropriate organic moiety [22, 23], in the search for materials of choice for the complete removal of organic contaminants. In particular,  $\text{CoFe}_2\text{O}_4$  NPs have drawn the interest of wastewater treatment experts as one of the best heterogeneous active catalysts for PMS activation and organic pollutant destruction [24].

##### 4.1. Mechanism

Identification and capture of active species have provided a comprehensive explanation of the degrading mechanisms of organic contaminants utilizing  $\text{CoFe}_2\text{O}_4$  NPs and NCs [25, 26]. For instance, radical scavengers were added to the photocatalysis reaction in order to identify the active species that were degrading Rhodamine B. Superoxide radicals, photo-generated electron holes, and hydroxyl radicals have all been scavenged by isopropanol (IPA), EDTA, and benzoquinone (P-BQ) in that order. The addition of radical scavengers was found to reduce photocatalytic activity, according to the results. In contrast to IPA, the photocatalytic activity was much lower with the addition of P-BQ and EDTA. Thus, it was determined that hydroxyl radicals had little role in the process of degradation [27]. Furthermore, the primary active species are superoxide radicals and electron holes produced by photosynthesis. A typical proposal for the mechanism combines the analysis results with radical scavengers. However, Hassani and colleagues' study [28] found that superoxide and hydroxyl radicals are the two primary oxygen reactive species. This resulted from benzoquinone and tert-butyl alcohol (hydroxyl radicals) significantly quenching the degradation efficiency. Furthermore, the degradation efficiency was marginally lowered in the reaction due to the presence of ammonium oxalate, a photogenerated electron hole. Based on the previously

described research, it can be concluded that the type of heterojunction present in photocatalysts determines the critical oxygen species interaction.

## 5. Characterization techniques

Understanding the structural and physicochemical characteristics of cobalt ferrite nanoparticles, which can influence their antibacterial action, is crucial for developing effective characterization tools for these agents. Cobalt ferrite nanoparticles can be characterized using a variety of sophisticated methods, such as magnetic tests, TEM, XRD, and FTIR. A popular method for figuring out the crystal structure of cobalt ferrite nanoparticles is X-ray diffraction. The crystallinity, lattice parameter, and crystal size of the nanoparticles are all revealed by the XRD spectra. The degree of crystallinity and the crystal structure of the nanoparticles can be ascertained by examining the XRD spectra [29]. One very useful technique for examining the size, shape, and structure of cobalt ferrite nanoparticles is transmission electron microscopy (TEM). Agglomerates and defects can be identified thanks to TEM pictures, which provide insightful information on the distribution of particle sizes and shapes. Furthermore, the lattice spacing and crystal structure of the nanoparticles can be ascertained by TEM [30]. Cobalt ferrite nanoparticle surface functional groups and chemical composition can be ascertained by Fourier transform infrared (FTIR) analysis. The chemical bonds and vibrations of the nanoparticles are revealed by the FTIR spectra, and these details may have an impact on how the particles interact with microbes [31]. Cobalt ferrite nanoparticles' magnetic characteristics are assessed by magnetic measurements. The size and shape of nanoparticles affect their magnetic behavior. Magnetic measurements can reveal details about the nanoparticles' magnetic characteristics, including coercivity, magnetic anisotropy, and magnetic moment. These characteristics may have an impact on the nanoparticles' magnetic response and how they interact with microbes. Cobalt ferrite nanoparticle characteristics can also be assessed using other methods, such as thermogravimetric analysis (TGA), dynamic light scattering (DLS), and zeta potential evaluations. The size distribution and surface charge of the nanoparticles can be ascertained by DLS and zeta potential tests, while TGA is utilized to assess the thermal stability and

composition of the particles [32]. In general, the methods used to characterize cobalt ferrite nanoparticles as an antibacterial agent are crucial for comprehending their physicochemical and structural characteristics, which can influence their antimicrobial activity. A thorough understanding of the characteristics of the nanoparticles can be obtained by combining several characterization approaches, which enables the optimization of the antibacterial activity of the particles.

Evaluating the biological activity of cobalt ferrite nanoparticles against microbial strains is crucial, in addition to characterization procedures. Cobalt ferrite nanoparticles' antibacterial properties can be evaluated using a variety of tests, such as disk diffusion, minimum inhibitory concentration (MIC), and biofilm assays. These tests can aid in the optimization of cobalt ferrite nanoparticles' activity and reveal how well they work against various microbial strains. A thorough grasp of the characteristics of cobalt ferrite nanoparticles as an antibacterial agent can be obtained by combining characterization methods with biological experiments. Transmission electron microscopy is used to see the size, shape, and morphology of nanoparticles, while X-ray diffraction is used to assess the crystal structure of the particles. The chemical makeup and functional groups of nanoparticles can be determined using Fourier transform infrared spectroscopy, and their magnetic characteristics can be assessed using magnetic tests. Cobalt ferrite nanoparticles can also be characterized by other methods such as zeta potential tests, thermogravimetric studies, and dynamic light scattering. A thorough understanding of the characteristics of the nanoparticles can be obtained by combining several characterization approaches, which enables the optimization of the antibacterial activity of the particles. Different biological assays can be employed to evaluate the antibacterial efficacy of cobalt ferrite nanoparticles against distinct microbial strains, apart from characterization approaches.

## **6. Antimicrobial activity**

Different sorts of bacteria can infect humans or animals, and the wide range of antibiotics that are currently on the market can effectively treat these infections. However, three major global health challenges remain: antimicrobial resistance, the high cost of antibiotics, and their adverse effects. Finding substitutes for or

improving the antimicrobials that are now on the market is one of the common approaches to solving these issues. NPs are currently frequently used as potential solutions to these issues; one such strategy is the application of magnetic NPs, which is gaining popularity. This is mostly due to its intriguing physical and chemical properties in the field of biomedicine. The available research indicates that in addition to well-known antimicrobials like  $\text{Cu}_2\text{O}$ , silver nanoparticles,  $\text{CoFe}_2\text{O}_4$ ,  $\text{TiO}_2$ ,  $\text{MgO}$ , and  $\text{ZnO}$ , nanoparticles can also effectively combat human microorganisms more effectively than antibiotics. In particular, numerous studies have examined the antibacterial qualities of bare or substituted  $\text{CoFe}_2\text{O}_4$  NPs and its NCs [33, 34].

The primary characteristics of  $\text{CoFe}_2\text{O}_4$  NPs in various forms of wastewater treatment are their photocatalytic, antibacterial, and magnetic qualities [35]. For instance, wastewater and occasionally contaminated floods are common places to find *E. Coli* and *S. Aureus*. They have the potential to cause devastating infections if they enter the human body. Furthermore, the fungus *Candida albicans* causes illnesses to human skin, nails, and mucous membranes. It has been demonstrated that  $\text{CoFe}_2\text{O}_4$  NPs and its metal doped NPs are effective in breaking down the majority of the previously mentioned microbes as well as *Bacillus subtilis*. [34]. In a study treating textile effluent wastewater, activated carbon from waste Apocynaceae leaves mixed with  $\text{CoFe}_2\text{O}_4$  NPs shown good antibacterial activity within the 10–17 mm zone of inhibition [36]. Similarly, it was discovered that  $\text{CoFe}_2\text{O}_4$  NPs had a good antibacterial activity against fungi at a 15 mm zone of inhibition [37]. In a different study, it was demonstrated that  $\text{CoFe}_2\text{O}_4$  NPs have high catalytic activity for activating PMS in the presence of UV-A light and producing active hydroxyl and sulphate radicals. Within a short period of time (30–60 min), the application of a modest amount of  $\text{CoFe}_2\text{O}_4$  NPs and PMS in simulated wastewater and UV-A radiation has reduced the number of different kinds of bacteria [38]. Overall, the study showed that  $\text{CoFe}_2\text{O}_4$  NPs have a potent antibacterial potential, and this is one of the areas of active research right now.

$\text{CoFe}_2\text{O}_4$ 's antibacterial activity can be increased through surface modification with the right organic moieties or metal doping. In particular, compared to Gram negative *E. coli*,  $\text{Zn}^{2+}$  doped  $\text{CoFe}_2\text{O}_4$  has demonstrated a greater affinity for

inhibition against Gram positive *S. aureus*[39]. Using Ag-doped  $\text{CoFe}_2\text{O}_4$  NPs, similar outcomes were also noted [40]. Both the pristine and Ag-doped  $\text{CoFe}_2\text{O}_4$  NPs had strong antibacterial activity in a different investigation that assessed the antimicrobial activity of the NPs made using the honey-assisted combustion approach.

## 7. Antifungal activities of cobalt ferrite NPs

Human skin, neck, and external mucosal infections are caused by a number of fungal strains. Out of all the fungal strains listed, *Candida* strains are the most prevalent strains that cause various fungal illnesses. The effects of cobalt ferrite NPs and metal-doped cobalt ferrite NPs against various bacterial strains have been assessed by a number of researchers. In this regard, Suba et al. mixed cobalt ferrite NPs with activated carbon made from Apocyanaceae leaf waste. The constructed nanosystem was observed to exhibit a zone of inhibition that was 10–17 mm higher than that of the control groups. The green synthesis method was also used to create cobalt ferrite nanoparticles, which demonstrated greater antifungal activity with a 15 mm zone of inhibition against *Aspergillus aureus* and *Candida krusie* [36, 37, 41].

Rehman et al. used the sonochemical approach to synthesize neodymium coated cobalt ferrite NPs in one investigation. It was discovered that the anti-fungal and antibacterial action was greatly increased by raising the neodymium level. The attachment of a metal-based ligand, which demonstrated increased NP contact with the bacteria' membranes, was the cause of this increased activity[42]. In a different work, cobalt ferrite NPs based on cellulose and biodegradable, were created by polyaniline and cobalt ferrite NPs being polymerized in situ when cellulose was present. The resultant composites demonstrated a size distribution average of less than 50 nm and a markedly increased antibacterial efficacy against multiple bacterial and fungal species, including *Candida albicans* and *Escherichia coli*. Additionally, it was shown that while the biodegradability reduced, the antibacterial activity rose with an increase in the concentration of cobalt ferrite NPs. The observed increased antimicrobial activity could be attributed to many mechanisms, including disruption of the transcription process, inhibition of multiple mechanisms during translation,

disruption of cell wall formation, and degradation of metabolic pathways.[43].

Zalneravicius et al. assessed the effect of particle size on antibacterial activity in one investigation. Using the co-precipitation method, NPs of  $\text{CoFe}_2\text{O}_4$  with particle sizes of 15, 5, and 1.65 nm were created. Using *Candida albicans*, *Candida parapsilosis*, *Candida krusei*, and *Candida parapsilosis*, the antibacterial activity of these NPs was assessed. Their investigation's conclusions showed that, in comparison to large-sized NPs, smaller-sized NPs had the strongest antibacterial activity. The cobalt content of NPs was the cause of this size-dependent antibacterial action. Since the smaller-sized NPs have a larger cobalt concentration, they can adhere to yeast membranes more strongly and ultimately kill them more effectively [44].

El-Sayed et al. used *M. purpureus* fungus strains to create cobalt ferrite NPs, claiming that the method used was eco-friendly and low-cost. X-ray analysis revealed a uni-phase crystalline lattice, while TEM analysis revealed a spherical shape with a size distribution of 6.5 nm. The prepared NPs demonstrated significantly higher antifungal and antibacterial potentials at a particular MIC [45]. Using the combustion method, Naik et al. developed cobalt-doped manganese ferrite NPs. The cubic structure of the NPs was confirmed by the X-ray investigation. It was discovered that the distribution of particle sizes fell between 15 and 30 nm. Investigations were also conducted on the antifungal activity against *Rhizopus* fungus at room temperature. It was shown that the presence of cobalt ions correlated with antifungal activity. Increased cobalt ion concentration results in increased antifungal action [46].

## 8. Mechanisms of Antibacterial Action

The antibacterial properties of cobalt ferrite nanoparticles (CFNPs) are attributed to several mechanisms, which often work synergistically:

### 8.1. Generation of Reactive Oxygen Species (ROS)

Thus, it was shown that CFNPs can stimulate the formation of ROS, for instance hydroxyl radicals and superoxide anions. These ROS can damage cell walls, proteins, and DNA and induce cell death in bacteria. The antibacterial potential

of nanoparticles is attributed to the ease with which they generate ROS due to the large surface area [47].

### ***8.2. Membrane Disruption***

CFNPs can also inhibit bacterial cell growth by physically damaging the organism via penetration into bacterial cell membrane and enhancing the permeability of the membrane. This interaction leads to the loss of contents in the cells and ultimately leads to cell death. This mechanism is purely dependent on the fact that CFNPs are highly negatively charged and their interaction with the bacterial membranes is almost always strong [48].

### ***8.3. Metal Ion Release***

Damage of bacterial cellular structures can be induced due to the binding of cobalt ions  $\text{Co}^{2+}$  derived from CFNPs, which can disrupt the metabolism of bacteria. These ions can denature enzymes, prevent the synthesis of proteins, and prevent phosphorylation of cells, all of which help in the killing of bacteria.

### ***8.4. Photothermal Effect***

CFNPs can also fluoresce and can be used to direct heat to the bacteria through mechanisms such as hyperthermia. This photocatalytic action is especially beneficial for delivering localized antibacterial actions where temperatures need to be properly regulated.

## **9. Effectiveness Against Bacterial Strains**

CFNPs exhibit broad-spectrum antibacterial activity against both Gram-positive and Gram-negative bacteria. Significant bactericidal effects have been observed against various pathogenic strains:

### ***9.1. Staphylococcus aureus***

The oligomers of CFNPs damage the cell wall of *S. aureus* which is a Gram-positive organism, causing cell death. ROS generation and membrane disruption are most efficient against this strain where combination therapy is most efficient [49, 50].

### ***9.2. Escherichia coli***

The mechanisms of ROS generating and the disruption of the membranes are

efficient in the case of *E. coli* which is a Gram-negative bacterium, and its anatomy involves a complex layering of the cell walls [49].

### ***9.3. Pseudomonas aeruginosa***

CFNPs can penetrate the biofilm of *P. aeruginosa*, and hence treat the bacterial infection, which is otherwise resistant to normal antibiotics [96]. Both mechanisms involve the release of cobalt ions and generation of reactive oxygen species that slow down the growth of this bacterium [50].

### ***9.4. Methicillin-Resistant Staphylococcus aureus (MRSA)***

CFNPs exhibit potential against antibiotic-resistant strains such as MRSA. Their multiple-target antibacterial activities decrease the chance of formation of resistance, which may bring some solutions to antibiotic-resistant infections [51].

## **10. Applications in Antibacterial Treatments**

The unique properties and antibacterial mechanisms of CFNPs enable their use in various applications:

### ***10.1. Medical Devices and Implants***

Application of CFNPs on the surface of medical devices and implants can reduce bacterial colonization and formation of biofilms thereby minimizing the prospects of infection. The application is important for the elimination of hospital-acquired infections and enhancing the overall durability and safety of implants.

### ***10.2. Wound Dressings***

CFNPs, when incorporated into wound dressings, offer a continually protecting layer for the wound, enhance the rate of healing, and also greatly decrease the possibility of infections. The potential to incorporate these nanoparticles into polymer matrices or hydrogels is utilized in the development of efficient antibacterial dressings.

### ***10.3. Water Purification***

Filtration systems which employ CFNPs have the potential of helping remove bacterial contaminants from water necessary for drinking. They can be easily collected and recycled due to their magnetic nature; thus, they are more environmentally friendly compared to other conventional methods of water treatment.

#### ***10.4. Food Packaging***

When CFNPs are incorporated into food packaging materials, they can slow down the rate of growth of bacteria hence increase the shelf life of the products. Another by-product arising from the use of this application is the minimized food wastage and enhanced food hygiene.

### **11. Advantages and Challenges**

#### ***11.1. Broad-Spectrum Activity***

Similar to other CFNPs, they may be effective towards a broad spectrum of bacterial strains inclusive of those that are resistant to antibiotics. They are effective against a vast range of infections because their modes of action are diverse and complex, thereby presenting the bacterium with a large range of targets, which are difficult to alter genetically.

#### ***11.2. Biocompatibility***

Some investigations have demonstrated that although metal-based NPs are toxic to cells, when the CFNPs are appropriately functionalized, they will not be toxic to human cells for biomedical applications. They can be made sufficiently safe, surface modifications being able to help in this regard.

#### ***11.3. Multifunctionality***

A few of the applications of CFNPs include the use in antibacterial agents, diagnostic imaging, targeted drug delivery and haemorrhage treatments, and hyperthermia cancer treatments. This versatility attributes them with features that make them ideal in biomedical applications.

### **12. Challenges**

#### ***12.1. Toxicity Concerns***

Although the chemical nature of CFNPs makes them relatively biocompatible for long term implantation, concerns over the long term toxicity of cobalt ions have been surmised. More research is required to determine how the continuous intake of cobalt ions affects the body or if there are approaches to prevent the leeching of the substance.

#### ***12.2. Environmental Impact***

It was pointed out that disposal of nanoparticles is a menace to the environment and therefore new and efficient green synthesis and degradation techniques are called for. Some research focuses on the biodegradable nanoparticle coatings for the carriers and eco-friendly synthesis methods.

### ***12.3. Regulatory Hurdles***

For regulating use of CFNPs in clinical practices, it is much demanding in terms of time and resources as these molecules must go through elaborate regulatory processes to guarantee their safety and efficacy. To this end, there is a call for a reform of the existing regulatory systems for the purposes of improving the existing legal standards with regard to the newer developments in the field of nanotechnology.

## **13. Future Perspectives**

Research into the antibacterial applications of CFNPs is still in its early stages, and several areas hold promise for future exploration:

### ***13.1. Enhanced Functionalization***

It is also possible to enhance the targeting ability and efficacy of the CFNPs against the desired bacterial strains by developing the new surface coatings and functional groups. Higher specificity of forthcoming antibacterial agents can be attained with the help of further upgrade in the surface chemistry and molecular engineering.

### ***13.2. Combination Therapies***

Supplementing CFNPs with regular antibiotics or another type of nanoparticle may also increase their antibacterial performance and the challenge of resistance. Combinations of two or more distinct antibacterial agents work in harmony to produce a better result.

### ***13.3. In Vivo Studies***

To provide more information about the safety and metabolism of CFNPs in living organisms, more in vivo investigations shall be conducted on pharmacokinetics and biodistribution activities of the CFNPs as well as check on long-term impacts. Afterward, animal research and clinical studies will be vital in turning laboratory results to actual revolutionary applications.

### ***13.4. Sustainable Production***

The use of environmentally friendly approaches in the synthesis process and also in the management of the end disposal or recycling of CFNPs poses a major challenge. There are several strategies to reduce the environmental effects of creating and employing nanoparticles: These include systematic approaches as green chemistry and existence of Life Cycle Assessments.

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# Existence, uniqueness and stability results for a global optimization problem involving nonlinear contractions

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## Abstract

Best proximity point problems are global optimization problems which are realized through non-self functions. Here we establish the existence and uniqueness of best proximity points for certain class of non-self nonlinear contractions by which the minimum distance between two subsets of a metric space is determined. The problem is treated here as that of finding the optimal approximate solution of a fixed point equation where in general the exact solution does not exist. Further we show that the best proximity points corresponding to the above mentioned category of contractions are weakly stable under uniform convergence. The results obtained here are illustrated with examples.

**Mathematics Subject Classification:** 47H10, 54H10, 54H25.

**Keywords:** Metric space; best proximity point; stability.

## 1 Introduction and Mathematical Preliminaries

The aim of this section is to provide with the mathematical background as well as to introduce certain notions related to stability for the derivation of the results in the subsequent sections of the paper. The specific programme in this paper is to establish the existence of unique best proximity points of nonself mappings belonging to a particular class of generalized nonlinear contractions and that the best proximity points corresponding to a sequence of such categories of mappings are weakly stable under uniform convergence. Suppose that throughout the paper  $(X, d)$  denotes a metric space and let  $A, B \subseteq X$ . We use the following notations.

$$d(A, B) = \inf \{d(x, y) : x \in A \text{ and } y \in B\},$$

$$A_0 = \{x \in A : d(x, y) = d(A, B) \text{ for some } y \in B\},$$

$$B_0 = \{y \in B : d(x, y) = d(A, B) \text{ for some } x \in A\}.$$

It is to be noted that if  $(A, B)$  is a nonempty, weakly compact and convex pair in a Banach space  $X$ , then  $A_0$  and  $B_0$  are nonempty [4, 16].

Best proximity point problems were introduced by Eldred et al. in [14]. Best proximity point results are related to the problem of finding minimum distances which is by itself a classical problem considered in many areas of mathematics. In our case the objects are subsets of metric spaces. Here the minimum distance between pairs of subsets are realized by utilizing best proximity points of non-self mappings. Let  $A$  and  $B$  be two non-intersecting subsets of a metric space  $(X, d)$ . Let  $T: A \rightarrow B$  be a non-self mapping. Then  $x^* \in A$  is a best proximity point of  $T$  if  $d(x^*, Tx^*) = d(A, B)$ . A best proximity point reduces to a fixed point in case where  $A = B$ . A best proximity point problem can be described as the problem of finding an optimal approximate solution of the fixed point equation  $x^* = Tx^*$  although the exact solution need not exist. There is an approach to this global optimization problem of finding minimum distance between two sets by minimizing globally the quantity  $d(x^*, Tx^*)$  such that the minimum value  $d(A, B)$  is attained at some point. There are uses of several contractive mappings in best proximity point problems in a good number of papers [1, 2, 9, 12, 15, 16, 18, 19, 20]. We use a generalized almost contraction in our results. Particularly, Berinde introduced almost contractions [5] which are generalized notions of several contractions. Almost contractions and their generalizations were considered in several works like [3, 8, 13, 17].

As is well known that stability is the study of limiting behaviors of mathematical systems which is variously discussed in many different contexts [6, 7, 10, 11, 21]. We propose the following definitions of stability for best proximity points.

**Definition 1.1** Let  $T_n : A \rightarrow B$ ,  $n = 1, 2, 3, \dots$  be a sequence of mappings each having a unique best proximity point  $p_n$ . Let  $T = \lim_{n \rightarrow \infty} T_n$  have a unique best proximity point  $p$ . We say that the unique best proximity points of  $\{T_n\}$  are stable if  $p_n \rightarrow p$  as  $n \rightarrow \infty$ .

We recall that the fixed point sets  $F(T_n)$  of a sequence sequence of mappings  $T_n : A \rightarrow A$  are stable if  $H(F(T_n), F(T)) \rightarrow 0$  as  $n \rightarrow \infty$  where  $T = \lim_{n \rightarrow \infty} T_n$  and  $H$  is the Hausdorff metric [11].

In the case when the mapping  $T_n$  has a unique fixed point  $p_n$  for all  $n \geq 1$ , and  $T = \lim_{n \rightarrow \infty} T_n$  has a unique fixed point  $p$ , then the above condition reduces to  $p_n \rightarrow p$  as  $n \rightarrow \infty$ . We say in this case that the unique fixed points of the sequence  $\{T_n\}$  are stable.

Also in this cases of sequences of self-mappings, the stability in the definition 1.1 coincides with the above notion of stability.

Next we define weak stability of best proximity points.

**Definition 1.2** Let  $T_n : A \rightarrow B$ ,  $n = 1, 2, 3, \dots$  be a sequence of mappings each having a unique best proximity point  $p_n$ . Let  $T = \lim_{n \rightarrow \infty} T_n$  have a unique best proximity point  $p$ . We say that the unique best proximity points of  $\{T_n\}$  are weakly stable if there exists  $r \geq 0$  such that for given  $\epsilon > 0$  there exists a positive integer  $N$  such that

$$p_n \in S_p(r + \epsilon) \text{ for all } n \geq N,$$

where  $S_p(r + \epsilon) = \{x \in A : d(x, p) < r + \epsilon\}$  is the open sphere with centre  $p$  and radius  $r + \epsilon$ .

When  $r = 0$ , the weak stability reduces to stability.

In our results in the following sections we use the following class of functions.

$$\Psi = \{\varphi : [0, \infty) \rightarrow [0, \infty) : \overline{\lim} \varphi(x_n) < t \text{ whenever } \{x_n\} \text{ is a sequence in } [0, \infty) \\ \text{with } x_n \rightarrow t > 0\}.$$

**Note:** It is clear from the definition of  $\Psi$  that for any  $\varphi \in \Psi$ ,  $\varphi(t) < t$  for all  $t > 0$ .

The following are some specific features of the present work:

- We introduce the concepts of stability and weak stability pertaining to best proximity points.
- The best proximity point in our theorem is unique.
- A weak stability result is established.
- The results are illustrated with examples.

## 2 Main Results

**Theorem 2.1** Let  $(X, d)$  be a complete metric space and  $(A, B)$  be a pair of non-empty closed subsets of  $X$  such that  $A_0$  is non-empty and closed. Let  $T : A \rightarrow B$  be a mapping with  $T(A_0) \subseteq B_0$ . Suppose that there exist  $\psi \in \Psi$  and a real number  $L \geq 0$  such that for all  $x, y, u, v \in A_0$

$$d(u, Tx) = d(A, B) \text{ and } d(v, Ty) = d(A, B) \implies d(u, v) \leq M(x, y, u, v), \quad (2.1)$$

where

$$M(x, y, u, v) = \psi(\max \{d(x, y), d(x, u), d(y, v), \frac{d(x, v) + d(y, u)}{2}\}) \\ + L \min \{d(x, u), d(y, v), d(x, v), d(y, u)\}.$$

Then  $T$  has a unique best proximity point in  $A_0$ .

**Proof.** Let  $x_0 \in A_0$ . Since  $T(A_0) \subseteq B_0$ , there exists a point  $x_1 \in A_0$  such that

$$d(x_1, Tx_0) = d(A, B). \quad (2.2)$$

Now,  $x_1 \in A_0$  and  $T(A_0) \subseteq B_0$  imply that there exists a point  $x_2 \in A_0$  such that

$$d(x_2, Tx_1) = d(A, B). \quad (2.3)$$

Continuing this process, we obtain a sequence  $\{x_n\}$  in  $A_0$  such that for all  $n \geq 0$ ,

$$d(x_{n+1}, Tx_n) = d(A, B). \tag{2.4}$$

By the construction of the sequence  $\{x_n\}$ , we get

$$d(x_{n+1}, Tx_n) = d(A, B) \text{ and } d(x_{n+2}, Tx_{n+1}) = d(A, B),$$

which, by (2.1), imply that

$$d(x_{n+1}, x_{n+2}) \leq M(x_n, x_{n+1}, x_{n+1}, x_{n+2}), \tag{2.5}$$

where

$$\begin{aligned} M(x_n, x_{n+1}, x_{n+1}, x_{n+2}) &= \psi(\max \{d(x_n, x_{n+1}), d(x_n, x_{n+1}), d(x_{n+1}, x_{n+2}), \\ &\quad \frac{d(x_n, x_{n+2}) + d(x_{n+1}, x_{n+1})}{2}\}) \\ &\quad + L \min \{d(x_n, x_{n+1}), d(x_{n+1}, x_{n+2}), d(x_n, x_{n+2}), d(x_{n+1}, x_{n+1})\} \\ &= \psi(\max \{d(x_n, x_{n+1}), d(x_{n+1}, x_{n+2}), \frac{d(x_n, x_{n+2})}{2}\}). \end{aligned}$$

Since  $\frac{d(x_n, x_{n+2})}{2} \leq \frac{d(x_n, x_{n+1}) + d(x_{n+1}, x_{n+2})}{2} \leq \max \{d(x_n, x_{n+1}), d(x_{n+1}, x_{n+2})\}$ , it follows that

$$M(x_n, x_{n+1}, x_{n+1}, x_{n+2}) = \psi(\max \{d(x_n, x_{n+1}), d(x_{n+1}, x_{n+2})\}).$$

Suppose that  $d(x_n, x_{n+1}) < d(x_{n+1}, x_{n+2})$ , for some integer  $n \geq 0$ . So  $d(x_{n+1}, x_{n+2}) > 0$ .

Then it follows by (2.5) and a property of  $\psi$

$$d(x_{n+1}, x_{n+2}) \leq \psi(d(x_{n+1}, x_{n+2})) < d(x_{n+1}, x_{n+2}),$$

which is a contradiction. Therefore,  $d(x_{n+1}, x_{n+2}) \leq d(x_n, x_{n+1})$ , for all  $n \geq 0$  and  $\{d(x_n, x_{n+1})\}$  is a monotone decreasing sequence of positive real numbers. Now, there exists some  $t \geq 0$  such that

$$d(x_n, x_{n+1}) \longrightarrow t \text{ as } n \longrightarrow \infty. \tag{2.6}$$

Suppose that  $t \neq 0$ .

Since  $\{d(x_n, x_{n+1})\}$  is a monotone decreasing sequence of positive real numbers, it follows from (2.5) that

$$d(x_{n+1}, x_{n+2}) \leq \psi(d(x_n, x_{n+1})). \tag{2.7}$$

Taking limit supremum on both sides of the above inequality, using (2.6) and a property of  $\psi$ , we have

$$t \leq \overline{\lim} \psi(d(x_n, x_{n+1})) < t,$$

which is a contradiction. Thus  $t = 0$  and hence

$$\lim_{n \rightarrow \infty} d(x_n, x_{n+1}) = 0. \tag{2.8}$$

Next we show that  $\{x_n\}$  is a Cauchy sequence.

Suppose that  $\{x_n\}$  is not a Cauchy sequence. Then there exists  $\delta > 0$  and two sequences  $\{m(k)\}$  and  $\{n(k)\}$  of positive integers such that for all positive integers  $k$ ,  $n(k) > m(k) > k$  and  $d(x_{m(k)}, x_{n(k)}) \geq \delta$ . Assuming that  $n(k)$  is the smallest such positive integer, we get

$$n(k) > m(k) > k, d(x_{m(k)}, x_{n(k)}) \geq \delta \text{ and } d(x_{m(k)}, x_{n(k)-1}) < \delta.$$

Now,

$$\delta \leq d(x_{m(k)}, x_{n(k)}) \leq d(x_{m(k)}, x_{n(k)-1}) + d(x_{n(k)-1}, x_{n(k)}) < \delta + d(x_{n(k)-1}, x_{n(k)}).$$

From the above inequality and (2.8), it follows that

$$\lim_{k \rightarrow \infty} d(x_{m(k)}, x_{n(k)}) = \delta. \quad (2.9)$$

Again,

$$d(x_{m(k)}, x_{n(k)}) \leq d(x_{m(k)}, x_{m(k)+1}) + d(x_{m(k)+1}, x_{n(k)+1}) + d(x_{n(k)+1}, x_{n(k)})$$

and

$$d(x_{m(k)+1}, x_{n(k)+1}) \leq d(x_{m(k)+1}, x_{m(k)}) + d(x_{m(k)}, x_{n(k)}) + d(x_{n(k)}, x_{n(k)+1}).$$

The above two inequalities imply that

$$\begin{aligned} d(x_{m(k)}, x_{n(k)}) - d(x_{m(k)}, x_{m(k)+1}) - d(x_{n(k)+1}, x_{n(k)}) &\leq d(x_{m(k)+1}, x_{n(k)+1}) \\ &\leq d(x_{m(k)+1}, x_{m(k)}) + d(x_{m(k)}, x_{n(k)}) + d(x_{n(k)}, x_{n(k)+1}). \end{aligned}$$

From the above inequality, (2.8) and (2.9), we have

$$\lim_{k \rightarrow \infty} d(x_{m(k)+1}, x_{n(k)+1}) = \delta. \quad (2.10)$$

Again,

$$d(x_{m(k)}, x_{n(k)}) \leq d(x_{m(k)}, x_{n(k)+1}) + d(x_{n(k)+1}, x_{n(k)})$$

and

$$d(x_{m(k)}, x_{n(k)+1}) \leq d(x_{m(k)}, x_{n(k)}) + d(x_{n(k)}, x_{n(k)+1}).$$

The above two inequalities imply that

$$d(x_{m(k)}, x_{n(k)}) - d(x_{n(k)+1}, x_{n(k)}) \leq d(x_{m(k)}, x_{n(k)+1}) \leq d(x_{m(k)}, x_{n(k)}) + d(x_{n(k)}, x_{n(k)+1}).$$

From the above inequality, (2.8) and (2.9), we have

$$\lim_{k \rightarrow \infty} d(x_{m(k)}, x_{n(k)+1}) = \delta. \quad (2.11)$$

Similarly, we can prove that

$$\lim_{k \rightarrow \infty} d(x_{n(k)}, x_{m(k)+1}) = \delta. \quad (2.12)$$

By the construction of the sequence  $\{x_n\}$ , we have

$$d(x_{m(k)+1}, Tx_{m(k)}) = d(A, B) \text{ and } d(x_{n(k)+1}, Tx_{n(k)}) = d(A, B),$$

which imply that

$$d(x_{m(k)+1}, x_{n(k)+1}) \leq M(x_{m(k)}, x_{n(k)}, x_{m(k)+1}, x_{n(k)+1}), \tag{2.13}$$

where

$$M(x_{m(k)}, x_{n(k)}, x_{m(k)+1}, x_{n(k)+1}) = \psi(\max \{d(x_{m(k)}, x_{n(k)}), d(x_{m(k)}, x_{m(k)+1}), d(x_{n(k)}, x_{n(k)+1}), \frac{d(x_{m(k)}, x_{n(k)+1}) + d(x_{n(k)}, x_{m(k)+1})}{2}\}) + L \min \{d(x_{m(k)}, x_{m(k)+1}), d(x_{n(k)}, x_{n(k)+1}), d(x_{m(k)}, x_{n(k)+1}), d(x_{n(k)}, x_{m(k)+1})\}.$$

Let

$$U_k = \max \{d(x_{m(k)}, x_{n(k)}), d(x_{m(k)}, x_{m(k)+1}), d(x_{n(k)}, x_{n(k)+1}), \frac{d(x_{m(k)}, x_{n(k)+1}) + d(x_{n(k)}, x_{m(k)+1})}{2}\}$$

and

$$V_k = \min \{d(x_{m(k)}, x_{m(k)+1}), d(x_{n(k)}, x_{n(k)+1}), d(x_{m(k)}, x_{n(k)+1}), d(x_{n(k)}, x_{m(k)+1})\}.$$

Then

$$M(x_{m(k)}, x_{n(k)}, x_{m(k)+1}, x_{n(k)+1}) = \psi(U_k) + L V_k.$$

By (2.8), (2.9), (2.11) and (2.12),

$$\lim_{k \rightarrow \infty} U_k = \delta \text{ and } \lim_{k \rightarrow \infty} V_k = 0. \tag{2.14}$$

From (2.13), we have

$$d(x_{m(k)+1}, x_{n(k)+1}) \leq \psi(U_k) + L V_k.$$

Taking limit supremum on both sides of the above inequality, using (2.10), (2.14) and a property of  $\psi$ , we obtain

$$\delta \leq \overline{\lim} \psi(U_k) < \delta,$$

which is a contradiction. Therefore,  $\{x_n\}$  is a Cauchy sequence in  $A_0$ . Since  $A_0$  is a closed subset of the complete metric space  $(X, d)$ , there exists  $x^* \in A_0$  such that

$$\lim_{n \rightarrow \infty} x_n = x^*; \text{ that is, } \lim_{n \rightarrow \infty} d(x_n, x^*) = 0. \tag{2.15}$$

Since  $x^* \in A_0$  and  $T(A_0) \subseteq B_0$ , there exists a point  $z \in A_0$  such that

$$d(z, Tx^*) = d(A, B). \tag{2.16}$$

Now

$$d(x_{n+1}, Tx_n) = d(A, B) \text{ (by (2.4)) and } d(z, Tx^*) = d(A, B) \implies d(x_{n+1}, z) \leq M(x_n, x^*, x_{n+1}, z), \tag{2.17}$$

where

$$M(x_n, x^*, x_{n+1}, z) = \psi(\max \{d(x_n, x^*), d(x_n, x_{n+1}), d(x^*, z), \frac{d(x_n, z) + d(x^*, x_{n+1})}{2}\}) \\ + L \min \{d(x_n, x_{n+1}), d(x^*, z), d(x_n, z), d(x^*, x_{n+1})\}.$$

Let

$$P_n = \max \{d(x_n, x^*), d(x_n, x_{n+1}), d(x^*, z), \frac{d(x_n, z) + d(x^*, x_{n+1})}{2}\}$$

and

$$Q_n = \min \{d(x_n, x_{n+1}), d(x^*, z), d(x_n, z), d(x^*, x_{n+1})\}.$$

Then

$$M(x_n, x^*, x_{n+1}, z) = \psi(P_n) + L Q_n.$$

By (2.15),

$$\lim_{n \rightarrow \infty} P_n = d(x^*, z) \text{ and } \lim_{n \rightarrow \infty} Q_n = 0. \quad (2.18)$$

From (2.17), we have

$$d(x_{n+1}, z) \leq \psi(P_n) + L Q_n.$$

Suppose that  $d(x^*, z) \neq 0$ .

Taking limit supremum on both sides of the above inequality, using (2.15), (2.18) and a property of  $\psi$ , we get

$$d(x^*, z) \leq \overline{\lim} \psi(P_n) < d(x^*, z),$$

which is a contradiction. Therefore,  $d(x^*, z) = 0$ ; that is,  $z = x^*$ . Thus by (2.16), we have  $d(x^*, Tx^*) = d(A, B)$ ; that is,  $x^* \in A_0$  is a best proximity point of  $T$ .

We next establish that the best proximity point of  $T$  is unique.

Let  $x^*, y^* \in A_0$  be two best proximity points of  $T$  and suppose that  $x^* \neq y^*$ . Then we have

$$d(x^*, Tx^*) = d(A, B), \quad d(y^*, Ty^*) = d(A, B) \text{ and } d(x^*, y^*) \neq 0.$$

Now

$$d(x^*, Tx^*) = d(A, B) \text{ and } d(y^*, Ty^*) = d(A, B) \implies \\ d(x^*, y^*) \leq M(x^*, y^*, x^*, y^*), \quad (2.19)$$

where

$$M(x^*, y^*, x^*, y^*) = \psi(\max \{d(x^*, y^*), d(x^*, x^*), d(y^*, y^*), \frac{d(x^*, y^*) + d(y^*, x^*)}{2}\}) \\ + L \min \{d(x^*, x^*), d(y^*, y^*), d(x^*, y^*), d(y^*, x^*)\}$$

$$= \psi(d(x^*, y^*)).$$

Since  $d(x^*, y^*) \neq 0$ , by (2.19) and using a property of  $\psi$ , we have

$$d(x^*, y^*) \leq \psi(d(x^*, y^*)) < d(x^*, y^*),$$

which is a contradiction. Therefore,  $d(x^*, y^*) = 0$ ; that is,  $x^* = y^*$  and hence the best proximity point of  $T$  is unique.  $\square$

**Example 2.1** Let  $X = R^2$  ( $R$  denotes the set of all real numbers) and  $d$  be a metric on  $X$  defined as  $d(x, y) = |x_1 - x_2| + |y_1 - y_2|$ , for  $x = (x_1, y_1)$ ,  $y = (x_2, y_2) \in X$ . Let

$$A = \{(x, 1) : 0 \leq x \leq 1\} \cup \{(0, x) : 1 \leq x \leq 2\},$$

$$B = \{(x, -1) : 0 \leq x \leq 1\} \cup \{(0, x) : -2 \leq x \leq -1\},$$

$$A_0 = \{(x, 1) : 0 \leq x \leq 1\} \subseteq A \text{ and } B_0 = \{(x, -1) : 0 \leq x \leq 1\} \subseteq B.$$

Let  $T : A \rightarrow B$  be defined as follows:

$$T(t) = \begin{cases} (\frac{x}{2}, -1) & \text{if } t = (x, 1) \in A_0, \\ (0, -x), & \text{if } t = (0, x) \in \{(0, x) : 1 \leq x \leq 2\}. \end{cases}$$

Let  $\psi : [0, \infty) \rightarrow [0, \infty)$  be defined as follows:

$$\psi(t) = \begin{cases} \frac{t}{p}, & \text{if } t \leq 1, \text{ where } p \text{ is a constant satisfying } 1 < p \leq 2, \\ 1, & \text{if } t > 1. \end{cases}$$

Let  $L \geq 0$  be arbitrary.

Here all of the conditions of Theorem 2.1 are satisfied and it is seen that  $(0, 1) \in A_0$  is the unique best proximity point of  $T$ .

**Corollary 2.1** Let  $(X, d)$  be complete metric space and  $(A, B)$  be a pair of non-empty closed subsets of  $X$  such that  $A_0$  is non-empty and closed. Let  $T : A \rightarrow B$  be a non-self mapping with  $T(A_0) \subseteq B_0$ . Suppose there exist two real numbers  $k \in [0, 1)$  and  $L \geq 0$  such that for all  $x, y, u, v \in A_0$

$$d(u, Tx) = d(A, B) \text{ and } d(v, Ty) = d(A, B) \implies d(u, v) \leq M(x, y, u, v),$$

where

$$M(x, y, u, v) = k \max \{d(x, y), d(x, u), d(y, v), \frac{d(x, v) + d(y, u)}{2}\} + L \min \{d(x, u), d(y, v), d(x, v), d(y, u)\}.$$

Then  $T$  has a unique best proximity point in  $A_0$ .

**Proof.** Taking  $\psi(t) = k t$  with  $0 \leq k < 1$  in theorem 2.1 we have the required proof.

### 3 Stability of best proximity point

In the following theorems and lemmas of this section, we take  $\psi \in \Psi$  with the additional properties that  $\psi$  is monotonic nondecreasing and  $\Phi(t) = \sum \psi^n(t) < \infty$  with  $\Phi(t) \rightarrow 0$  as  $t \rightarrow 0$ .

**Theorem 3.1** Let  $(X, d)$  be complete metric space and  $(A, B)$  be a pair of non-empty closed subsets of  $X$  such that  $A_0$  is non-empty and closed. Let  $T_i : A \rightarrow B$  ( $i = 1, 2$ ) be two mappings such that for every  $i \in \{1, 2\}$ ,  $T_i$  satisfies all the conditions of theorem 2.1. Then

$$d(p_1, p_2) \leq \Phi(2 d(A, B) + M),$$

where  $M = \sup \{d(T_1x, T_2x) : x \in A_0\}$ , and  $p_1$  and  $p_2$  are best proximity points of  $T_1$  and  $T_2$  respectively.

**proof.** By theorem 2.1, each  $T_i$  ( $i = 1, 2$ ) has a unique best proximity point in  $A_0$ . Let  $p_1$  and  $p_2$  be the unique best proximity points of  $T_1$  and  $T_2$  respectively. Then

$$d(p_1, T_1p_1) = d(A, B) \quad \text{and} \quad d(p_2, T_2p_2) = d(A, B). \quad (3.20)$$

Put  $p_1 = v_0$ . Since  $p_1 = v_0 \in A_0$  and  $T_2(A_0) \subseteq B_0$ , there exists  $v_1 \in A_0$  such that

$$d(v_1, T_2p_1) = d(v_1, T_2v_0) = d(A, B). \quad (3.21)$$

Since  $T_2(A_0) \subseteq B_0$ , there exists a point  $v_2 \in A_0$  such that

$$d(v_2, T_2v_1) = d(A, B). \quad (3.22)$$

Continuing this process, we have a sequence  $\{v_n\}$  in  $A_0$  such that for all  $n \geq 0$ ,

$$d(v_{n+1}, T_2v_n) = d(A, B). \quad (3.23)$$

Similar to the proof of Theorem 2.1, we can prove that

- $\{d(v_n, v_{n+1})\}$  is a monotone decreasing sequence of non-negative real numbers,
- for all  $n \geq 0$ ,

$$d(v_{n+1}, v_{n+2}) \leq \psi(d(v_n, v_{n+1})), \quad (3.24)$$

- $\{v_n\}$  is a Cauchy sequence in  $A_0$ .

Since  $A_0$  is a closed subset of complete metric space  $(X, d)$ ,  $A_0$  is also complete. Hence there exists  $v^* \in A_0$  such that

$$\lim_{n \rightarrow \infty} v_n = v^*; \quad \text{that is,} \quad \lim_{n \rightarrow \infty} d(v_n, v^*) = 0. \quad (3.25)$$

Arguing similarly as in the proof of theorem 2.1, we can prove that  $v^* \in A_0$  is the unique best proximity point  $T_2$ . By our assumption it follows that  $v^* = p_2$ . Therefore, from (3.25), we have

$$\lim_{n \rightarrow \infty} v_n = p_2; \quad \text{that is,} \quad \lim_{n \rightarrow \infty} d(v_n, p_2) = 0. \quad (3.26)$$

By repeated application of (3.24) and using the monotone property of  $\psi$ , we have

$$d(v_{n+1}, v_{n+2}) \leq \psi(d(v_n, v_{n+1})) \leq \psi^2(d(v_{n-1}, v_n)) \leq \dots \leq \psi^{n+1}(d(v_0, v_1)) = \psi^{n+1}(d(p_1, v_1)). \quad (3.27)$$

Using the triangular inequality, (3.20) and (3.21), we have

$$\begin{aligned} d(p_1, v_1) &\leq d(p_1, T_1p_1) + d(T_1p_1, T_2p_1) + d(v_1, T_2p_1) = 2 d(A, B) + d(Tp_1, T_2p_1) \\ &\leq 2 d(A, B) + \sup \{d(T_1x, T_2x) : x \in A_0\} \leq 2 d(A, B) + M. \end{aligned}$$

By triangular inequality, (3.26), (3.27) and the monotone property of  $\psi$ , we have

$$\begin{aligned} d(p_1, p_2) = d(v_0, p_2) &\leq \sum_{i=0}^n d(v_i, v_{i+1}) + d(v_{n+1}, p_2) \leq \sum_{i=0}^{\infty} d(v_i, v_{i+1}) \\ &\leq \sum_{i=0}^{\infty} \psi^i(d(p_1, v_1)) \leq \sum_{i=0}^{\infty} \psi^i(2 d(A, B) + M) = \Phi(2 d(A, B) + M). \end{aligned}$$

**Lemma 3.1** *Let  $(X, d)$  be metric space and  $(A, B)$  be a pair of non-empty closed subsets of  $X$  such that  $A_0$  is non-empty and closed. Let  $\{T_n : A \rightarrow B : n \in \mathbb{N}\}$  be a sequence of mappings uniformly convergent to a mapping  $T : A \rightarrow B$ . Suppose that for every  $n \in \mathbb{N}$ ,  $T_n$  satisfies (2.1) for all  $x, y, u, v \in A_0$ , where  $M(x, y, u, v)$  is the same as in Theorem 2.1. Then  $T$  satisfies (2.1) for all  $x, y, u, v \in A_0$ , where  $M(x, y, u, v)$  is the same as in Theorem 2.1.*

**proof.** By the hypothesis of the lemma, for every  $n \in \mathbb{N}$ ,  $T_n$  satisfies (2.1) for all  $x, y, u, v \in A_0$ , where  $M(x, y, u, v)$  is the same as in Theorem 2.1; that is, for all  $x, y, u, v \in A_0$ ,

$$d(u, T_nx) = d(A, B) \text{ and } d(v, T_ny) = d(A, B) \implies d(u, v) \leq M(x, y, u, v),$$

where

$$\begin{aligned} M(x, y, u, v) &= \psi(\max \{d(x, y), d(x, u), d(y, v), \frac{d(x, v) + d(y, u)}{2}\}) \\ &\quad + L \min \{d(x, u), d(y, v), d(x, v), d(y, u)\}. \end{aligned}$$

Since the sequence  $\{T_n\}$  uniformly converges to  $T$ , taking the limit as  $n \rightarrow \infty$  in the above inequality we have that for all  $x, y, u, v \in A_0$ ,

$$d(u, Tx) = d(A, B) \text{ and } d(v, Ty) = d(A, B) \implies d(u, v) \leq M(x, y, u, v),$$

where

$$\begin{aligned} M(x, y, u, v) &= \psi(\max \{d(x, y), d(x, u), d(y, v), \frac{d(x, v) + d(y, u)}{2}\}) \\ &\quad + L \min \{d(x, u), d(y, v), d(x, v), d(y, u)\}; \end{aligned}$$

that is,  $T$  satisfies (2.1) for all  $x, y, u, v \in A_0$ , where  $M(x, y, u, v)$  is the same as in theorem 2.1.

**Theorem 3.2** *Let  $(X, d)$  be a complete metric space and  $(A, B)$  be a pair of non-empty closed subsets of  $X$  such that  $A_0$  is non-empty and closed. Let  $\{T_n : A \rightarrow B : n \in \mathbb{N}\}$  be a sequence of mappings, uniformly convergent to a mapping  $T : A \rightarrow B$  with  $T(A_0) \subseteq B_0$ . Suppose that for every  $n \in \mathbb{N}$ ,  $T_n$  satisfies all the conditions of theorem 2.1. Then the best proximity points of the sequence of mappings  $\{T_n\}$  are weakly stable.*

**proof.** By the hypothesis of the theorem and using the lemma 3.1, we have

- $T(A_0) \subseteq B_0$ ,
- $T$  satisfies (2.1) for all  $x, y, u, v \in A_0$ , where  $M(x, y, u, v)$  is the same as in Theorem 2.1.

By theorem 2.1,  $T_n$  ( $n \in \mathbb{N}$ ) and  $T$  have unique best proximity points.

Suppose that  $\{p_n\}$  is the sequence of unique best proximity points of the sequence of mappings  $\{T_n\}$  and  $p$  is the unique best proximity point of the mapping  $T$ .

Let  $M_n = \sup_{x \in A_0} d(T_n x, Tx) = \sup \{d(T_n x, Tx) : x \in A_0\}$ .

Since the sequence  $\{T_n\}$  converges uniformly to the mapping  $T$ , we have that

$$\lim_{n \rightarrow \infty} \sup_{x \in A_0} d(T_n x, Tx) = \lim_{n \rightarrow \infty} M_n = 0. \quad (3.28)$$

By the theorem 3.1 and using the monotone property of  $\psi$ , we have

$$d(p_n, p) \leq \sum_{i=0}^{\infty} \psi^i(2 d(A, B) + M_n) = \Phi(2 d(A, B) + M_n). \quad (3.29)$$

Taking limit supremum in both side of the above inequality, we get

$$\overline{\lim} d(p_n, p) \leq \overline{\lim} \Phi(2 d(A, B) + M_n). \quad (3.30)$$

Since  $M_n \rightarrow 0$  as  $n \rightarrow \infty$ , the sequence  $\{M_n\}$  is bounded. Then there exists a positive real number  $R$  such that  $0 \leq M_n \leq R$ . As  $\psi$  is monotonic nondecreasing and  $\Phi(t) = \sum \psi^n(t) < \infty$  for all  $t > 0$ ,  $\Phi$  is also monotonic nondecreasing. Then we have

$$\Phi(2 d(A, B)) \leq \Phi(2 d(A, B) + M_n) \leq \Phi(2 d(A, B) + R).$$

Hence  $r = \overline{\lim} \Phi(2 d(A, B) + M_n)$  is finite. From (3.30) it follows that for given  $\epsilon > 0$  there exists a positive integer  $N$  such that

$$d(p_n, p) < r + \epsilon \text{ for all } n \geq N, \text{ that is, } p_n \in S_p(r + \epsilon) \text{ for all } n \geq N.$$

Hence the unique best proximity points of the sequence  $\{T_n\}$  are weakly stable.

**Example 3.1** Assume the complete metric space  $(X = R^2, d)$  considered in example 2.1. Let

$$A = \{(x, 1) : -1 \leq x \leq 1\} \cup \{(-1, x) : 1 \leq x \leq 2\},$$

$$B = \{(x, -1) : -1 \leq x \leq 1\} \cup \{(-1, x) : -2 \leq x \leq -1\},$$

$$A_0 = \{(x, 1) : -1 \leq x \leq 1\} \subseteq A \text{ and } B_0 = \{(x, -1) : -1 \leq x \leq 1\} \subseteq B.$$

Let  $T_n : A \rightarrow B$ , where  $n \in \mathbb{N}$ , be defined as follows:

$$T_n(t) = \begin{cases} (\frac{(-1)^n}{n}, -1) & \text{if } t \in A_0, \\ (-1, -x), & \text{if } t = (-1, x) \in \{(-1, x) : 1 < x \leq 2\}. \end{cases}$$

Let  $T : A \rightarrow B$  be defined as follows:

$$T(t) = \begin{cases} (0, -1) & \text{if } t \in A_0, \\ (-1, -x), & \text{if } t = (-1, x) \in \{(-1, x) : 1 < x \leq 2\}. \end{cases}$$

Let  $\psi : [0, \infty) \rightarrow [0, \infty)$  be defined as follows:

$$\psi(t) = \begin{cases} \frac{t}{2}, & \text{if } t \leq 1, \\ \frac{1}{2}, & \text{if } t > 1. \end{cases}$$

Let  $L \geq 0$  be arbitrary.

All of the conditions of Theorem 3.2 are satisfied. It is seen that  $\{p_n\}$ , where  $p_n = (\frac{(-1)^n}{n}, 1)$  for all  $n \in \mathbb{N}$ , is the sequence of unique best proximity points of the sequence of mappings  $\{T_n\}$  and  $p = (0, 1)$  is the unique best proximity point of  $T$ . Here for every  $\epsilon > 0$ , there exists a positive integer  $N$  such that

$$d(p_n, p) < \epsilon \text{ for all } n \geq N, \text{ that is, } p_n \in S_p(\epsilon) \text{ for all } n \geq N.$$

Hence the unique best proximity points of the sequence  $\{T_n\}$  are weakly stable.

**Example 3.2** Assume the complete metric space  $(X = R^2, d)$  considered in example 2.1. Let

$$A = \{(x, 1) : 0 \leq x \leq 1\} \cup \{(0, x) : 1 \leq x \leq 2\},$$

$$B = \{(x, -1) : 0 \leq x \leq 1\} \cup \{(0, x) : -2 \leq x \leq -1\},$$

$$A_0 = \{(x, 1) : 0 \leq x \leq 1\} \subseteq A \text{ and } B_0 = \{(x, -1) : 0 \leq x \leq 1\} \subseteq B.$$

Let  $T_n : A \rightarrow B$ , where  $n \in \mathbb{N}$ , be defined as follows:

$$T_n(t) = \begin{cases} (\frac{x}{2n}, -1) & \text{if } t = (x, 1) \in A_0, \\ (0, -x), & \text{if } t = (0, x) \in \{(0, x) : 1 \leq x \leq 2\}. \end{cases}$$

Let  $T : A \rightarrow B$  be defined as follows:

$$T(t) = \begin{cases} (0, -1) & \text{if } t = (x, 1) \in A_0, \\ (0, -x), & \text{if } t = (0, x) \in \{(0, x) : 1 \leq x \leq 2\}. \end{cases}$$

Let  $\psi : [0, \infty) \rightarrow [0, \infty)$  be defined as follows:

$$\psi(t) = \begin{cases} \frac{t}{2}, & \text{if } t \leq 1, \\ \frac{1}{2}, & \text{if } t > 1. \end{cases}$$

Let  $L \geq 0$  be arbitrary.

All of the conditions of Theorem 3.2 are satisfied. It is seen that  $\{p_n\}$ , where  $p_n = (0, 1)$  for all  $n \in \mathbb{N}$ , is the sequence of unique best proximity points of the sequence of mappings  $\{T_n\}$  and  $p = (0, 1)$  is the unique best proximity point of  $T$ . Here for every  $\epsilon > 0$ , there exists a positive integer  $N$  such that

$$d(p_n, p) < \epsilon \text{ for all } n \geq N, \text{ that is, } p_n \in S_p(\epsilon) \text{ for all } n \geq N.$$

Hence the unique best proximity points of the sequence  $\{T_n\}$  are weakly stable.

**Remark 3.1** In the above two examples 3.1 and 3.2, the unique best proximity points of the sequence  $\{T_n\}$  are stable. But based on our theorem we can only conclude that the unique best proximity points corresponding to the sequence  $\{T_n\}$  are weakly stable.

**Remark 3.2** In the example 3.1, except the function  $T_1$  every function in the sequence of functions  $\{T_n\}$  and the function  $T = \lim_{n \rightarrow \infty} T_n$  are discontinuous. In the example 3.2, every function in the sequence of functions  $\{T_n\}$  and the function  $T = \lim_{n \rightarrow \infty} T_n$  are continuous.

**Remark 3.3** If  $A \cap B \neq \emptyset$ , then  $d(A, B) = 0$  and  $A_0 = B_0 = A \cap B$ . Then  $T_n$  ( $n \in \mathbb{N}$ ) and  $T$  have unique fixed points in  $A_0$ . So,  $\{p_n\}$  becomes the sequence of unique fixed points of the sequence of mappings  $\{T_n\}$  and  $p$  becomes the unique fixed point of the mapping  $T$ . By (3.28),  $\lim_{n \rightarrow \infty} [2d(A, B) + M_n] = 0$  which implies that  $\Phi(2d(A, B) + M_n) \rightarrow 0$ . Then by (3.29), it follows that  $\overline{\lim} d(p_n, p) = 0$ , which implies that  $\lim_{n \rightarrow \infty} d(p_n, p) = 0$ , that is, the unique fixed points of the sequence  $\{T_n\}$  are stable.

**Conflict of interest.** All the authors declare that there is no conflict of interests.

**Authors' contributions.** The authors contributed equally to this work. All authors have read and approved the manuscript.

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RELATIONSHIP BETWEEN THE MODERN AND TRADITIONAL  
INFORMAL SECTORS: A THEORETICAL FRAMEWORK AND SOME  
POLICY OUTCOMES

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**Abstract:** A peculiar process of transformation is being observed not only in India but also in the global south. The informal sector (INFS) is expanding with the core of the economy. Within the INFS, dualistic tendencies are observed. While the modern part moves in tandem with the core sector, a very large traditional segment keeps on persisting. In this peculiar situation, policymakers are faced with a variety of dilemmas: How to handle this expanding INFS? What should be the appropriate policy to eradicate this problem of informality or to develop this informality? Therefore, the INFS has been a matter of policy concern at the global level. Our objective in this paper is to build a theoretical framework to understand the structure of the macroeconomy, the relationships among the different sectors, and the policy impacts. Thus, we have constructed a theoretical model following the Structuralist approach (Kaleckian approach). While policy favouring MINFS from the demand-side without expansion in agriculture leads to a supply-side conflict, there may or may not be a demand conflict between MINFS and TINFS. However, policies favouring MINFS from the demand side with agriculture expansion are capable of mitigating the resource supply conflict and creating positive demand linkages between MINFS and TINFS. Through this strategy, the economy can experience growth with employment, which is also the objective of inclusive growth.

**Keywords:** Informal sector, Inclusive growth, agriculture-informal relations, dualism within informal sector, policies on informal sector

## 1. Introduction

As per development theory, as an underdeveloped economy progresses through capital accumulation and growth, the core of the economy expands and its outside, be it agriculture or non-agriculture, transforms into a dynamic sector, and a portion of it is also incorporated into the core. However, not only in India but also across the global south, a peculiar process of transformation is being observed. The INFS is expanding with the core of the economy (the formal sector), and thereby there is a kind of persistence of dualism beyond agriculture. Additionally, within the INFS, dualistic tendencies are also observed. INFS is getting divided, with the modern part moving in tandem with the growing economy (the core sector), but a very large traditional segment keeps on persisting. In this peculiar situation, policymakers are faced with a variety of dilemmas: How to handle this expanding INFS? What should be the appropriate policy to eradicate this problem of informality or to develop this informality? To prescribe a proper policy framework for the INFS, we must first understand the structure and pattern of the INFS itself. While from a growth perspective, modern INFS is important as it adds value to the economy, a very large segment of the population is engaged in traditional INFS. Therefore, the focus of analysis here is traditional non-agricultural INFS (TINFS), because a substantial portion of the population is engaged in this segment after agriculture.

## 2. Materials and Method

### 2.1 Literature Review

Literature on agriculture-industry linkage failed to explain the logical reason behind the development of a very large under-remunerative INFS beyond the modern/formal segments (and outside of agriculture), despite sizeable expansion and improvements in agriculture [ILO (1972); Papola (1980)]. Bangasser (2000) argued that while informal employment and the INFS, in general, were continuously expanding within the non-agricultural segments, there was a very low rate of job generation within the FS. Bardhan (2009) argued that despite the

growing existence of the INFS and its non-inclusion within the very core of the FS, the conditions of enterprise and labour within the former are improving (albeit slowly)—generally in view of its direct interactions with the global market and particularly due to its direct and/or indirect linkages with the FS. However, the other group of economists [Kathuria et al. (2010); Chatterjee (2008); and Raj and Sen (2016)] view INFS as a non-dynamic/survivalist sector. Further, while INFS has deep **positive** linkages with agriculture [Mellor (1976); Reardon et al., (2007); Haggblade et al., (2007)], a conflict/absence of any relation between relatively dynamic agriculture (HVC cultivation, corporate farming) and petty/small INFS [Dunham, (1991); Harriss, (1991); Chakrabarti & Kundu, (2009)] is also there. It follows from the above literature review that dividing INFS into two halves and understanding its relationships with agriculture, the modern sector, etc. is not much discussed.

## **2.2 Objective, Hypothesis, and Methodology**

Our objective in this paper is:

(i) To construct a theoretical framework to understand the structure of the macroeconomy and the relationships among the different sectors, i.e., the Modern Informal Sector (MINFS)—Agriculture—Traditional Informal Sector (TINFS) relationship.

(ii) To understand the policy impacts, especially focusing on the traditional non-farm INFS.

Considering above objectives, we formulate the following hypotheses:

(i) There exists a supply-side conflict within the INFS, i.e., between the MINFS and the TINFS, given resource constraints in the agriculture sector, and

(ii) There exists a positive relationship between MINFS and TINFS in terms of demand.

For analytical and theoretical analyses, we have followed the Structuralist approach (Kaleckian approach). Further, we have graphically analysed the outcomes of various policies favouring demand of MINFS and supply of agriculture sector on the very foundation of TINFS.

## 2.3 Basic Structure of our Theoretical Model

### 2.3.1 Basic features of our model economy

- (1) We consider two broad non-capitalistic sectors in our model economy: an informal sector (INFS) which is divided into two segments— modern informal sector (MINFS) and traditional informal sector (TINFS); and a generic agriculture producing a composite commodity, ‘food’.
- (2) The basic difference between modern and traditional INFS is: TINFS run without any hired worker employed on a fairly regular basis while MINFS run with at least one hired worker on a fairly regular basis.
- (3) INFS is characterized by consumption motive—[Chatterjee (2008); Sanyal (2007)]—self-employment, and absence of limiting/fixed capital. Additionally, there is an excess of labour within the INFS.
- (4) Both the modern and traditional segments of INFS are self-reliant regarding implements and non-food consumption. However, they rely on agriculture, the primary source, for food, (a composite representing all the non-industrial products).
- (5) For both MINFS and TINFS, a marketable surplus of food indicates a constraint in agricultural supply. Therefore, the food price is demand-determined. This limitation in agricultural supply serves as a general resource pool. To capture the bundle of resources essential for both the MINFS and TINFS, food has been used as a proxy.
- (6) The substitutability of food supply for both MINFS and TINFS, considering the overall potential, can be represented by a production possibility frontier (PPF). Assuming imperfect substitutability, the PPF takes on a concave shape.
- (7) We consider a closed economy framework and undertake a short-run analysis.

### 2.3.2 Notations

$Y_m$ =level of output in the MINFS

$D_m$ =demand for the MINFS output

$S_m$ =supply of the MINFS output

$P_m$  = price of the MINFS output

terms of trade (t-o-t) between TINFS and agriculture sector

demand of TINFS output from MINFS

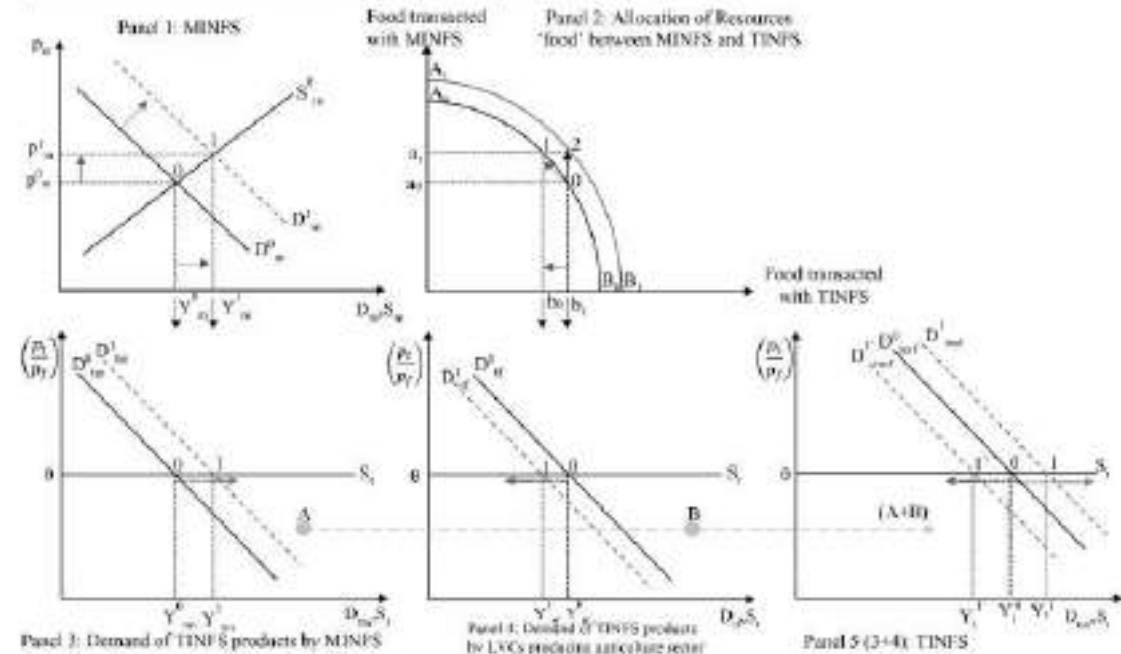
supply of the TINFS output

demand of TINFS output from food sector

aggregate demand of TINFS output

Figure 1, represents the macro model of our theoretical framework. It is seen from Panel 1 that, at market-determined price  $P_m$ , MINFS output demand is  $D_m$ . To produce this amount of MINFS output, it requires 'oa<sub>0</sub>' amount of food, panel 2. Demand for TINFS output by the MINFS is shown in Panel 3. It is seen from panel 3 that MINFS demands amount of TINFS output at the given price of TINFS output, 'θ'. A part of the demand for TINFS output also comes from the agricultural sector. Thus, by exchanging the 'ob<sub>1</sub>' amount of food, this sector demands the amount of TINFS output, which is shown in Panel 4. Now, by combining demand from both the sectors, we get aggregate demand for TINFS output at the given price, 'θ' which is shown in Panel 5. PPF shown by in panel 2 represents resource constraints in agriculture i.e. 'food'. Figure 4 therefore, represents the macro model of our theoretical framework. The initial equilibrium of the economy is shown by point '0' in each panel.

Figure 1: Basic structure of our model and impact of various policies on TINFS



Source: Prepared by the author

Figure 1: Basic structure of our model and impact of various policies on TINFS  
**Source: Prepared by the author**

### 3. Result & Discussion

In this basic theoretical framework, let us now show the impact of (i) policy favouring MINFS (demand-side) on TINFS without expansion of agriculture sector, and (ii) policy favouring MINFS (demand-side) on TINFS with expansion of agriculture sector. The resultant outcomes are shown graphically in Figure 1.

#### 3.1 Case 1: Impact of demand-side policy (viz., procurement) favouring MINFS on TINFS without expansion in agriculture

It is seen, from Figure 1, that any policy that favours MINFS from the demand side (e.g., government procurement) without expansion in agriculture sector leads to an increase in demand for MINFS output, and thus the demand curve for MINFS shifts upwards from its initial equilibrium level of  $D_m^0$  to  $D_m^1$ . With this increase in demand, price of MINFS output also increases from its initial level

$p_m^0$  to  $p_m^1$ . Thus, the MINFS equilibrium shifts from its initial level '0' to a new level '1'. With this new equilibrium position MINFS output demand increases from  $Y_m^0$  to  $Y_m^1$ . Increase in output in MINFS means expansion of MINFS sector in terms of employment and value additions. This led to an increase in demand for TINFS output as well from MINFS. Thus, we have an upward shift in the TINFS demand curve from  $D_{tm}^0$  to  $D_{tm}^1$ . This is because MINFS uses TINFS output as an input in its production process besides its consumption. Thus, the equilibrium position shifts from its initial level '0' to a new level '1'. This leads to an increase in TINFS output from  $Y_{tm}^0$  to  $Y_{tm}^1$ . This implies MINFS expansion induce demand for TINFS positively.

Now, as the per capita food consumption is assumed to be given at  $a_{fm}^0$  in MINFS, expansion of MINFS implies increase in food demand also, since employment level increases (equation 8). However, as there is no simultaneous expansion in agricultural sector, increase in food demand implies increase in food price. With this increase in food price, TINFS contracts in terms of output and employment. This is because the share of food transacted with TINFS decline with increase in food price. Thus, the initial  $D_{tf}^0$  curve shifts leftward to  $D_{tf}^1$ . This implies a resource conflict between MINFS and TINFS from supply-side, given resource constraints of the agriculture sector.

Thus, the overall impact of this policy on TINFS depends entirely on the relative strength of the increase in demand of TINFS output by the MINFS and the fall in demand of TINFS output from agriculture sector. Therefore, we have three possibilities in this case. First, MINFS induced increase in demand for TINFS is much higher than the fall in TINFS output demand from the agriculture sector. In this case, aggregate demand curve for TINFS shifts rightward to  $D_{tmf}^1$  from its initial level  $D_{tmf}^0$ . Second, MINFS induced increase in demand for TINFS is less than the fall in TINFS output demand from the agriculture sector. In this case, aggregate demand curve for TINFS shifts leftward to  $D_{tmf}^2$  from its initial level  $D_{tmf}^0$ . Third, MINFS induced increase in demand for TINFS is just equivalent to the fall in TINFS output demand from the agriculture sector. In this case, aggregate

demand curve for TINFS remains unchanged at its initial level  $D_{tmf}^0$ .

Thus, it can be argued that a biased sectoral policy that favours MINFS from the demand side (e.g., government procurement) without expansion in agriculture sector may or may not induced aggregate demand for TINFS output, but it causes a resource conflict between MINFS and TINFS.

### **3.2 Case 2: Impact of demand-side policy (viz., procurement) favouring MINFS on TINFS with expansion in agriculture**

In this case, as seen from Figure 4, there is an increase in demand for MINFS output, and thus the demand curve for MINFS shifts upwards to  $D_m^1$ . Thus, price of MINFS output also increases to  $p_m^1$ . Hence, the MINFS equilibrium shifts to a new level '1'. With this new equilibrium position MINFS output demand increases from  $Y_m^0$  to  $Y_m^1$ . Increase in output in MINFS means expansion of MINFS sector in terms of employment and value additions. This led to an increase in demand for TINFS output as well from MINFS. Thus, we have an upward shift in the TINFS demand curve from  $D_{tm}^0$  to  $D_{tm}^1$ . This is because MINFS uses TINFS output as an input in its production process besides its consumption. Thus, the equilibrium position shifts from its initial level '0' to a new level '1'. This leads to an increase in TINFS output from  $Y_{tm}^0$  to  $Y_{tm}^1$ . This implies MINFS expansion induce demand for TINFS positively.

Now, as the per capita food consumption is assumed to be given at  $a_{fm}^0$  in MINFS, expansion of MINFS implies increase in food demand also, since employment level increases. This increase in food demand leads to an increase in food price. However, as there is a simultaneous supply-side support for agriculture is available, the PPF shown in Panel 2 shifts rightward from ' $A_0B_0$ ' to ' $A_1B_1$ '. The expansion in agriculture is in such a way that it can meet the additional food requirements of MINFS without disturbing the share of food transacted towards TINFS. Thus, we have a movement from point '0' of the initial PPF to point '2' on the new PPF. Therefore, TINFS not contracts as before in terms of output and employment. This is because the share of food transacted with TINFS does not decline with

increase in demand for MINFS output. Thus, the demand for TINFS output by the agriculture sector remains unchanged at the initial level of  $D_{tf}^0$ . This implies there is no resource conflict between MINFS and TINFS from supply-side. Now, by combining demand for TINFS from MINFS (panel 3) and agricultural sectors (panel 4), we derive the new aggregate demand curve for TINFS, which is higher ( $D_{tmf}^1$ ) than the initial demand curve ( $D_{tmf}^0$ ).

Thus, it can be argued that a balanced sectoral policy that favours MINFS from the demand side (e.g., government procurement) with expansion in the agriculture sector causes an increase in aggregate demand for TINFS output without any resource conflict between MINFS and TINFS. Thus, there is neither supply-side conflict nor demand-side conflict between MINFS and TINFS. In fact, both modern and traditional segments of INFS expand, which leads to growth (MINFS) with employment (TINFS). Thus, inclusive growth can be achieved to some extent through this policy.

#### 4. Conclusion

In this paper, we have built a theoretical framework to understand the structure of the macroeconomy consisting of modern INFS, agriculture and traditional INFS. We have shown the relationships among the sectors. We have analysed the impact of sectoral policies that favour MINFS from the demand side on TINFS without expansion in agriculture. The resultant outcome of this policy is that MINFS expand but agriculture resource ‘food’ diversification takes place, which leads to supply conflict between MINFS and TINFS in terms of resources. Therefore, the TINFS demand contract from agriculture sector. However, the impact on aggregate demand of TINFS is unknown, i.e., it may increase, decrease or remain unchanged depending on the relative strength of the MINFS induced demand of TINFS. Thus, the possibility of demand conflict, beside supply conflict, is also there. We have also analysed the impact of sectoral policies that favour MINFS from the demand side as well as supply-side policies that lead to expansion in agriculture simultaneously on TINFS. The resultant outcome is that MINFS expands but there is no supply-side resource conflict between MINFS and TINFS. Moreover, it leads

to an increase in aggregate demand for TINFS output. Thus, a positive linkage in demand is observed. In this case TINFS expand along with MINFS. We have also undertaken an empirical study by considering Indian data. The regression results of the empirical study confirm our theoretical outcomes. It is seen from regression result, in India, MINFS expansion induce TINFS expansion. It is clear from the above analysis that to mitigate the supply side resource conflict between MINFS and TINFS, to generate positive demand linkage between MINFS & TINFS and to bring inclusive growth in the economy, a balanced growth strategy as well as a balanced sectoral policy is essential. Through this balanced policy, we can ensure growth with employment.

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LOSS OF FOREST COVER AND FARMLANDS FOR HYDROPOWER  
AND INFRASTRUCTURAL DEVELOPMENT IN SIKKIM - IT'S IMPACT  
ON ECOSYSTEM AND SOCIO-ECONOMY

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**Abstract**

The state of Sikkim, renowned for its rich biodiversity and vibrant agricultural landscapes, has experienced significant environmental changes due to the rapid expansion of hydropower projects and infrastructural development. This paper investigates the loss of forest cover and farmland in Sikkim, focusing on the socio-economic and ecological repercussions of these developments. The analysis reveals that large-scale deforestation and conversion of agricultural land for hydropower infrastructure have led to habitat fragmentation, loss of biodiversity, and disruption of ecosystem services. The displacement of local communities, along with the alteration of traditional livelihoods, has exacerbated socio-economic challenges, including increased vulnerability to natural disasters and a decline in agricultural productivity. Furthermore, the paper explores the conflicting interests between economic growth driven by energy demands and environmental conservation, calling for a balanced approach to sustainable development in the region. The findings state the urgent necessity for policy interventions to mitigate the adverse impacts of developmental activities and to promote inclusive growth that safeguards both the environment and the well-being of local communities.

In Sikkim control of environmental pollution leads the state on Green economy principle, in which the state is active in reducing greenhouse gas emission. To save the ecological condition they have chosen hydroelectricity in place of fossil fuel power generation. Sikkim has many torrential rivers & streams, but in placeless construction of dams & altered river flows, lose the wild life and forest. For strong

objections from environmental organizations, the activity was protested. For this reason Sikkim changed their concept.

**Keywords :** expansion, habitat fragmentation, urbanization, civilization, power generation, disruption of ecosystem, green economy principle.

## **Introduction**

The Himalayan state Sikkim is known for its stunning natural beauty and rich biodiversity. It faces a complex challenge towards balancing economic development with environmental conservation. There is an intricate relationship between the construction of hydropower projects on river beds and other infrastructure and the resulting loss of forests and farmland in Sikkim. Urbanization is a process of population concentration in a suitable place. In the present stage of civilization electricity is the foundation of urbanization and our culture. Over the past few decades, the state has undergone significant changes, particularly in terms of infrastructure and energy development. Among the most notable developments is the expansion of hydropower projects, which have become a cornerstone of Sikkim's economic growth strategy.

To meet the demand of electricity many methods are applied for power generation. But none of those are eco-friendly. To save the natural ecological set up from greenhouse gas, many countries tried to find alternative methods of power generation. Hydroelectricity generation from rivers also has some negative effects. In this study, assessment of the various consequences on ecology and some issues on socio economic problems has been done.

The Mali project in Sikkim is already creating landslides in adjoining areas, as the small river is to be rejuvenated. Many villages located nearby will have to be shifted, virtually the government now thinking over it. Moreover, new roads to be constructed for communication. Apart from those many small Hydro power projects are established for the demand of electricity. Ridge lines are neglected for diversion of natural flow.

## **Study Area**

The study area is the Indian State Sikkim, which belongs to the Eastern

Himalayan region. It is located between 27°04' N to 28°07'48" N & 88° 55 '25" E to 88°58' E. It borders Tibet in the north and northeast, Bhutan in the east, Nepal in the west and West Bengal in the south. It has an area of 7096 sq km. and a population of 0.60 million. The forest covers 46% of land area of the state (Forest survey of India 2003-2007).

### **Objectives**

- Quantify the amount of forest cover and agricultural land that has been lost due to hydropower projects and infrastructural development in Sikkim.
- Investigate the effects of deforestation and land conversion on local biodiversity, including species richness, habitat loss, and changes in ecosystem functions.
- Study the socio-economic impacts on local communities, including displacement, changes in livelihood, and the economic benefits or drawbacks resulting from these developments.
- Explore how the loss of farmlands has affected agricultural practices, food security, and land use patterns in Sikkim.
- Identify the effects of hydropower development on the region's hydrology, including changes in water availability, river flow patterns, and potential climate-related changes.
- Assess the role of government policies, regulations, and governance in managing the trade-offs between development and conservation.
- Develop strategies to mitigate the negative impacts of hydropower and infrastructural development on Sikkim's ecosystem and socio-economy.

### **◆ Infrastructural Development in sikkim**

Infrastructural development refers to the process of constructing, upgrading, and maintaining essential physical structures and facilities which are essential for the functioning of an economy. These infrastructures are crucial for enabling economic growth, enhancing the standard of living, and ensuring the smooth operation of various services. Infrastructural development is a multi-faceted process and its success depends on careful planning, adequate financing, and sustainable practices.

Sikkim has seen significant infrastructural development in recent years, contributing to its growth and accessibility. Some key examples are as follows :

### **1. Road Connectivity:**

- **National Highways:** The expansion and maintenance of NH-10 have improved connectivity between Sikkim and the rest of India, particularly linking it to Siliguri in West Bengal.
- **Border Roads:** The Border Roads Organisation (BRO) has played a crucial role in constructing and maintaining roads in the challenging terrains of Sikkim, especially those connecting remote areas and military outposts.

### **2. Air Connectivity :**

**Pakyong Airport :** Inaugurated in 2018, Pakyong Airport is the first greenfield airport in Sikkim. It has greatly improved air connectivity to the state, especially for tourism and business.

### **3. Telecommunication :**

**Broadband and Mobile Networks :** Significant improvements in broadband and mobile connectivity, including 4G services, have enhanced communication and access to information, even in remote areas.

### **4. Urban Development :**

- **Gangtok Smart City Project :** As part of the Smart Cities Mission, Gangtok is undergoing various urban development projects, including improved sewage systems, smart street lighting, and better public transportation systems.
- **Solid Waste Management :** Sikkim has implemented advanced waste management systems, especially in urban areas like Gangtok, which has helped the state to maintain cleanliness and sustainability.

### **5. Tourism Infrastructure :**

- **Eco-tourism Facilities:** Development of eco-tourism infrastructure, including trekking routes, homestays, and adventure sports facilities, particularly in areas like Tsomgo Lake, Nathula Pass, and Yumthang Valley etc.
- **Ropeways :** The construction of ropeways, such as the Gangtok Ropeway, has improved tourist accessibility to scenic spots.

## **6. Education and Healthcare Facilities :**

- Educational Institutions : Establishment of institutions like Sikkim University and various other schools and colleges, including technical institutes, has improved educational infrastructure.
- Healthcare Infrastructure : Development of healthcare facilities, including the STNM Hospital (Sir Thutob Namgyal Memorial) in Gangtok, and outreach in rural areas, has significantly improved healthcare access.

All these developments have played a vital role in boosting Sikkim's economy, making it a more accessible and attractive destination for tourists.

### **◆ Development of Hydropower Projects in Sikkim :**

Sikkim, though a small state in the north-eastern part of India, is rich in various natural resources, particularly water. The state is characterized by its hilly terrain, which makes it ideal for the development of hydroelectric power projects. The major power projects in Sikkim are :

#### **1. Teesta Hydroelectric Project Series**

The Teesta River is the lifeline of Sikkim's hydroelectric power generation. This river and its tributaries have been harnessed through a series of hydroelectric projects (Teesta Stage III, IV, and V) which are among the largest infrastructure projects in the state, providing significant power generation capacity.

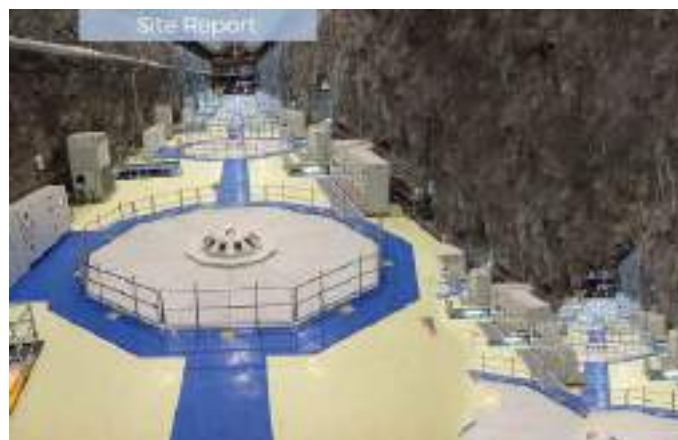
**a) Teesta Stage III** - It is located at Chungthang, North Sikkim and capacity is 1,200 MW. This was developed by Teesta Urja Limited. It harnesses the flow of the Teesta River to generate power. The project faced challenges during its construction due to the difficult terrain and the region's seismic activity.

**b) Teesta Stage IV** - It is located near Singtam, East Sikkim and its capacity is 520 MW. Teesta Stage IV is also part of the series of projects harnessing the Teesta River. It aims to utilize the potential of the river between the Teesta Stage III and Teesta Stage V projects.

**c) Teesta Stage V** - It is located at Dikchu, East Sikkim. Operated by NHPC (National Hydroelectric Power Corporation), Teesta Stage V is a run-of-the-river scheme, which means it does not require large reservoirs. The power generated

here is fed into the national grid, contributing significantly to the energy supply in the region. Its capacity is 510 MW.

**d) Teesta Stage VI** - It is located at Sirwani, South Sikkim and its capacity is 500 MW. Teesta Stage VI is another run-of-the-river project. It was initially developed by Lanco Infratech but later taken over by NHPC due to financial difficulties faced by the original developer. The project is designed to utilize the flow of the Teesta River downstream of the Teesta Stage V project.



Teesta Stage III hydropower project



Teesta Stage IV hydropower project



Teesta-V hydropower project



Teesta-VI Hydropower Project

**2. Rangit Hydroelectric Project Series** - The Rangit River, being a tributary of the Teesta, is another significant source for hydroelectric power in Sikkim. Located at Legship, West Sikkim, this is a run-of-the-river project developed by NHPC. It is important in meeting local energy demands. Its capacity is 60 MW.

**3. Pakyong Hydroelectric Project** - This project is located at Pakyong, East Sikkim and has 96 MW capacity. It utilizes the flow of the streams around the

Pakyong area. It is another example of a run-of-the-river project, which is the preferred method in Sikkim due to the state's hilly terrain and the need to minimize environmental impact.

**4. Jorethang Loop Hydroelectric Project** - It is designed to harness the water flow from the river Rangit, downstream of the Rangit Stage III project. It is developed by Dans Energy Pvt. Ltd. It is located at South Sikkim and has 96 MW capacity.

**5. Tashiding Hydroelectric Project** - It has 97 MW capacity and is located near the sacred Tashiding Monastery at West Sikkim. This project has been developed with a focus on minimizing environmental and cultural impact. The project utilizes the flow of the Rangit River.

#### ◆ **Socio-Economic Impact of Development**

The socio-economic and environmental impact of infrastructural development in Sikkim is significant, reflecting both positive and negative aspects. The loss of forests and farmland due to hydropower and infrastructure development has far-reaching socio-economic consequences in Sikkim. These are as follows -

##### **Positive Impacts**

- **Economic Growth** : Infrastructure supports industrial activities, trade, and commerce, leading to increased productivity.
- **Job Creation** : Development, especially in sectors like tourism, hydropower, and transportation (construction of roads, bridges etc) has contributed to creation of jobs in those sectors, both directly and indirectly.
- **Increase in per capita income** : The per capita income has increased due to these developments, enhancing the overall standard of living.
- **Urbanization** : Development of cities and towns with modern amenities attracts people, leading to the growth of urban centers like Gangtok. The influx of people from rural areas to urban centers has brought lifestyle changes.
- **Tourism Development** : Improved infrastructure has made Sikkim more accessible. The state's natural beauty, coupled with better connectivity, has led to a surge in domestic and international tourists.

- **Education and Healthcare :** The establishment of schools, colleges, and hospitals, especially in rural areas, has led to better access to education and healthcare services.
- **Social Development :** The development of educational institutions, healthcare facilities and public services has improved the quality of life.

### **Negative Impacts**

- **Adverse impact on local people :** Large-scale infrastructure projects, such as hydropower plants, have led to the displacement of local communities from their lands, which caused disruptions in the traditional way of life and can lead to increased poverty, especially for indigenous communities.
- **Income Inequality :** While some segments of the population have benefited from infrastructural development, others, particularly in remote areas, have seen little change. This has led to income inequality and regional disparities within the state.
- **Cultural Erosion :** The influx of tourists and the influence of external cultures have led to the erosion of local traditions and customs. The commercialization of cultural heritage sites has sometimes overshadowed the preservation of authentic cultural practices.
- **Rural To Urban Migration :** The destruction of agricultural lands can impact food security and contribute to the migration of rural population to urban areas.
- **Others :** The dependence on hydropower projects can create economic and social vulnerabilities in the region.

### ◆ **Environmental Impact of Infrastructural Development**

Sustainable infrastructure can reduce carbon footprints and promote green growth, but poorly planned infrastructure can cause environmental degradation. There are significant environmental and social challenges which are as follows :

### **Positive Impacts**

- **Renewable Energy Development :** Sikkim has focused on hydropower

development, which provides a cleaner alternative to fossil fuels. The state has the potential to become a significant producer of renewable energy, contributing to India's green energy goals.

- **Afforestation and Conservation Efforts** : The state government has taken steps to counterbalance the environmental impact of development through afforestation and conservation initiatives. These efforts are aimed at preserving biodiversity and maintaining ecological balance.

### **Negative Impacts**

- **Deforestation / Forest Clearance** : The construction of large-scale hydroelectric projects on river beds in Sikkim often require the clearing of extensive forest areas for the construction of dams, reservoirs, and associated infrastructure. But, these vast tracts of forest lands are vital for the ecosystem services of this region.
- **Loss of Biodiversity** : The loss of forests and farmland for the construction of hydroelectric power projects and other infrastructure on riverbeds is a significant environmental and socio-economic concern. It has profound consequences for biodiversity. This region is home to a wide array of plant and animal species, many of which are endemic and vulnerable to habitat loss, particularly the endangered species like the red panda and snow leopard. This impact is particularly severe in Sikkim, which is a part of the Eastern Himalayas biodiversity hotspot.
- The clearing of forests for roads and construction has disturbed wildlife corridors, leading to human-wildlife conflicts.
- **Ecosystem Disruption** :The removal of forests leads to the fragmentation of habitats, disrupting the local ecosystems, affecting flora and fauna, and natural movement and breeding patterns of animals. The loss of plant diversity disrupts the delicate balance of the ecosystem, impacting food chains and natural processes like pollination, seed dispersal, and nutrient cycling processes.
- **Impact on aquatic life** : Hydropower projects can disrupt the downstream ecosystems and impact aquatic life, including fish populations. Modification

of River Topography can fragment river systems, isolating populations of aquatic species and hindering their natural migration patterns. This fragmentation can also reduce the connectivity of the river ecosystem, impacting the flow of nutrients and sediments.

- **Land Acquisition:** Farmland is often acquired for infrastructure development. Beyond deforestation, the construction of hydropower projects and related infrastructure, such as roads, dams, transmission lines and other infrastructure encroaches upon valuable farmland, which reduces the land available for agriculture. This can threaten food security and livelihoods by affecting local economies, particularly in rural areas where farming is the primary occupation.
- **Soil Erosion and Degradation :** The construction of dams and other infrastructure on riverbeds can lead to soil erosion, degrading the remaining farmland and making it less productive. The alteration of natural water flow can also lead to sedimentation, which further impacts agricultural productivity.
- **Pollution and waste generation :** The development process can also lead to conflicts with local communities over land rights and environmental concerns. The influx of workers and construction materials can create increased pollution of rivers and streams with sediments, chemicals, and waste materials, and changes in land use patterns.
- **Riverbed Alteration :** The construction of hydropower projects often involves significant modifications of the natural topography of riverbeds. Dams, reservoirs, diversion channels, and other infrastructure alter the courses of rivers, natural flow patterns of rivers, leading to changes in groundwater recharge, sedimentation, and erosion.
- **Seismic Activity :** Sikkim lies in a seismically active zone, making the construction and operation of large hydroelectric projects risky. The region has experienced earthquakes, raising concerns about the safety of these dams.
- **Increased Risk of Landslides :** In a geologically sensitive area like Sikkim, the modification of topography for infrastructure projects can increase

the risk of landslides, affecting the stability of the surrounding areas. The removal of vegetation and the construction of large structures on unstable slopes increase this risk, which is particularly concerning during the monsoon season. This not only endangers lives but also damages property and disrupts transportation and communication networks.

- **Displacement of Communities:** The acquisition of land and the environmental degradation caused by these projects can displace local communities. The loss of agricultural land and forest resources can undermine traditional livelihoods, leading to economic hardship and social unrest.
- **Alteration of Water Flow:** Dams and other structures can alter the natural flow of rivers, affecting water availability downstream. This can lead to conflicts over water resources and impact agricultural activities that rely on consistent water supply.
- **Increased Flood Risk:** The alteration of riverbeds and the construction of large dams can increase the risk of flooding in surrounding areas, particularly during the monsoon season. This poses a threat to local communities, agricultural lands and as well as to infrastructure.
- **Climate Change and Glacial Retreat :** Infrastructure development in sensitive areas, like the high-altitude regions of Sikkim, has contributed to local climate change. The construction activities and increased human presence have accelerated glacial retreat, threatening water sources and contributing to unpredictable weather patterns.

◆ **Mitigation Measures and Sustainable Development** - To balance the socio-economic benefits with environmental sustainability, Sikkim needs to focus on :

- Implementation and enforcement of strict environmental impact assessments (EIA) before approving infrastructure projects. This includes proper planning to minimize deforestation and habitat disruption.
- Selection of terrain, prior to diversion of the natural flow of river, rock layers to be assessed on threshold capacity.
- Plantation of new forest zones.

- Loss of farm lands to be replaced by selection of other suitable areas for the same activity.
- Displaced villagers should be given proper accommodation.
- Overall sustainable plan to be taken.
- Proper land reclamation to be given effort for future generation's learning.
- Farmers to be given support for better earnings.
- Project should be completed within the time.
- Promotion of eco-friendly tourism practices that minimize environmental impact while maximizing economic benefits. This includes regulating the number of tourists, promoting homestays, and supporting local communities.
- Development of infrastructure that can withstand the challenges posed by climate change, such as landslides and extreme weather events. This includes using modern construction techniques and materials that are both durable and environmentally friendly.
- Strengthening conservation efforts to protect the rich biodiversity of Sikkim. This involves expanding protected areas, restoring degraded habitats, and promoting the sustainable use of natural resources.
- Ensuring that local communities are involved in the decision-making process related to infrastructural development. This helps in addressing the concerns of those affected and ensuring that development projects benefit the broader population.

#### ◆ **Regulatory Frameworks, Environmental Policies and Conservation Measures**

Sikkim has established a regulatory framework to manage hydropower development and mitigate its environmental impacts.

- **Environmental Impact Assessments (EIAs):** To mitigate these impacts, comprehensive EIAs are required before the approval of such projects. These assessments must consider the long-term environmental and social consequences of infrastructure development. The state government has implemented policies and regulations to ensure the sustainable development of hydropower projects, including environmental impact assessments (EIAs) and forest clearance procedures.

- **Conservation Initiatives:** Efforts to protect remaining forest areas and to

promote sustainable development practices are crucial. This includes the adoption of alternative energy sources and the implementation of policies that balance development with environmental conservation. The Forest Conservation Act of 1980 and the Wildlife Protection Act of 1972 are crucial frameworks for protecting forests and wildlife.

The need for a comprehensive approach to environmental impact mitigation is essential to minimize the negative consequences of infrastructure development and promote sustainable development. However, challenges remain in effectively enforcing these regulations and ensuring that environmental concerns are prioritized.

### **Conclusion**

Infrastructural development in Sikkim has undoubtedly brought about significant socio-economic benefits, but it has also posed serious environmental challenges. Achieving a balance between development and sustainability is crucial for the long-term well-being of the state and its people. By adopting sustainable practices and involving local communities in the development process, Sikkim can continue to grow while preserving its unique environmental and cultural heritage, because the success of these projects depends on balancing the need for energy with the imperative to protect the environment and the rights of local communities.

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## भारतीयदर्शनेषु दुःखविमर्शः

ड. प्रशान्त-कर्मकारः

सहयोगी अध्यापकः

स्यार्-रासविहारी-घोष-महाविद्यालयः

उखरिद्, खण्डघोषः, पूर्ववर्धमानः, पश्चिमवङ्गः

१.०. प्रबन्धसारः - धर्मार्थकाममोक्षाणां चतुर्वर्गत्वं भारतीयसंस्कृतौ सगौरवं प्रपञ्चितम् । तत्र मोक्षो हि परमपुरुषार्थ इति प्रकीर्तितः । धर्मार्थकामानाम् अपक्षपातया सेवया स मोक्ष आस्वादनीयो मुमुक्षुभिः इति शास्त्रेषु गीयते । भारतीयशास्त्रपरम्परायां सर्वत्रैव तस्यैव मोक्षस्य परमार्थत्वमुदीरितम् । आवैदिककालाद्भारतीयर्षिभिः मोक्षमार्गः अन्विष्टः । वैदिककर्मकाण्डेषु यागादिकर्मणां बाहुल्येऽपि उपनिषदादिषु मोक्षतत्त्वं भूय उपदिष्टम् । ततश्च भारतीयदर्शनेषु एतत्तत्त्वं बहुधा उदीरित आलोचितश्च । मोक्षो हि वस्तुगत्या परमात्मना सह जीवात्मनः अभेदान्वयः । परमात्मा हि उपनिषत्सु आनन्दस्वरूपक इति प्रतिपादितः । तस्मात् मोक्षो नाम आनन्दावाप्तिः । आनन्दस्तु क्षुत्पिपासादिनिवारणात्, काम्यलाभाच्च उपलभ्यते प्राणिभिः । मोक्षस्तु एतदानन्दभिन्नः । जागतिकविषयेभ्य उपजायमान आनन्दो हि विनाश्यः, दुःखपरिणामि च । मोक्षस्तु भूमानन्दस्वरूपकः, अविनाशी नित्यो वा । सकलदुःखानामात्यन्तिकविनाशात्मोक्ष उदेति । मोक्षमार्गवर्णनावसरे शास्त्रेषु वस्तुतो दुःखनिरोधमार्ग एव उपदिष्टः । कस्यापि वस्तुनो हानमुपादानं वा तद्वस्तुनो ज्ञानाधीनम् । ज्ञाते एव वस्तुनि तस्य उपकारकत्वम् अनुपकारकत्वं वा अवधार्यते । वस्तुन उपकारकत्वे ज्ञाते तदुपादानेच्छा, अनुपकारकत्वे ज्ञाते च तद्धानेच्छा वा सञ्जायते प्राणिनाम् । दुःखहानायापि तस्माद् दुःखस्वरूपं नूनमेव अवधेयमिति धिया भारतीयदर्शनशास्त्रेषु दुःखस्वरूपं विस्तरश आलोचितम् । अत्र प्रबन्धे प्रबन्धकृता भारतीयदर्शनेषु चर्चितं दुःखस्वरूपं संक्षेपेण यथामति अवतारयिष्यते ।

२.०. मुख्यशब्दसङ्केताः - जन्ममृत्युचक्रम्, नित्यनैमित्तिककाम्यकर्माणि, दुःखादात्यन्तिकनिवृत्तिः, भूमानन्दः ।

३.०. उपोद्घातः - भारतीयसंस्कृतेः प्रमुखाधारो हि अध्यात्मतत्त्वविवेचनम् । सर्वत्रैवशास्त्रेषु परमलक्ष्यत्वेन निर्धारितो मोक्षः । मोक्षस्वादास्वादानाय भारतीयेभ्यो भूय उपदिष्टा धर्मार्थकामानां त्रिवर्गाणां अपक्षपातया सेवा । त्रिवर्गाणां यथाविधि सेवनात् कालेन मोक्षमास्वादयन्ति त्रिवर्गसेवकाः । कस्तावन्मोक्षः ? मोक्षो हि मौख्येन दुःखानामात्यन्तिकाभावात्मकः । जागतिकविषयान् अतिक्रम्य पारत्रिकविषयचिन्ता मौख्येन प्रकाशिता भारतीयदर्शनेषु । आस्तिकनास्तिकनिर्विशेषं सर्वाण्येव भारतीयदर्शनानि मोक्षचिन्तायामभिनिविष्टानि परिलक्ष्यन्ते । सर्वाण्येव तानि दर्शनानि मोक्षस्वरूपं दुःखाभावात्मकत्वेनैव प्रतिपादयन्ति । एतन्निदर्शनात् दुःखमपि भारतीयदर्शनेषु प्रमुखमालोच्यमिति विविच्यते । तत्र दर्शनेषु नेति नेति क्रमेणैव मोक्ष उपदिष्टः । वृहदारण्यकोपनिषदि याज्ञवल्क्यमैत्रेयीसंवादादेव नेति नेति क्रमेण

ब्रह्मास्वादः कथंकार आस्वाद्यते तदुपलभ्यते । तैत्तिरीयोपनिषद्यपि अन्नमयमत्वं, प्राणमयत्वं, मनोमयत्वञ्चादिकं समुपवर्ण्य अन्तत आनन्दस्यैव ब्रह्मस्वरूपकत्वमुदीरितम् । आनन्दो हि दुःखाभावः । दुःखादात्यन्तिकनिवृत्तिः दुःखस्वरूपज्ञानमन्तरेण न सम्भाव्यते । अतएव भारतीयदर्शनेषु दुःख उदीरित आलोचितश्च । प्रस्तुतेऽस्मिन् प्रबन्धे आस्तिकनास्तिकभेदेन दर्शनेषु प्रतिपादितं दुःखस्वरूपं यथामति प्रतिपादयिष्यते ।

भारतीयदर्शनेषु सम्प्रदायभेदेन मतवैचित्र्यात् दुःखस्वरूपमपि बहुधा अवतारितम् । तत्रापि दुःखशब्दस्य व्युत्पत्तिविन्यासेन तत्स्वरूपं सामान्यतोऽवधार्यते । तद्यथा 'दुर् दुष्टं खनतीति' विग्रहात् दुर्-उपपदाद् अवदारणार्थात् खन्-धातोः कर्त्तरि ड-प्रत्यये दुःखपदं निष्पाद्यते । तस्माद् येन पुरुषस्य दुष्टम् अशिवं वा अवधार्यते खन्यते वा तदेव दुःखम् । संसारो, रोगः, पीडा, बाधः प्रभृतयो दुःखशब्दस्य पर्याया उक्ताः कोशेषु । सर्वे एते शब्दाः पुरुषस्य दुष्टमेव सूचयति । तथापि भारतीयदर्शनेषु दुःखपर्यायत्वेन संसारशब्दस्य प्रयोग एव समीचीनो मन्यते । पुरुषाः संसारे एव बद्धाः सन्तः दुःखमुपभुञ्जते । दुःखनाशाय संसारबन्धनात् मुक्तिरावश्यिकी । दर्शनेषु स एव उपायो बहुधा प्रतिपादितः । स तु उपायो दुःखनाशप्रकार एव, आत्यन्तिकदुःखनिवृत्तेरेव मुक्तिस्वरूपकत्वात् । ज्ञानमन्तरेण ग्रहणात्मिका हानात्मिका वा प्रवृत्तिः नैव सञ्जायते । तस्माद् दुःखहानाय दुःखस्वरूपज्ञानस्यावश्यकत्वात् सकलदर्शनेषु तत्स्वरूपमुदीरितम् । अधो नास्तिकास्तिकभेदेन आलोचितं दुःखस्वरूपं संक्षेपेण उपस्थाप्यते ।

**४.०. नास्तिकदर्शनेषु दुःखविमर्शः** - भारतीयदर्शनेषु नास्तिकपदेन वेदविरोधिनो बुध्यन्ते । वेद एव सकलधर्ममूलमिति नैतेषां सम्मतम् । वेदसम्मतं यागादिकं न मानावानां भूतिं साधयन्ति । अतः केचन दर्शनसम्प्रदायाः वैदिककर्मणां प्रामाण्यं न गणयन्ति । एतेषु दर्शनसम्प्रदायेषु प्रमुखास्तावत् चार्वाका, बौद्धा, जैनाश्च । मोक्षतत्त्वं तु न कस्यापि असम्मतम् । स्वस्वसम्प्रदायानुमतसिद्धान्तानुसारं तत्सम्प्रदायगता आचार्या मोक्षस्वरूपं तल्लाभोपायञ्च वर्णयामासुः । मोक्षतत्त्ववर्णनावसरे प्रसङ्गसङ्गत्या दुःखमपि आलोचितं तत्र । तदेव दुःखतत्त्वमधः क्रमश उपस्थाप्यते ।

**४.१. चार्वाकदर्शने दुःखस्वरूपम्** - नास्तिकदर्शनेषु भोगवोदो भूय उपदिष्टश्चार्वाकदर्शने । सुखप्राप्तिरेव चार्वाकानां परमं लक्ष्यम् । अतएव अत्र दर्शने कुत्रापि दुःखस्वरूपं पृथक्तया नोदीरितम् । वस्तुतश्चार्वाका एव केवलं दुःखं न आलोच्यतया गणयन्ति । चार्वाका हि सुखवादिन इतीर्यन्ते । सुखोपभोग एव जीवानां मुख्यं लक्ष्यं स्यादिति ते प्रतिपादयन्ति । तथाहि चार्वाकषष्ट्यां ते उक्तवन्तो -

यावज्जीवेत्सुखं जीवेदृणं कृत्वा घृतं पिबेत् ।

भस्मीभूतस्य देहस्य पुनरागमनं कुतः ॥५५॥ इति ।

चार्वाकानां नये परिदृश्यमानं जगदेव सत् । तद्भिन्नं यदतीन्द्रियं तत्सर्वमलीकम् । प्रत्यक्षमन्तरेण नान्यत्किमपि प्रमाणं तैः स्वीक्रियते । चार्वाकेतराणि सर्वाण्येव दर्शनानि प्रत्यक्षेण साकम् अतीन्द्रियविषयानपि स्वीकुर्वन्ति । तत्र प्रतिपादितो मोक्षोऽपि अतीन्द्रियसुखस्य प्राप्त्यात्मक एव । आनन्दात्मकस्य मोक्षस्योदयात् जीवाः सकलदुःखेभ्यो विमुच्यन्ते । चार्वाकास्तु मोक्षस्य अतीन्द्रियत्वम् अविगणय्य देहनाश एव मोक्ष इति प्रतिपादयामासुः । अस्मात् कारणाद् दुःखस्वरूपपर्यालोचनायां न ते कालान् नीतवन्तः । वस्तुगत्या न हि सुखं दुःखाभावात्मकमिति चार्वाकाः प्रतिपादितवन्तः, अपि तु दुःखसहकृतमेव सुखमुपभोक्तव्यमिति तेषां मतिः । सुखं दुःखं च सममेव विद्यते इदं जगति । तस्मात्सुखोपभोगाय कौशलेन दुःखमात्रं वर्जनीयं भवति । दुःखविध्वंसनात् सुखप्राप्तिरिति न तेषां सम्मतम् । अतएव दुःखविषयकं पृथगालोचनं चार्वाकदर्शने नोपलभ्यते । तथापि दुःखं न ते सर्वथा अस्वीकुर्वन्ति । दुःखाभावात् सुखं

प्रतिष्ठापयितुं नैव शक्यते । तथापि सुखमेव तेषामाकाङ्क्षितम् । दुःखं तु सुखसहकृतमात्रमिति बोध्यम् । तदुक्तं चार्वाकषष्ट्यां –

त्याज्यं सुखं विषयजन्म पुंसां

दुःखोपसृष्टमिति मुखविचारणैषा ।

ब्रीहीन् जिहासति सितोत्तमतण्डुलाद्यान्

को नाम भोस्तुषकणोपहितान् हितार्थी ॥५९॥ इति ।

४.२. बौद्धदर्शने दुःखस्वरूपम् - बौद्धदर्शनं नास्तिकमपि मोक्षपदवीं न अस्वीचकार । निर्वाणपदप्रपित्सुभ्यो बौद्धेभ्यो भगवता बुद्धेन उपदिष्टो मोक्षमार्गः । भगवत एक एव उपदेशः श्रोतॄणां बुद्धिभेदात् बहुधा परिवेशितः । तदाधारेण बौद्धेषु चतुर्विधः सम्प्रदायो माध्यमिकयोगाचारवैभाषिकसौत्रान्तिकभेदेन समजायत । निर्वाणमेव समेषां तेषां परमं लक्ष्यम् । जिनदत्तसुरिणा विवेकविलासे तत्प्रतिपादयतोक्तं –

रागादिज्ञानसन्तानवासनोच्छेदसम्भवा ।

चतुर्णामपि बौद्धानां मुक्तिरेषा प्रकीर्तिता ॥

रागादिज्ञानसन्तानवासनोच्छेदो भावनाचतुष्टयानां क्रमेण विनाशादुदेति मोक्षप्सेषु । सर्वं क्षणिकं क्षणिकं, सर्वं दुःखं दुःखं, सर्वं स्वलक्षणं स्वलक्षणं, सर्वं शून्यं शून्यं चेति चतस्रो भावनाः<sup>19</sup> ।

वस्तुमात्रस्य क्षणिकत्वं प्रोच्य दुःखस्वरूपकत्वं प्रतिपादयन्ति बौद्धाः । तेषां मतेन जगदिदं दुःखमयम् । नास्ति अविमिश्रः सुखलेश इह जगति । आजन्मनो मृतिं यावत्सर्वं खलु दुःखमयम् । एतद्दुःखनाशादेव आनन्दमयं निर्वाणं प्राप्यते । दुःखविमिश्रितसुखहानाय दुःखस्वरूपज्ञानमावश्यकमिति प्रोक्तं नागार्जुनकृतस्य मध्यमकशास्त्रस्य प्रसन्नपदटीकायामाचार्येण धर्मकीर्तिना – ‘इह पञ्चोपादानस्कन्धा दुःखमित्युच्यते, तच्च अस्ति’ इति । रूपवेदनासंज्ञासंस्कारविज्ञानानि पञ्चस्कन्धाः । पञ्चस्कन्धानां समन्वयात् जीवा जन्यन्ते । स्कन्धशब्दस्य समुदायोऽर्थः । रागादीनामुत्पादो यस्माद् भवति स स्कन्धः । रागादयः संसारकारणानि । रागादीनामुत्पादनकारणानि स्कन्धा इत्यत स्कन्धा संसारकारणानि । संसारदुःखमयमित्यतः स्कन्धा दुःखमयाः । तदुक्तं तर्करहस्यदीपिकायां गुणरत्नेन – ‘दुःखं दुःखतत्त्वं किमित्याह । संसरन्ति स्थानात् स्थानान्तरं भवाद् भवान्तरं गच्छन्तीत्येवंशीलाः संसारिणः स्कन्धाः’ इति । तत्र इन्द्रियाणि विषयाश्च रूपस्कन्धाः । विज्ञानस्कन्ध आलयप्रवृत्तिभेदाद् द्विविधः । रूपस्कन्धविज्ञानस्कन्धयोः समन्वयाज्जायमान सुखादिज्ञानप्रवाहो वेदनास्कन्धः । शब्दोच्चारणाज्जायमानो ज्ञानप्रवाहः संज्ञास्कन्धः । रागद्वेषादयः क्लेशाः, मदमानादय उपक्लेशा धर्माधर्मौ च संस्कारस्कन्धाः । एते पञ्च स्कन्धा दुःखसाधनानि इत्यतो दुःखायतनानि । भगवान् बुद्धो दुःखार्णवनिमग्नान् उत्तरयितुम् आर्यसत्यचतुष्टयान् उपदिदेश । दुःखं हि कार्यात्मकमित्यतः तत्कारणं नूनमेव अनुसन्धेयम् । दुःखकारणानि प्रत्ययोपनिबन्धनानि हेतूपनिबन्धनानि च भवन्ति । तत्र प्रत्ययोपनिबन्धनत्वं कारणसमवायजन्यत्वम् । यथा मृत्तिकाजलबीजेभ्यः अङ्कुरः सञ्जायते । हेतूपनिबन्धनत्वञ्च निर्दिष्टकारणात् निर्दिष्टकारणजन्यत्वम् । तस्मात् पञ्चस्कन्धानां समुदायाद् एकैकस्माद्वा पृथक्त्वशो दुःखोत्पादः सम्भाव्यते । कारणनाशात् कार्यनाशः स्यादिति ज्ञानाद् दुःखकारणनाशाद् दुःखमपि विनश्यति एतद्विचिन्त्य मोक्षेप्सुना न हतोद्यमेन भाव्यम् । भगवता बुद्धेनोपदिष्टः अष्टाङ्गिको मार्गो दुःखनिरोधाय । अतो बौद्धदर्शनं न दुःखपरतन्त्रमपि तु दुःखनाशेन आनन्दस्वरूपकं मोक्षमेव सूचयति ।

**४.३. जैनदर्शने दुःखस्वरूपम्** - जैनदर्शने दुःखं सगुरुत्वं विवेचितम्। दुःखनिवृत्तिरेव मोक्ष इत्येव सामान्यं मोक्षस्वरूपं जैनदर्शने। मोक्षस्तत्र जैनसम्मतनवद्रव्येषु चरमः। आत्मा हि जैनदर्शने जीवपदेन निर्दिश्यते। सहिचेतनः। तद्विन्नं सर्वमजीवः। स हि भोक्ता, द्रष्टा, कर्ता च। सुखं दुःखञ्च उपभुङ्क्ते जीवः। पुण्याचरणाज्जीवः सुखमुपभुङ्क्ते तथा पापाचरणाद्दुःखम्। सत्कर्म पुद्गलाः पुण्यम्। पुद्गला भौतिकतत्त्वानि। सत्तत्त्वानां समूहो हि पुण्यम्। मनोवुद्धीनां शौचं विधीयते यैः कर्मभिस्तदेव पुण्यम्। अहिंसासत्यास्तेयादयः कर्माणि पुण्यजनकानि। मोक्षाचरणात् जीवा मोक्षमार्गमभिवर्धन्ते। पुण्येन सुखं जन्यते उपभुज्यते च जीवैः। पुण्याद्विपरीतं हि पापं दुःखजनकम्। पापाचरणात् जीवानां प्रकृतं स्वरूपमात्रियते। मुक्तिरपि जीवा न लभन्ते। पापाचरणात् चित्तेषु मालिन्यं जन्यते तथा संसारबन्धने बाहुल्येन निगडितो भवति जीवः। संसारो हि दुःखमयम्। तस्मात् पापाचरणं दुःखकारणमिति मन्यते। तथाहि उक्तं हरिभद्रसुरिणा षड्दर्शनसमुच्चये – ‘पुण्यप्रकृतिविसदृशं पापं पापतत्त्वमित्यर्थः’ इति।

मिथ्यादर्शनाविरतिप्रमादकषायभेदात् पापस्य तथा दुःखस्य कारणानि। तत्र मिथ्यादर्शनं नाम अविद्यावशाद् विषयान्वेषणम्। अनित्यवस्तूनां नित्यताज्ञानं, अशौचानां शौचभानं, दुःखानां सुखसंवेदनं वा मिथ्यादर्शनम्। मिथ्यादर्शनाद् दुःखं सुखभावेन विविच्य अधिकं दुःखं लभन्ते जीवाः। विषयासक्तिः अविरतिर्वा पापस्य द्वितीयं कारणम्। विषयेषु आसक्ताः सन्तो जीवाः पुनः पुनो मोहिता भवन्ति दुःखार्णवे च पतन्ति। प्रमादो हि अपरं कारणं दुःखस्य। प्रमादो नाम अहंकारजन्यो विषयानुरागः। अहंकारात् जीवा विषयोपभोगस्य मान्द्यं न जानन्ति। तेन विषयानुसक्तिः जीवानां भृशं सञ्जायते। क्रोधो, मानः, माया, लोभश्च चत्वारः कषायाः। एभिः विषयासक्तिः भूयो वर्धते। अत एतानि दुःखकारणानि इति विविच्यन्ते। तदुच्यते षड्दर्शनसमुच्चये – ‘मिथ्यादर्शनाविरतिप्रमादकषाययो गा हेतवः पापस्य कारणानि’ इति।

जैनदर्शने न केवलं दुःखकारणानि अपि तु दुःखनिरोधात्मका उपायाश्च वर्णिताः। मोक्षास्वादानादेव भवबन्धनात्मकं दुःखमतिक्रामन्ति जीवाः। भवबन्धनमाश्रवपदेन अभिधीयते जैनाचार्यैः। तन्निरोधोपायः प्रोक्तस्तैः संवराभिधया। त्यागेन, तपसा, योगेन वा कर्मनिरोध आश्रवनिरासो वा संवरः। कर्मनिरोधाद् बन्धनं शिथिलं भवति। ततश्च क्रमेण कर्मपुद्गला जीवेभ्यो विनिर्मुक्ता भवन्ति। इयं हि प्रक्रिया निर्जरा इत्युच्यते। ततः कर्मपुद्गलानां पूर्णतो नाशात् जीवा दुःखार्णवं तीर्त्वा मोक्षपदवीं प्राप्नुवन्ति।

**५.०. आस्तिकदर्शनेषु दुःखविमर्शः** - आस्तिकत्वं हि वेदानुगामित्वम्। ‘वेदोऽखिलधर्ममूलम्’ इत्येव आस्तिकानां मतिः। वेदप्रतिपादितस्य ब्रह्मतत्त्वस्य तल्लाभोपास्य च बहुधा व्याख्यानमुपलभ्यते दर्शनेषु। वेदाश्रितत्वादेतेषाम् आस्तिकत्वाभिधानम्। सर्वत्रैव आस्तिकदर्शनेषु वेदेनुसारि मोक्षतत्त्वं व्याख्यातम्। केवलं मतवैचित्र्यात् तल्लाभोपायानां वैभिन्न्यमुपलभ्यते। सर्वत्रैव आस्तिकदर्शनेषु दुःखनिवृत्तिरेव मोक्ष इत्युक्तः। दुःखस्य तस्मात् प्राधान्येन आलोचनम् आस्तिकदर्शनेषु सुलभम्। अधस्तात् क्रमेण आस्तिकदर्शनसमर्थितं दुःखस्वरूपमुल्लिख्यते।

**५.१. न्यायदर्शने दुःखस्वरूपम्** - न्यायसम्मतद्वादशप्रमेयेषु दुःखमन्यतमम्। प्रमाणेन ज्ञायमानः पदार्थो हि प्रमेयम्। प्रमेयेषु चरमस्तावदपवर्गः। दुःखं तु तत्पूर्ववर्ती। अपवर्गो हि दुःखभिन्न इत्यतस्तत्स्वरूपं पूर्वमुल्लिखितम्। महर्षिणा गौतमेन न्यायसूत्रे दुःखलक्षणं प्रतिपादयतोक्तं – ‘बाधनालक्षणं दुःखम्’ (१/१/२१) इति। बाधना-शब्दस्य पीडा तापो वार्थ इति वात्स्यायनः। लक्षणपदेन अनुषक्त इत्यर्थो बोध्यः। अनुषक्तो नाम अविनिर्भागेन नियमेन

वा वर्तमान इति । तेन यद् बाधनां पीडां प्रतिकूलं सुखवैपरीत्यं वा द्योतयति तदेव दुःखम् । तथापि एतन्मात्रं न दुःखस्वरूपम् । महर्षिमतानेन ये खलु पदार्था दुःखेन अनुषक्ता नियतसम्बन्धेन वा सम्बद्धास्ते सर्वे एव दुःखस्वरूपकाः । तस्माद् आत्मातिरिक्तशरीरादिफलपर्यन्तानि नव प्रमेयानि अपि दुःखात्मकानि एव । तदुक्तं न्यायवार्तिके उद्योतकरेण – ‘एतदेव शरीरादिबोधनानुषङ्गाद् दुःखमित्युच्यते । स्वभावस्तु दुःखमेव दुःखं, लक्षणशब्दोऽनुषङ्गार्थः सर्वमिदं शरीरादिदुःखानुषक्तमिति’<sup>22</sup> इति ।

प्राणिनो हि सर्वदैव सुखमभिलषन्ति । सुखं हि जीवस्य अनुकूलात्मकम् । शरीरेन्द्रियाणां स्वास्थ्यं, चित्तस्य अमालिन्यं, वासनापूर्तिश्च जीवानामनुकूलात्मकम् । तत्पूर्तौ सुखमपूर्तौ च दुःखमनुभवन्ति प्राणिनः । आचार्यगौतममतेन प्राणिनां जीवनं हि दुःखमयम् । तथापि सुखमपि ते अनुभवन्ति । वस्तुतो दुःखाभावात् सुखानुभूतिर्न सम्भाव्यते । सुखानन्तरं दुःखं, दुःखानन्तरं च सुखमिति चक्रं प्रचलति एव । एतच्च भवचक्रमुच्यते । परन्तु न सुखं दुःखाभावात्मकमपि तु दुःखपरिणामि । जागतिकं सुखं कालेन जन्मात्मकं दुःखमेवावहति । आनन्दो हि दुःखनाशो कारणम् । नानन्दः सुखपर्यायः । आनन्दो हि मोक्षापरपर्यायो न्यायमतेन । दुःखानामात्यन्तिकविनाशाद् आनन्दात्मको मोक्षः प्राणिभिः आस्वाद्यते । तदुक्तं वात्स्यायनेन न्यायसूत्रभाष्ये – ‘तेन दुःखेन जन्मनाऽत्यन्तं विमुक्तिरपवर्गः । कथम् ? उपात्तस्य जन्मनो हानमन्यस्य चानुपादानम् । एतामवस्थामपर्यन्तामपवर्गं वेदयन्तेऽपवर्गविदः । तदभयमजरममृत्युपदं ब्रह्म क्षेमप्राप्तिः’<sup>23</sup> इति । दुःखस्वरूपावबोधोऽपवर्गस्वरूपमपि न ज्ञायते इत्यतो दुःखस्वरूपं न्यायमते भूयः प्रतिपादितः । दुःखकारणं तत्स्वरूपं च ज्ञात्वा एव मुमुक्षुः तत्कारणनाशो यत्नवान् स्यात्, मोक्षपदवीं च लभेत । उक्तञ्च न्यायसूत्रभाष्ये – ‘सोऽयं सर्वं दुःखेनानुविद्धमिति पश्यन् दुःखं जिहासुर्जन्मनि दुःखदर्शी निर्विद्यते, निर्विण्णो विरज्यते, विरक्तो विमुच्यते’<sup>24</sup> इति ।

**५.२. वैशेषिकदर्शने दुःखस्वरूपम्** - वैशेषिकदर्शनं हि न्यायसमानतन्त्रीयमिति ज्ञातमेव अस्माकम् । न्यायसिद्धान्तेन सह सामान्यं बहुत्रैव उपलभ्यते वैशेषिकदर्शने । दुःखस्वरूपनिर्णयावसरे मतैक्यं दृश्यते उभयत्र दर्शने । वैशेषिका हि चतुर्विंशतिगुणेषु दुःखमन्तर्भावयन्ति । दुःखं हि आत्मगुणः । तेनैतदात्मनि समवायेन विद्यते । आत्मनो हि यत्प्रतिकूलं तदेव दुःखस्वरूपम् । अनीप्सितविषया हि आत्मनः प्रतिकूलाः । अतस्ते विषया आत्मानं क्लेशयन्तीति ते दुःखस्वरूपकाः । दुःखलक्षणमुक्तमाचार्येण प्रशस्तपादेन वैशेषिकसूत्रभाष्ये – ‘उपघातलक्षणं दुःखम्’ इति । ‘उपहन्यते अनेन’ इति व्युत्पत्त्या उपजूर्वकात् हन्-धातोः करणे घञा उपघातपदं निष्पाद्यते । उपपूर्वको हन्-धातुः अभिघातार्थकः । आत्मनि अभिघातो जन्यते येन हेतुना तदेव दुःखम् । लक्षणोक्तं लक्षणपदं स्वभावार्थकम् । तेन उपघातलक्षणमित्यस्य आत्मप्रतिकूलस्वभावमित्यर्थः । तदुक्तं न्यायकन्दल्ल्यां श्रीधराचार्येण – ‘उपहन्यतेऽनेनेत्युपघातः, उपघातलक्षणम् उपघातस्वभावम् । दुःखमुपजातं प्रतिकूलस्वभावतया कुर्वदात्मानमुपहन्ति’ इति । दुःखानुभूतिः आत्मनो नितरामनीप्सितम् । तस्मादुत्पन्नं दुःखमात्मानमुपहन्ति ।

दुःखमनीप्सितविषादिविषयसामीप्याद्, अनीप्सिततद्विषयैः इन्द्रियसन्निकर्षाद्, वेदानुमतकर्मानुष्ठानजन्याधर्मसह कृतात्मना मनःसंयोगादुत्पद्यते । वस्तुत एभिः कर्मभिः आत्मनि यत्क्लेशः, द्वेषः, प्रतिकूलवेद्यता चोत्पद्यन्ते तत्सर्वं दुःखस्वभावमेव । विषादीनों प्रयोगे आत्मनो हानिः स्यादिति विविच्य तद्दर्शनात्, श्रवणात्, स्मरणाच्च आत्मनि तद्विषयको द्वेषो जन्यते । एवमेव वेदानुमतकर्मानुष्ठानात् यदधर्म उत्पद्यते तस्य भोगोय देहधारणं कर्तव्यमिति धियापि आत्मनि द्वेषो जन्यते । द्वेषो हि दुःखजन्यमित्यत आत्मा दुःखमुपभुङ्क्ते । सति दुःखे आत्मनि उपघातो जायते । तेन क्लिष्टो भवति आत्मा । एवमुक्तं प्रशस्तपादभाष्यटीकायां न्यायकन्दल्ल्यां – ‘अमर्षोऽसहिष्णुता द्वेष इति यावत् ।

उपघातो दुःखानुभवः, दैन्यं विच्छायता, तेषां निमित्तम् । दुःखे सति तदनुभवलक्षण आत्मोपघातः स्याद्' इति ।

**५.३. सांख्यदर्शने दुःखस्वरूपम् -** सांख्याचार्याणां मतेन जगदिदं दुःखमयम् । दुःखमयादस्य जगतो निवृत्त्यर्थमेव सांख्यशास्त्रं ज्ञातव्यमिति तेषां मतिः । सांख्या हि सामान्येन आत्मनो यत्प्रत्यात्मवेदनीयं तस्यैव दुःखत्वमूचुः। सांख्यदर्शने आत्मा नाम देहमनसोः सङ्घातः । व्यवहारिकदृष्ट्या पुरुषे दुःखधर्ममारोप्य 'अहं दुःखी' इत्यादिप्रयोगः क्रियते । आत्मा यैः हेतुभिः क्लिष्यते तत्सर्वं दुःखपदवाच्यम् । यथा भोजनादेरग्रहणात् क्षुधानिमित्तकं दुःखम्, अभीप्सितस्याप्राप्तेः क्रोधनिमित्तकं वा दुःखं नात्मा कामयते । अत एतत्सर्वं दुःखपदवाच्यम्। सांख्याचार्यैः त्रिविधं दुःखमङ्गीक्रियते - आध्यात्मिकम्, आधिभौतिकम्, आधिदैविकञ्च । आत्मनि देहे मनसि वेति अध्यात्मम् । तत्र जायमानमाध्यात्मिकं शारीरं मानसञ्चेति । तस्मादाध्यात्मिकं हि दुःखं द्विविधमिति सूच्यते । देहस्य यत्प्रतिकूलं, मनसश्च यत्प्रतिकूलं तदुभयमेव अध्यात्मपदवाच्यमिति ज्ञेयम् । वातपित्तकफानां वैचित्र्याद्देहस्य प्रातिकूल्यमवगन्तव्यम् । अतएव शारीरं दुःखमेतद्दोषत्रयजन्यम् । मानसं हि दुःखं कामक्रोधमोहभयपरोत्कर्षासहिष्णुताभीष्टनाशाच्च सञ्जायते । पुनश्च कर्कशवाक्यादिप्रयोगादपि मानसं दुःखमुत्पद्यते । तथाहि उक्तं सांख्यतत्त्वकौमुद्यां वाचस्पतिमिश्रेण - 'दुःखानां त्रयं दुःखत्रयम् । तत्खलु आध्यात्मिकम्, आधिभौतिकम्, आधिदैविकञ्च । तत्राध्यात्मिकं द्विविधम् - शारीरं मानसं च । शारीरं वातपित्तश्लेष्माणां वैषम्यनिमित्तम् । मानसे कामक्रोधलोभमोहभयेष्यां विषादविषय विशेषादर्शननिबन्धनम् । सर्वञ्चैतदान्तरोपायसाध्यत्वादाध्यात्मिकं दुःखम्'<sup>54</sup> इति ।

बाह्योपायसाध्यं दुःखं द्विविधम् - आधिभौतिकम्, आधिदैविकञ्च । 'भूतानिव्याघ्रसर्पादीनि अधिकृत्य जातम्' इति विग्रहेण अधिभूतशब्दात् ठञ्-प्रत्ययेन आधिभौतिकमिति पदं निष्पद्यते । अतएव मनुष्यपशुपक्षिवृक्षादिस्थावरजङ्गमात्मकप्राणिभ्यो यदा देहो मनश्च व्यथितं भवति, तदैतद् आधिभौतिकं दुःखमुच्यते । तद्यथा पश्वादीनां दंशनात्, वृक्षादीनां पातनात्, मनुष्यैश्च सह विवादाद् उपभुज्यमानं दुःखं हि आधिभौतिकम् । 'अधिदेवेभवः' 'देवान्वातादीन् अधिकृत्य प्रवृत्तः' इति वा विग्रहाद् अधिदेवशब्दात् ठञ्-प्रत्ययेन आधिदैविकमिति पदं निष्पद्यते । अतीन्द्रियविषयप्रभावाद् वायुवृष्टिशुष्कादीनां वा अभिघाताद् उत्पद्यमानं दुःखं हि आधिदैविकम् । तद्यथा ग्रहादिसन्निवेशात्, वायुप्रवाहात्, जलोच्छवासात्, वृष्टेरभावाद्वा यदनिष्टं जीवानां संघटते तत्सर्वमाधिदैविकम् । उक्तमेतत् स्वरूपं सांख्यतत्त्वकौमुद्यां - 'तत्राधिभौतिकं मनुष्यपशुमृगपक्षिसरीसृपस्थावरनिमित्तम् । आधिदैविकं तु यक्षराक्षसविनायकग्रहाद्यावेशनिबन्धनम्'<sup>55</sup> इति ।

सांख्या हि सत्कार्यवादिन इति प्रसिद्धम् । कार्यमुत्पत्तेः पूर्वं स्वकारणे स्यादिति सांख्यराद्धान्तः । तस्माद् दुःखं सदिति निश्चीयते । यत्सत् न तस्य पूर्णतो विनाशः सम्भाव्यते । तथापि अस्याभिभवः कर्तुं शक्यः । आचार्येण ईश्वरकृष्णेन तदुपायो वर्णितः सांख्यकारिकायां -

'तद्विपरीतः श्रेयान् व्यक्ताव्यक्तज्ञविज्ञानात्' इति (३) ।

व्यक्ताव्यक्तज्ञविज्ञानाद् दुःखमभिभूयते जीवैरिति सांख्यमतिः । व्यक्तं चाव्यक्तं च ज्ञश्च व्यक्ताव्यक्तज्ञाः, तेषां विज्ञानात् दुःखानामभिभवः सम्भाव्यते । तत्र व्यक्तं नाम कार्याणि विकारा वा बुध्यन्ते । अव्यक्तं हि विकाराणां कारणं त्रिगुणात्मिका प्रकृतिः ज्ञायते । ज्ञपदेन चैतन्यमवबुध्यते । सांख्यसम्प्रदाये चेतनो हि पुरुषो विज्ञायते । एतेषां तत्त्वानां विवेकेन अज्ञाननाशपूर्वकज्ञानेन जीवानां दुःखानि अभिभूयन्ते ।

**५.४. योगदर्शने दुःखस्वरूपम् -** योगदर्शनं हि सांख्यसमानतन्त्रीयमित्यतो दुःखस्वरूपमत्रापि सम्प्रदाये

अनुरूपमेव। दुःखलक्षणं साक्षादत्र यद्यपि नोक्तं तथापि एतद्योगस्यान्तरायरूपेण प्रतिपादितम्। आचार्येण पतञ्जलिना अनुक्तमपि दुःखलक्षणं स्पष्टतया तदुक्तं महर्षिणा व्यासेन स्वभाष्ये - 'येनाभिहताः प्राणिनस्तदुपघाताय प्रयतन्ते तद्दुःखम्'<sup>79</sup> इति। तस्माज्जीवा येन आहताः सन्तः तन्निवृत्तये यत्नवन्तो भवन्ति तदेव दुःखमिति ज्ञेयम्। चित्तविक्षेपः चित्तवृत्तिनिरोधे अन्तरायस्वरूपकः। योगदर्शने व्याधिस्त्यानसंशयप्रामादालस्याविरतिभ्रान्तिदर्शनालब्धभूमिकत्वा नवस्थितत्वभेदात् नव अन्तरायाः प्रोक्ताः। एतेषां प्रभावेन चित्तं विक्षिप्तं भवति। विक्षिप्ते हि चित्ते दुःखमुत्पद्यते। चित्तविक्षेपाद् यद्धेयं तदेव उपादेयतया अवगम्य परिणामतः कष्टमनुभवन्ति जीवाः। अत एतद्दुःखकारणम्। तत्सूत्रितं पतञ्जलिना - 'दुःखदौर्मनस्याङ्गमेजयत्वश्वासप्रश्वासविक्षेपसहभुवः'<sup>80</sup> इति। चित्ते रजोगुणप्राबल्याद् विक्षेपः सञ्जायते। तस्माद्रजोगुणो दुःखकारणतया अवधेयः।

चित्तेरजोगुणप्राबल्यस्य हेतुरुक्तः पञ्चक्लेशाः। अविद्यास्मितारागद्वेषाभिनिवेशाः पञ्चक्लेशाः। एते पञ्चजीवान्क्लेश यन्ति इत्यतस्ते दुःखजनकाः। तत्र अनित्यपदार्थेनित्यताज्ञानं, अशुचौशुचिताज्ञानं, दुःखप्रदेषु विषयेषु सुखबोधः, अनात्म निआत्मज्ञानञ्चाविद्या। बुद्धिपुरुषयोरेकत्वभानमस्मिता। सुखानुकूलकर्मानुशयोरागः। दुःखानुकूलकर्मानुशयोद्वेषः। पूर्वपूर्वजन्मलभ्यमृत्युभयानुरूपसंस्कारविशेषोऽभिनिवेशः। अस्मितादयश्चत्वारः अविद्यावशादेव उत्पद्यन्ते। एते पञ्चक्लेशाः कर्मविपाकं जनयन्ति। एषां प्रभावेण चित्तमपि एतद्भावेन परिणमते। तथात्वे एते सत्त्वरजस्तमसां सहायेन जात्यायुर्भोगरूपं कर्म विपाकं जनयन्ति। पतञ्जलिसूत्रभाष्ये व्यासेनोक्तं - 'क्लेशा इति पञ्चविपर्यया इत्यर्थः, तेस्यन्दमाना गुणाधिकारं द्रढयन्ति परिणाममवस्थापयन्ति कार्यकारणस्रोत उन्नमयन्ति, परस्परानुग्रहतन्त्राभूत्वा कर्मविपाकं च अभिनिर्हरन्ति'<sup>81</sup> इति। एते जात्या युर्भोगरूपाः कर्मविपाकाः अपुण्यहेतुकाश्चेद्दुःखं जनयन्ति।

दुःखकारणभूताः अन्तराया एकतत्त्वाभ्यासाद्विनिवर्तन्ते। एकतत्त्वं नाम ईश्वरतत्त्वम्। चित्ते अनुभूयमानो बहुत्वभावो 'मम देहो', 'ममचित्तं', 'ममपुत्र' इत्यादिरूपेण एकेन ईश्वरतत्त्वेन परिवर्तनीयः। न हि सकृदेव चेष्टया बहुत्ववादो विनश्यते, अपितु भूयोऽभ्यासादेव चित्तमेकत्वे प्रतिष्ठाप्यते। चित्तैकाग्रतासम्पादनात् प्राणिनः अविद्यादिक्लेशानाम् उत्पत्तिक्रममवधार्य तद्विपरी तक्रमेण चिन्तया संस्काररूपेण चित्ते विद्यमानान् अविद्यादिसूक्ष्मक्लेशान्विनाशयितुं प्रभवन्ति। ये च स्थूलवृत्तयस्ते ध्यानेन अपसारणीयाः। तस्मादेकाग्रचित्तेन ध्यानाभ्यासाद्दुःखं विनश्यतीति योगसिद्धान्तः।

**५.५. मीमांसादर्शने दुःखस्वरूपम् -** महर्षिजैमिनिप्रणीतं मीमांसाशास्त्रं साक्षादेव वैदिककर्मकाण्डेन सह सम्पृक्तम्। वैदिककर्मकाण्डेषु ब्राह्मणभागेषु च समुपदिष्टानां यागानां दार्शनिकत्वान्वेषणे प्रवृत्तो महर्षिः। अतएव कर्ममीमांसा इति मीमांसादर्शनस्य अपराभिधानम्। यागानां साक्षात् फलं तावत् स्वर्गलाभः। अतएव स्वर्गो विस्तरेण आलोचितो मीमांसादर्शने। मोक्षोऽत्र दर्शनेन सर्वथा उक्तः। सर्वत्रैव दर्शनेषु मोक्षतत्त्वालोचनावसरे दुःखमुल्लिखितम्। मोक्षालोचनायाः अभावात् मीमांसाशास्त्रस्य प्रारम्भिकग्रन्थेषु दुःखमपि तस्मादुल्लिखितम्। मीमांसाशास्त्रस्य मुख्यशाखयोः भाट्टप्रभाकरयोः प्रवर्तकौ कुमारिलभट्टप्रभाकरौ अपि विषयेऽस्मिन् तुष्णीं बभूवतुः। परन्तु उत्तरवर्तिमीमांसकेषु मोक्षविषये आग्रहः समजायत। मीमांसेतरशास्त्रेषु स्वर्गस्य क्षणिकत्वं यथा प्रतिपादितं तदवधार्य उत्तरवर्तिमीमांसकैः स्वर्गस्य परमार्थत्वं नाङ्गीकृतम्। स्वर्गसुखस्य अनित्यतामवधार्य ते नित्यसुखमन्विष्टवन्तः। एतदन्वेषणमेव मीमांसादर्शने वेदान्तभावनायाः अन्तर्भावं साधितवान्। नित्यसुखावाप्तौ कर्माणि एव अन्तरायाः। अनेन सिद्धान्तेन मीमांसकानां स्वसिद्धान्तव्याघातो यद्यपि अवधार्यते तथापि कुमारिलपरवर्तिभिः मीमांसकैः स्वर्गातिरिक्तनित्यसुखानुसन्धानमितिः

निवेशिता। तस्मात् गौडब्रह्मानन्देन सिद्धान्तविन्दौ उक्तम् - 'प्राभाकरभाट्टयोस्तु वेदान्तदर्शने विद्वेषाभावः' इति।

प्रभाकरमतानुसारिणा आचार्येण शालिकानाथेन स्वकृतौ प्रकरणपञ्चिकायां यथोक्तं मोक्षस्वरूपं तदाधारेण प्रतिपाद्यते यत्शरीरं हि सुखदुःखयोः भोगाय तन्मात्रं सुखं हि जीवानां धर्मजन्या आनन्दानुभूतिः। अपरञ्च दुःखं हि तेषामधर्मजन्या वेदनाभूतिः। वेदबोधितकर्मणाम् अननुष्ठानाद् उत्पन्नः अधर्मात्मकोऽपूर्वः कालेन जन्मान्तरेण वा जीवानां दुःखानि उत्पादयति। ऐहिकपारत्रिकभेदादिदुःखं द्विविधम्। काम्यादिकर्मजन्या धर्मात्मकोऽपूर्वोऽहैवल्लोके रोगादिजन्यदुःखेन यज् जीवान्क्लेशयति तदेव ऐहिकदुःखम्। मृत्योश्चानन्तरं स्वकृतकर्मजन्यरौरवादिनरकवासजन्यं यद् दुःखं तच्च पारत्रिकम्। तेन उभयविधस्यैव दुःखस्य कारणं तावत् कर्म एवेति ज्ञायते। कर्मचरणादेव जीवाः सुखात्मकानि दुःखात्मकानि कर्मफलानि उपभोक्तुं पुनः पुनो देहधारणेन संसारचक्रे आवर्तन्ते। यद्यपि वेदबोधितकर्मणामनुष्ठानेषु प्रचोदयितृणां मीमांसकानां स्वसिद्धान्तविरोधः अनेन आपातदृष्ट्या अवधार्यते तथापि तत्त्वानुसन्धानात् तन्निराक्रियते। काम्यकर्माण्येव अधर्मात्मकमपूर्वजनयन्ति जीवान् जन्ममरणचक्रे पातयित्वा च वेदनामनुभावयन्ति। परन्तु वेदानुमतनित्यनैमित्तिकप्रायश्चित्तविधीनाम् अननुष्ठानात् जीवाः सुखदुःखसम्पृक्तं जन्ममरणचक्रमुज्झित्वा मोक्षाय प्रवर्तन्ते। तस्मादेतन्निश्चप्रचं यत्काम्यकर्माणि एव जीवानां बन्धनकारणानि। अपरतो नित्यादिकर्माणि मोक्षप्रवर्तकान्येवा जागतिकसुखानि परिणामतो दुःखानि एव आवहन्ति। यत एतादृशसुखभोगाय जीवानां पौनःपुन्येन जन्ममृत्युचक्रे पतनं ध्रुवमेवा तत्तु वस्तुतो दुःखमेव। अतएव संसारे वसमानैः जीवैः नूनमेव काम्यकर्मवर्जनपुरःसरं नित्यादिकर्मानुष्ठानं विधेयम्। अनेनैव विधिना जन्ममृत्युचक्रं दुःखभोगश्च विनिवर्तते। मोक्षस्वरूपं तु भाट्टप्राभाकरयोः भिन्नमेव, यद्यपि तल्लाभोपाय उभयत्रैव समानमेवा तत्र दुःखानामात्यन्तिकविनाशाद् उपभुज्यमानो मोक्षस्तु सुखदुःखयोरभावात्मक एवेति मतिः प्राभाकरस्य शालिकानाथस्य<sup>११</sup>। अनेन मोक्षस्य आनन्दस्वरूपं निवर्तते। अपरतो भाट्टमतेन मोक्षस्तावत् दुःखानामात्यन्तिकविनाशाद् आत्मनि विद्यमानस्य भूमानन्दस्य अभिव्यक्त्यात्मकः<sup>108०</sup>।

**५.६. वेदान्तदर्शने दुःखविमर्शः -** इतरास्ति कदर्शनसम्प्रदायवद्वेदान्तदर्शनसम्प्रदायेऽपि दुःखस्य धारणा अनुरूपैव कीर्तिता। जीवानां शारीरिकीमानसिकीचवेदनैव दुःखम्। परन्तु नेतरास्ति कदर्शनवद् दुःखस्यात्यन्तिकी निवृत्तिरेव मोक्ष इति प्रतिपादितः। एषामतेन नमोक्षो दुःखाभावात्मकोऽपि तु आनन्दात्मक एवा ब्रह्म हि आनन्दस्वरूपक इति वेदेषु समाप्ताः। अतो मुक्तिर्हि परमानन्दावाप्तिः, यदा स्वादानान्यान्य आनन्द आकाङ्क्ष्यते जीवैः। तदा तु जीवो परमानन्दस्वरूपकेण ब्रह्मणा तादात्म्यमनुभवति। परं न हि सुखदुःखात्मकशृङ्खलानि गडितेन जीवेन इच्छामात्रमेव आनन्दस्वरूपकेण ब्रह्मणा सायुज्यमुपभुज्यते। अतो जीवेन ब्रह्मविचारः कर्तव्यः। ब्रह्मविचाराय जीवेन ब्रह्मजिज्ञासायामधिकारिणा भाव्यमानि त्यानित्यवस्तुविवेकः, इहामुत्रफलभोगविरागः, शमादिषट्कसम्पत्तिः, मुमुक्षुत्वं च ब्रह्मजिज्ञासाधिकारिणो वैशिष्ट्यानि। ततोऽपि पूर्वं तेन शुद्धचित्तेन एकाग्रचित्तेन च भाव्यमा काम्यनिषिद्धकर्मवर्जनपुरःसरं नित्यनैमित्तिककर्मानुष्ठानाज्जीवस्य चित्तं शुद्धं भवति। शुद्धेन चेतसा सगुणब्रह्मोपसनया तस्य मनः क्रमशः एकाग्रो भवति।

काम्यकर्माणि निषिद्धकर्माणि च दुःखकारणानि इति मतं वैदान्तिकानाम्। जागतिकविषयाणां संग्रहणार्थं क्रियमाणानि कर्माणि काम्यानि उच्यन्ते। शास्त्रप्रतिषिद्धानि च कर्माणि निषिद्धानि भवन्ति। शास्त्रप्रतिषिद्धानि च कर्माणि आत्मनः प्रतिकूलवेदनीयत्वात् स्वभावतो दुःखात्मकान्येव। जागतिकविषयाणां लाभात् काम्यकर्माणि परिणामतो दुःखात्मकानि एव। वस्तुतः काम्यकर्माणि कर्मफलानि जनयन्ति तथा कर्मफलभोगाय पुनः पुनः जन्ममरणचक्रे पतनं ध्रुवमेव। वेदप्रतिपाद्ययागादीनाम् अनुष्ठानमपि वस्तुतः काम्यकर्माणि एव। यागादिजन्यं स्वर्गादिफलमपि उत्पाद्यत्वाद् विनाशि एव। स्वर्गफलविनाशात् जीवः पुनरपि जन्ममृत्युचक्रे निपतति। अतएव

यागादिजन्यं स्वर्गादिफलमपि दुःखपरिणामि एव । कठोपनिषदि<sup>11११</sup> नचिकेतसा श्रीमद्भगवद्गीतायाञ्च<sup>12१२</sup> भगवता कृष्णेन एतदेव उक्तम् । नित्यनैमित्तिककर्माणि कर्मफलानि न जनयन्ति । अस्मात् कारणात् एतानि केवलं जीवस्य भोगं सम्पादयन्ति । कर्मफलविनाशात् नवीनकर्मफलानुदयात् च नित्यनैमित्तिककर्माणि जीवं ब्रह्मजिज्ञासायामधिकारिणं कुर्वन्ति । ततश्च क्रमेण जीवो दुःखार्णवं तीर्त्वा आनन्दमयं ब्रह्मस्वरूपमाप्नोति ।

**६.०. उपसंहृतिः** - प्राणिनां जीवनं हि सुखदुःखसम्पृक्तम् । सर्वे तु प्राणिनः सुखं कामयन्ते दुःखञ्च द्विषन्ति । दार्शनिकदृशा तु जागतिकसुखमपि दुःखपरिणामि एव । सुखभोगाय पुनः पुनः संसारचक्रे पातनात् क्रमेण दुःखमेव अनुभवन्ति । अतएव भारतीयमनीषिभिः नित्यसुखमन्विष्टम् । नित्यत्वं तावत् प्रागभावाप्रतियोगित्वम् । सामान्येन उत्पत्तिविनाशरहितं नित्यत्वम् । अतो यत्सुखं न विनश्यते तदेव नित्यसुखम् । एतादृशसुखलाभाय सकलदुःखानामात्यन्तिको विनाशः कार्यः । दर्शनेषु स एव उपायः अन्विष्टो दार्शनिकैः । परन्तु कस्यापि हानाय तस्य ज्ञानं नूनमेव आवश्यकम् । एतद्विचिच्यैव भारतीयदर्शनेषु दुःखस्वरूपं विस्तरेण आलोचितमिति शिवम् ।

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# PRODUCTIVITY DYNAMICS IN THE INDIAN CHEMICAL INDUSTRY: A POST-REFORM PERSPECTIVE

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## **Abstract**

*The current study evaluates the Total Factor Productivity Growth (TFPG) of the Indian chemical industry in the post-reform era by employing Non-parametric Data Envelopment Analysis (DEA). The analysis utilizes the CMIE Prowess Database at the firm level for the period from March 1995 to March 2016. The findings indicate a decline in TFPG from 1.004 in 1995-96 to 0.877 in 2015-16, reflecting a 4.6% decrease, with an average TFPG of 0.954 over the study period. Efficiency change is identified as the primary driver of TFPG, suggesting that inputs are being utilized more effectively, contributing to sustainable growth. The determinant analysis reveals that Advertising and Marketing have a U-shaped impact on TFPG, while Research and Development and Net Exports exert a positive influence. Additionally, these strategic variables are significantly affected by TFPG within the Indian chemical industry. The study proposes several policy measures aimed at enhancing TFPG in this sector.*

**Key Words:** Total factor productivity growth, Manufacturing Sector, Indian Economy, Data Envelopment Analysis, Malmquist Index

**JEL Classifications:** D24, L6, O50

## **1. Introduction**

The development of the manufacturing sector in a structured manner could be instrumental in strengthening the foundations of economies experiencing a downturn in output and employment growth, thereby mitigating the decline in demand. Additionally,

considering the increasing significance of the service sector in the global economy and the established inter-sectoral link between services and manufacturing, the growth of the service sector depends on the growth of the manufacturing sector. Enhancing productivity and efficiency in the manufacturing sector may help economies better absorb economic shocks. Numerous studies have emphasized the importance of productivity growth, including works by Tinbergen (1942), Kendrick (1956), Abramovitz (1956), Solow (1957), Denison (1967), and Jorgenson and Grilliches (1967).

There is a conceptual distinction between technological change (TC) and total factor productivity growth (TFPG). Technological change refers to advancements in knowledge and its application to production (through invention, innovation, and diffusion). TFPG, on the other hand, is defined as the growth in output that is not attributed to the growth of inputs. It is a broader concept encompassing TC, technical-efficiency change (TEC), and scale-change. Productivity growth is crucial for increasing output and enhancing the competitiveness of an industry in both domestic and international markets. Scale effects are input-driven; growth driven by increased production factors is subject to diminishing returns and is not sustainable in the long run. Growth stemming from TC and TEC generally results from improvements in knowledge, organizational structures, human resource management, skill development, information technology, and the efficient use of production factors, all of which are more desirable for sustainable growth. Long-term development will benefit more if TFPG is driven by factors other than scale, such as TC and TEC.

The total factor productivity growth (TFPG) of a country's manufacturing sector depends on the TFPG of its various industries. This study examines the TFPG of firms in the Indian chemical industry (ICI) as a case study. The ICI, one of India's oldest manufacturing industries, significantly contributes to the economy, accounting for about 3% of GDP, with USD 60 billion in investment and around 1 million jobs. It ranks 12th globally and 3rd in Asia by volume, producing over 80,000 products. Chemical exports represent 14% of India's total exports, reaching both developed and developing nations. The INAE study (2011) identifies R&D as a crucial growth driver, with an expenditure of Rs. 7860 Crores in 2008-09. The industry has evolved from a net importer in the 1990s to a net exporter due to increased exports in pharmaceuticals and biotech. The sector is divided into three sub-sectors: basic chemicals, knowledge-intensive chemicals,

and specialty chemicals. The basic chemical sector is the largest, while the knowledge-intensive sector emphasizes R&D. The specialty chemical sector, driven by domestic demand and exports, has shown robust growth but faces challenges in R&D access. Both the specialty and knowledge-intensive sectors need R&D for product improvement.

Studies are available on productivity for different Indian industries (Goldar(2014); Ahluwalia(1990), Deb and Ray(2014); Ghose and Roy Biswas (2014)). Regarding the factors influencing TFPG, the global literature support the role of the variables like R&D expenditures (Grossman and Helpman (1991), Romer, (1986); Raut and Srinivasan (1993), Cohen and Levinthal (1989), Clark and Griliche (1982), Higon and Anon (2003), Mate-Garcia and Rodriguez Fernandez (2008)), exports (Balassa(1988), Grossman and Helpman (1990a, 1990b, 1991), Barro and Sala-i-Martin, (1995)), imports (Tybout (2000); Grossman and Helpman (1991), Lawrence and Weinstein (2001)), advertisement-expenditures (Syverson (2003); Carod and Blasco (2004)))and marketing-expenditures (Sheth and Sisodia (2002), Kao et al. (2006)) among others.

The present study is significantly different from the earlier in many respects. First of all, as distinct from the previous studies the variations in TFPG of different firms under ICI are estimated employing non-parametric Data Envelopment Analysis (DEA), applying the Malmquist Productivity Index (MPI) introduced by Caves, Christensen and Diewert 1982 and using Centre for Monitoring of Indian Economy (CMIE) Prowess data base, for the period 1995-2016. Secondly, the measured MPI is decomposed to separate the contributions of technical-change (TC), technical - efficiency change (TEC) and scale - efficiency change (SEC) using Ray and Desli (1997) methodology. Finally, a second-stage panel regression analysis is resorted to explore the impact of R&D, total exports and imports, advertising–expenditures and marketing expenditures on TFPG. A nexus relationship exists between Indian firms’ performance and strategic variables in the post-reform era (Chen & Ibhagui, 2019). Strategic variables like Advertising Intensity (ADV), Marketing Intensity (MKT), R&D Intensity (RD), and Net Export Intensity (NX) may be endogenous, affecting TFPG and being influenced by TFPG. Few studies have explored these simultaneous relationships. This study addresses this gap by examining the determinants of TFPG using a simultaneous panel model (EC2SLS random-effects IV regression) for TFPG, ADV, MKT, RD, and NX. It is crucial for policy-making to enhance Indian chemical firms’ performance.

The rest of the chapter unfolds as follows. Section 2 reports the data source. Section 3 contains the results of estimation of TFPG and its decomposition analysis. Section 4 explains the determinants of TFPG. Section 5 concludes the study along with some policy suggestions to promote TFPG.

## 2. Data Sources

The sample consists of 223 chemical companies' (firm) data collected from Centre for Monitoring of Indian Economy (CMIE) Prowess database, over the period 1995-1996 to 2015-2016.

The study conceptualizes a 1-output and 5-inputs production technology. The output is the total sales of the firm deflated by the WPI for textiles (base 1993-94 =100). The inputs are: (i) Raw Material inputs (measured in terms of the companies' expenditure on raw materials, stores and spares) deflated by the WPI for manufacturing products (base 1993-94 =100) , (ii) Energy and water Input (measured in terms of the expenditure of the companies for power, fuel and water) deflated by WPI of power & fuel (base 1993-94 =100) , (iii) Labour (measured in terms of wages and salaries of the workers and nominal wage has been deflated by WPI ( base 1993-94 = 100), (iv) Land (measured in terms of rent & lease rent paid) and (v) Capital (measured in terms of value of the net fixed assets) deflated by WPI of machinery (base: 1993-94 =100).

## 3. Empirical Analysis

Table 1 represents summary of means MPI of different firms annually and its decomposition into different components.

**Table 1: Malmquist Index Summary of Annual Means of Chemical firms**

Year	TEC	TC	SEC	MPI Index (TFPG)
1995-96	1.064	0.943	1.081	1.004
1996-97	0.875	1.042	0.936	0.912
1997-98	0.990	0.902	0.974	0.893
1998-99	1.093	0.911	1.145	0.995
1999-2000	1.262	0.744	1.109	0.939
2000-01	0.972	0.983	1.000	0.955
2001-02	0.933	1.075	0.930	1.003
2002-03	0.984	0.960	1.007	0.945
2003-04	0.977	1.015	0.936	0.992

2004-05	0.966	1.069	0.986	1.033
2005-06	1.147	0.835	1.054	0.958
2006-07	0.923	1.050	1.047	0.969
2007-08	0.922	1.003	0.977	0.925
2008-09	0.997	0.971	1.017	0.968
2009-10	1.108	0.818	0.989	0.907
2010-11	0.906	1.047	0.940	0.949
2011-12	1.113	0.812	1.096	0.904
2012-13	1.125	0.839	1.044	0.944
2013-14	0.900	1.098	0.936	0.988
2014-15	0.760	1.307	0.818	0.993
2015-16	0.957	0.917	0.961	0.877
Grand Mean	0.993	0.961	0.996	0.954

Source: Author's Calculation

Table 1 reveals that TFPG falls from 1.004 in 1995-96 to 0.877 in 2015-16. Mean TFPG is 0.954 indicating that TFPG has declined by 4.6%. The TEC falls from 1.064 in 1995-96 to 0.957 in 2015-16. The mean TEC is 0.993, meaning that TEC has declined by 0.7%. The TC falls from 0.943 in 1995-96 to 0.917 in 2015-16. The mean TC is 0.961, implying that TC falls by 3.9%. The SEC falls from 1.081 in 1995-96 to 0.961 in 2015-16. The mean SEC is 0.996, indicating that SEC falls by 0.4% over the study period. The fall in TEC, TC and SEC lead to overall fall in TFPG during the study period.

**Table 2: Mean Growth rate of Efficiency Change, Technical Change, Scale Change and TFPG**

Industry	Mean Growth rate (%) of Efficiency Change	Mean Growth rate(%) of Technical Change	Mean Growth rate(%) of Scale Change	Mean Growth rate(%) of TFPG
Chemical	33.71	4.62	5.35	29.89

Source: Author's Calculation

Table 2 shows that the growth rate of efficiency change is the largest contributor of total factor productivity change for chemical industry. This result suggests that efficiency change is contributing the most towards TFPG, implying that the same level of inputs is being efficiently used, as a result of which, the higher amount of output is getting

produced which brings about sustainable growth.

#### **4. Determinants of Productivity**

A second stage panel regression has been carried out to relate the productivity (TFPG) of Indian manufacturing firms with the strategic variables perused by firms as well as firms' characteristics namely ADV Intensity, MKT Intensity, RD Intensity, Net Export Intensity, Age, Diversification Index, Size and Age of the firm. The explanations for the inclusion of different explanatory variables can be summarized as follows:

##### **Advertising Intensity (ADV):**

Advertising, by promoting product substitutability, impacts firm productivity, leading to less productivity variation and higher average productivity in high-substitutability industries. Studies like Luo and Donthu (2005) and Tucker (2008) have explored the effect of advertising expenditure on productivity.

##### **Marketing Intensity (MKT):**

Marketing activity, which proxies product differentiation, is increasingly crucial in determining firm productivity. Rust et al. (2004) offer a framework for assessing marketing productivity and highlight its growing importance in enhancing firm performance. Research in marketing performance measurement includes studies by Donthu et al. (2005) and Lukas et al. (2005).

##### **R&D Intensity (RD):**

Companies investing in R&D can develop advanced technologies that boost their productivity. Enhanced technical knowledge typically leads to higher output levels, suggesting a positive link between a company's productivity and its R&D efforts. Extensive empirical research supports this relationship, including studies by Clark and Griliche (1982), Dietmar (1994), Kwon and Inui (2003), Higon (2003), Mate-Garcia and Rodriguez-Fernandez (2008), Johansson and Lööf (2008), and Moen and Burchardt (2009).

##### **Net Export Intensity (NX):**

When analyzing productivity in Indian manufacturing firms, the roles of exports and imports are crucial. Extensive literature shows that exports generally enhance productivity. Studies by Roberts and Tybout (1997), Clerides et al. (1998), Bernard and Jensen (1999)

and Alvarez and Lopez (2005) support this. Imports are also vital, particularly for R&D activities. The World Bank reports (1993, 1997) highlight that imports of foreign technology positively impact productivity. Therefore, understanding the relative impact of exports versus imports on productivity is important, and this study uses net exports (NX) to explore this relationship.

**Diversification Index (DIVIND):**

DIVIND of a particular industry groups captures the effect of market structure on productivity of the firms. DIVIND is the reciprocal of concentration ratio. The Herfindal Index or Concentration Index is calculated as follows:  $H = \sum s_i^2$ ; where  $s_i$  is the market share of the  $i^{\text{th}}$  firm in the market and N is the number of firms.

Some researchers expect a negative relationship between CR and TFPG due to increased competition driving technological advancement, while others anticipate a positive relationship due to benefits of large size and secure markets, with empirical literature offering mixed conclusions [(Katz, 1969); (Kendrick, 1973)].Age:

Debate exists on the effect of firm age on performance: older firms may excel due to experience and established advantages (Stinchcombe, 1965), while younger firms might outperform due to greater flexibility in adapting to change (Marshall, 1920). The present study has divided the sample companies into two groups:

Agedum = 1, if Mean Age of the firm < Grand Mean Age (considering all the firms and all time Points taken together)

= 0, Otherwise

Size:

Productivity varies with firm size, as larger firms benefit from cheaper, higher-quality inputs and economies of scale, leading to better performance compared to smaller firms (Penrose, 1959).The present study divides the sample basis on investment into three groups, on the basis of Investment in plant & machinery or equipment according to MSME Classification:

Smalldum = 1, if mean investment < 5 Cr. rupees

= 0, otherwise

Mediumdum = 1, if mean investment < 10 Cr. rupees

= 0, otherwise

$$\text{Largedum} = 1, \text{ if mean investment} > 10 \text{ Cr. rupees}$$

$$= 0, \text{ otherwise}$$

In order to avoid dummy variable trap, Mediumdum has been dropped.

It may be possible that the effect of different explanatory variables may be non-linear in nature. To get this effect, the sole effect of different variables, their square terms and the joint effect of different variables will be incorporated. The effects of the lag value (one year lag) of different strategic variables (i.e. the effects of different strategic variable in the previous period) have also been considered.

#### **4.1 Explaining the Factors Influencing TFPG of the Firms: The Results from a Two Stage Least Square Type Approach in a Simultaneous Panel Model.**

Proposed model is estimated in a panel set up showing simultaneous relationship among different variables.

#### **Significant Factors explaining the total factor productivity growth from a Simultaneous Equation Panel Model: The TFPG Block**

The estimated TFPG of Indian chemical firms and also the other endogenous variables explaining TFPG corresponding to TFPG block can be visualized below.

##### **Chemical Industry**

The estimated TFPG of Indian chemical firms and also the other endogenous variables explaining the TFPG corresponding to TFPG block can be visualized from Table 3 to Table 7.

#### **Table 3: Factors explaining the total factor productivity growth from a Simultaneous Equation Panel Model: The TFPG Block**

##### **Endogenous Variable: TFPG**

<b>Independent Variable</b>	<b>Coefficient</b>	<b>z-value</b>	<b>p&gt; z </b>
ADV	-.0115817	-3.33	0.001
(ADV) <sup>2</sup>	.0000248	2.36	0.018
ADVlag	.011994	3.48	0.000
MKT	-.00347	-3.47	0.001
(MKT) <sup>2</sup>	2.28e-06	1.42	0.154
MKTlag	.0032243	4.85	0.000
NX	8.28e-06	0.52	0.604

(NX) <sup>2</sup>	-1.17e-09	-1.19	0.233
NX*RD	7.84e-09	0.36	0.719
DIVIND	-.0044082	-2.41	0.016
Agedum	.0230011	1.40	0.163
Wald chi2 = 72.49			
Prob > chi2 = 0.0000			
Determinants		Marginal effects	
ADV		-0.0098	
MKT		-0.0021	
RD		0.0859	
NX		0.0028	

#### The first equation of TFPG Block: The estimated TFPG relation

Table 3 shows that TFPG is positively related to past ADV and MKT, meaning increased ADV and MKT in the previous period boost current TFPG. For current ADV and MKT, initial effects are negative, but beyond critical values, they positively affect TFPG, indicating a U-relationship. As sample firms' ADV and MKT are below these levels, their effects are currently negative. NX has an inverted U-relationship with TFPG, with positive initial impacts but negative effects beyond a certain level. The combined effect of NX and RD is positive, as RD enhances NX and vice versa. DIVIND negatively affects TFPG, while Agedum shows younger firms are more productive than older ones.

#### Table 4: Factors explaining ADV behaviour from a Simultaneous Equation Panel Model: The TFPG Block

##### Endogenous Variable: ADV

Independent Variable	Coefficient	z-value	p> z
TFPG	6.787432	1.82	0.068
MKT	.1058917	3.96	0.000
(MKT) <sup>2</sup>	-.0001244	-1.97	0.048
RD	.0291127	2.58	0.010
(RD) <sup>2</sup>	-.0000317	-3.68	0.000
RDlag	.0052767	1.41	0.159
RD*MKT	.0001997	4.21	0.000
NXlag	-.0007402	-1.57	0.117

(NXlag) <sup>2</sup>	3.11e-08	1.11	0.268
Wald chi2 = 151.31			
Prob > chi2 = 0.0000			
Determinants		Marginal effects	
TFPG		6.7874	
MKT		0.1099	
RD		0.0312	
NXlag		0.0006	

**The second equation of TFPG Block: The estimated ADV relation**

Table 4 shows that ADV is positively related to current TFPG and previous RD, with increases in both boosting ADV. MKT and RD in the current period have an inverted U-relationship with ADV, with initial positive effects that turn negative beyond a critical level. The joint effect of RD and MKT on ADV is positive, indicating that MKT's impact on ADV depends on RD and vice versa. NX from the previous period has a U-relationship with ADV, with an initial negative effect that becomes positive beyond a critical level, leading to a positive net effect.

**Table 5: Factors explaining MKT behaviour from a Simultaneous Equation Panel Model: The TFPG Block**

**Endogenous Variable: MKT**

Independent Variable	Coefficient	z-value	p> z
TFPG	8.750437	1.07	0.284
ADV	.5795459	5.40	0.000
(ADV) <sup>2</sup>	-.002213	-5.90	0.000
RD	.7338134	5.31	0.000
(RD) <sup>2</sup>	-.0006669	-13.84	0.000
RDlag	.0310864	4.39	0.000
RD*ADV	.0196586	26.96	0.000
NX	-.0033287	-3.70	0.000
(NX) <sup>2</sup>	6.44e-07	13.07	0.000
NXlag	-.0005862	-0.62	0.532
(NXlag) <sup>2</sup>	5.08e-07	9.57	0.000

Wald chi2 = 3158.57	
Prob > chi2 = 0.0000	
Determinants	Marginal effects
TFPG	8.7504
ADV	0.5770
RD	0.6902
NX	0.0075
NXlag	0.0054

**The third equation of TFPG Block: The estimated MKT relation**

Table 5 shows that MKT is positively related to current TFPG and previous RD, with increases in both boosting MKT. ADV and RD in the current period have an inverted U-relationship with MKT, with initial positive effects that turn negative beyond critical levels. The joint effect of RD and ADV on MKT is positive, indicating that MKT's impact depends on RD and vice versa. NX in both the current and previous periods has a U-relationship with MKT, with initial negative effects turning positive beyond critical levels.

**Table 6: Factors explaining RD behaviour from a Simultaneous Equation Panel Model: The TFPG Block**

**Endogenous Variable: RD**

Independent Variable	Coefficient	z-value	p> z
TFPG	1.679948	0.28	0.778
MKT	1.46275	7.14	0.000
(MKT) <sup>2</sup>	-.0057302	-10.49	0.000
ADV*MKT	.0064799	0.91	0.361
(ADV*MKT) <sup>2</sup>	7.10e-07	4.19	0.000
NX	-.0159259	-4.23	0.000
(NX) <sup>2</sup>	2.74e-06	18.41	0.000
NXlag	.0111813	4.48	0.000
Largedum	10.99895	1.21	0.228
Wald chi2 = 1346.12			
Prob > chi2 = 0.0000			

Determinants	Marginal effects
TFPG	1.6799
ADV	5.1914
MKT	4.9691
ADV*MKT	1.2466
NX	0.0021

#### The fourth equation of TFPG Block: The estimated RD relation

Table 6 shows that RD is positively associated with current TFPG and previous NX, with increases in these factors boosting current RD practices. MKT in the current period has an inverted U-relationship with RD, showing positive initial effects but negative impacts beyond a critical level. The combined effect of ADV and MKT on RD is positive, indicating that the impact of MKT on RD depends on ADV and vice versa. NX in the current period exhibits a U-relationship with RD, with an initial negative effect that turns positive beyond a critical level, resulting in a positive net impact. Additionally, larger firms engage more in RD, indirectly enhancing TFP.

#### Table 7: Factors explaining NX behaviour from a Simultaneous Equation Panel Model: The TFPG Block

##### Endogenous Variable: NX

Independent Variable	Coefficient	z-value	p> z
TFPG	4.690333	3.11	0.002
(TFPG) <sup>2</sup>	-.0060303	-2.48	0.013
MKT	11.9363	16.69	0.000
RD	6.372078	10.58	0.000
DIVIND	-13.37001	-2.04	0.041
Wald chi2 = 1062.97			
Prob > chi2 = 0.0000			
Determinants	Marginal effects		
TFPG	4.6781		
MKT	11.9363		
RD	6.3721		

#### The fifth equation of TFPG Block: The estimated NX relation

Table 7 shows that NX is positively related to MKT and RD, with higher levels of both

boosting NX. TFPG in the current period has an inverted U-relationship with NX, with an initial positive effect that becomes negative beyond a critical level. As TFPG increases significantly, imports may rise, causing NX to decline past this critical level. DIVIND negatively affects TFPG, meaning that as market share concentrates, NX increases.

## 5. Conclusion

This paper examines the extent of Total Factor Productivity Growth (TFPG) and its determinants in the Indian chemical industry post-reform. The results show that TFPG fell from 1.004 in 1995-96 to 0.877 in 2015-16, marking a 4.6% decline, with an average of 0.954. Technical Efficiency Change (TEC) dropped from 1.064 to 0.957, a 0.7% decrease, with a mean of 0.993. Technical Change (TC) declined from 0.943 to 0.917, a 3.9% reduction, with an average of 0.961. Scale Efficiency Change (SEC) fell from 1.081 to 0.961, a 0.4% drop, with a mean of 0.996. These declines in TEC, TC, and SEC contributed to the overall decrease in TFPG. Efficiency change is the primary contributor to TFPG, suggesting that inputs are being used more effectively, leading to sustainable growth.

The analysis reveals that for current Advertising (ADV) and Marketing (MKT), initial impacts are negative, but once these variables exceed critical values, they positively affect TFPG, indicating a U-shaped relationship. Since current ADV and MKT levels are below these thresholds, their effects on TFPG are negative. Research and Development (RD) has a positive marginal effect, suggesting that increased RD boosts TFPG. Net exports show a positive relationship, implying that the benefits of exports surpass the impacts of imports. The marginal effects of TFPG on ADV, MKT, RD, and Net Exports are positive, indicating that improvements in TFPG enhance these factors, further boosting TFPG in the Indian chemical industry.

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# ANNUITY IMPACT ON POST RETIREMENT LIFE

**Dr. Prasun Chatterjee<sup>1</sup>**

## **Abstract**

In changing scenario of Indian post-retirement demography, and medical advancement the average life expectancy is increasing. The development and growing market also provide enough opportunity to earn more from the market. In this article, after reading through the selected literature review and various papers related to pension, we understood the main requirements of older people are grounded on their limited income with uncertain increment of expenses for uncertain period. In this article we tried to explain the factors which influence the retiree's savings & approximate expenses of retirees with basic needs. The objective of our studies limited to (i) the influence of macro factors on retirees' investment, then (ii) tried to gauge the minimum expenses for post-retirement sustainability and (iii) Annuity and its impact on retired life. The model we tried to use the two-stage optimisation technique for impact minimisation. Though we are yet to use this on practical data.

**Keywords:** Annuity, Post Retirement Life, Sustainability, Pension, Impact on Retirees

## **Introduction/ Fundamentals of Pension**

India is younger populated country till 2024 but growing elderly people around 12% of the total population<sup>2</sup> and sustainability in post-retirement period is one of the biggest socioeconomic challenges at this moment. The segment is growing 3% every year. The expected number of older people will be 319 million by 2050. Government of India revised their pension policy twice since 2004. The preference of some of the state government also changed from contributory to fixed benefit system again. With medical advancement and growth, the life expectancy of people is increasing every year with increasing cost of living as well as higher medical cost in India. The inflation and other macro factors

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<sup>2</sup> As per LASI survey 2024

pooling down the growth of the retiral funds income too.

A person faces two types of risks- dying too early and living too long. Covering life for a lump sum through insurance may reduce the risk of dying early. Dying too early can be managed with insuring life with an insurance policy. Living too long is the longevity risk which can be restrained through the contribution in superannuation or pension policies or purchasing annuity for retirement life. Retirement is a natural phase of life when a person either reduces the work hours or ceases their work (Mangla et.al, 2023).

In India, we find much less social security for elderly people. The demographic characteristics of the Indian work or labour force are changing every day too. As per the United Nations' world population data, the life expectancy of India was 60.5 years in the 1996 calendar year. The same has increased to 70.4 years in 2023 which may be expected to increase further at 74+ by the next 20 years. To secure for future and to sustain life, people must accumulate at the time of their working period when they can contribute, or they should continue to work.

In this paper, we would like to address the parameter which impact the retirees' life. We also like to find out the constraints of retirees. Shall work on to minimise the impact of risk in post-retirement life by using the methodology with given constraints. We have scripted this paper in three portions would be to find the demographic facts and figure of retirees in India in recent time. Thereafter the pension fund management during the working years and details on Annuity and its current rates. The lastly, we would check the impact on sustainability.

### **Demographic Facts of Retirees in India**

If the superannuating age varies in between 58 to 65 years in India. The concept of retirement is visible with in middle class society in India. The middle-class retired people mainly depended on either the pension plan or the rental income. The lower middle-class people prefer to work till their lifetime like the upper-class people. 10% of the more than 60 years of age having the pension or rental income only. Though 75% of the Indian having a retirement plan in place which shows preparedness of retirement is improving. The retirement index is also increasing from 44 to 47 as of 2022. As per NSO NSS data (2017-18), 70% of the elderly people in India were dependent on others for their daily living. As the effects of the coronavirus disease (COVID-19) recede, life expectancy is expected

to rise everywhere. As people live longer, they will face the prospect of outliving their resources. They will have no choice but to adjust their resource reallocation strategies. (Mason et al 2024).

### **Quality of Life for senior citizens**<sup>3</sup>

55% of the older population are illiterate. The dependency ratio is 62% on working population. Almost one third of older people living with their children and without their spouse. 6% older men live alone, and 9% of women senior citizen live alone. 70% older people live in rural areas. This age group expect low, 5.3% did not eat even when they are hungry. 78% of elderly people live without any pension and only 18% having health insurance coverage. Average cost of health facilities is Rs. 31.9 thousand. Monthly per capita consumption expenditure of a household with at least 1 older person is Rs. 2948 only and monthly per capita income is Rs.3568 only. 69% of these expenses are spent on health care expenses. 28% of the older are aware of the senior citizen concessions and benefits available. Overall quality and economic wellbeing of older people of India depends on their economic conditions, work participations and social and health factors.

The irony is the birth is controlling with lower fertility and death is also declining with people living longer so the effect is higher number of older people only. These causes demographic changes in the economies and a realign of retirement assets must in place both individually and from government also. The dependency on one pension instruments should be introduced.

### **Life Expectancy & Health care spendings**

As per the UNDP data Life Expectancy is increasing regularly in India due to medical advancement and other developments. In 1974-75 the avg life expectancy of a male was 50 only which has increased to close to 71 in 2024 and will be 75 in 2050. The sex ration as per 2019-20 in the elderly people is 1065. For female mortality is 5 years more than male. 58% of the total number of older women out of which 54% are widows<sup>4</sup>. The figure 1 depicts the projected life expectancy from birth from 1950 to 2100 years where we can the rate may grow up to 81years.

As per LASI survey, 75% of the older people suffering from chronic disease in life.

<sup>3</sup> Above 60 years age = Senior citizen

<sup>4</sup> As per LASI survey Report 2024

25% having multi morbidity. Around 20% having mental health issues.33% of elderly people having depressive symptoms.43% use an aid or supportive device. 7% experiences hospitalisation. 60% of elderly people regularly visit OPD for regular care.

**Figure -1**  
**Projected Life Expectancy since 1950 to 2100**



Source : UNDP data

**Figure – 2**  
**Average Healthcare Spending trend 2000-2024**



Source: UNDP data

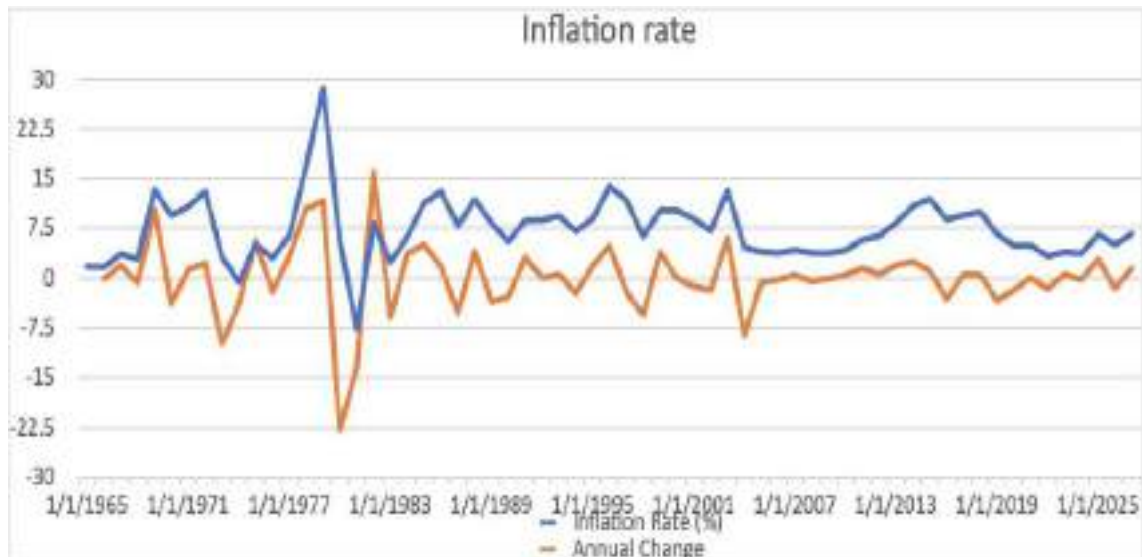
In figure- 2 we again refer the growth of India’s health care spending vis a vis percentage of GDP on the same sector. This implies that in last 20 years the spending

pattern become triple but the percentage change in GDP is negligible. Therefore, the older people must face this cost escalation. Only 2% of GDP is spending over health care. An average household spend Rs. 3638 in 2022-23. These expenses go 50% more for the age between 60 to 65 years. Above 65 years age it may increase to 80% more. Average spending is 69%. 18% of senior citizen covered with health insurance.

### Impact of Inflation in Retirement Life

Role of inflation in retired life is curbing purchasing power directly from the old age interest income. If Inflation and interest rate are positively correlated, then increase of inflation leads bond price to fall as well as interest rate increases too. Expenses increasing for older due to inflation which leads to cut the retirees extra expenses to meet the most needed. Older needs to keep investment risk moderate or controlled for retirees during inflation. Currently the inflation rate is plying between 6% to 7% in India. The rate of return from the accumulated wealth is also important motivator for retirees which also influenced by inflation.

**Figure -3**  
Average annual inflation in India for last 62 years



Source: [www.macrotrends.net](http://www.macrotrends.net)

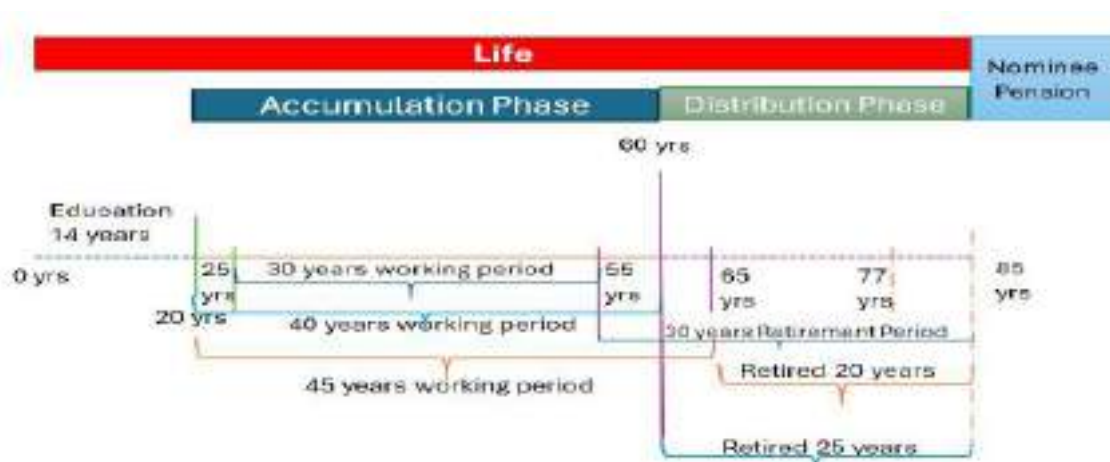
### The Life Cycle and Basics of Retirement

The flow of income varies over ages. There are three stages of life – education stage, working stage and retirement stage. During first 14 to 16 years of education or student life the wealth is not generating. The moment a person starts working his accumulation of wealth starts. During the working years that is if it starts from 20 to 25 years of age till the retirement or superannuating age may be from 55 year to 65 years in general, a person accumulates wealth for his retired life. The net wealth decides the sustainability in retired life. The following figure – 4, depicts a picture of the entire life stages of a person.

We can observe three scenarios –

- If a person started the working and accumulating wealth at the age of 20 years and retire at the age of i) 55 years ii) 60 years and iii) 65 years. Therefore, the accumulation phase may be continuous and i) 35 years ii) 40 years or iii) 45 years. The average retirement age we will consider 60 years for our study.
- If the person started accumulating wealth at the age of 25 years and working period is not continuous rather distorted. In some point of time, he could not accumulate his wealth for retirement within 60 years of age or accumulated less or some time it is more. This situation may be seen in private sector in India.
- If the life expectancy has increased to 71 years at present. In case during distribution phase the retiree lives up to age i) 71 years or ii) 85 years or more then how the retiree will manage his situations. We are considering the retirement life may vary from 20 years to 30 years. The average retirement life we will consider 25 years for our study.

**Figure -4**  
**Life Stage and sustainability**



*Source: Authors illustration*

We assume that the retiree chosen the option for family pension or nominee's pension in post death of the annuitant. If not, then at the time of death the pension amount will stop.

The wealth accumulation versus spending rate if we consider then we can find for scenario a) for average 40 years of accumulation his spending will be 25 years then the ratio will be  $40/25 = 1.6$  which implies every 1.6 years saving can give him 1 years spending in retired life. The three situations can give three different figures that is 1.16, 1.6 and 2.25 if we consider the death at age 85 for all cases.

For scenario b) where the accumulated wealth is distorted due to whatever reason the situation for all three will vary drastically. There we can find the saving & spending ratio will be 0.86 x net saving or 1.4 x net saving for retirement age 55 years or 60 years. The first situation leads to ruin risk or a situation where retiree will be out of income to live. The retirement between 55 years to 60 years may be termed as premature retirement.

For Scenario c) in the wealth save is mismatching with lifestyle or post-retirement cost of living then it might not enough for a retiree to continue till death with accumulated savings. Then it is must that retiree will be ran out of money and ruin comes. This is also possible if the real rate of return of saving period is much lower than expected. The cause may any macro factors like geopolitical reason or inflation or regulatory risk or behavioural risk etc too. Our study assumes with ceteris Paribas that is one thing can change at a time, rest all keeping constant.

### **Old Age Requirements**

For a sustainable retirement life with the working period lifestyle a retiree needs to earn extra or work longer period than their retirement age. It is obvious that after or around age 60 current labour income drops below current consumption (Mason et al (2024)).

The old age income depends on three factors – (a) balanced consumption income ratio, which is known as average propensity to consume, (APC) or  $C/Y$  (b) Increased Life expectancy and decreased mortality which is unknow and (c) the discounting rate. An increase in consumption (C) caused by an addition to an extra unit of income (Y) earned is known as marginal propensity to consume (MPC). MPC reflect the differences in the shadow price of consumption: the higher this price, the higher the propensity to consume

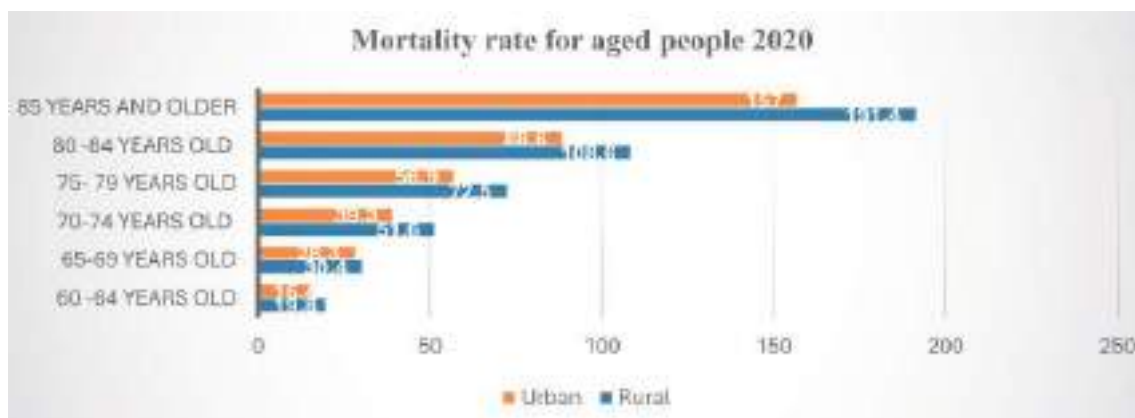
out of an exogenous increase in income. Mathematically we can write consumption function as  $C = C(Y)$ . MPC tends to zero for smoothing.

We discussed in earlier section that life expectancy has increased due to medical advancement and economic development but the mortality or death rate in India has decreased almost 4.23% in 2022. Death rate calculated as per thousand, rate of number of deaths in average population every year. As per UNICEF data India has 29.1 death per 1000 live births.

The mortality for older people as of 2020 we found that Rural has always a higher mortality compared to urban. The maximum number of deaths 197.4 per 1000 is observed for 85+ years of age in 2020. The similar result for the age group 80 to 84 years, 70 to 75 years age group also.

**Figure – 5**

**Mortality for older people per 1000 people** (Source: [www.statistica.com](http://www.statistica.com))

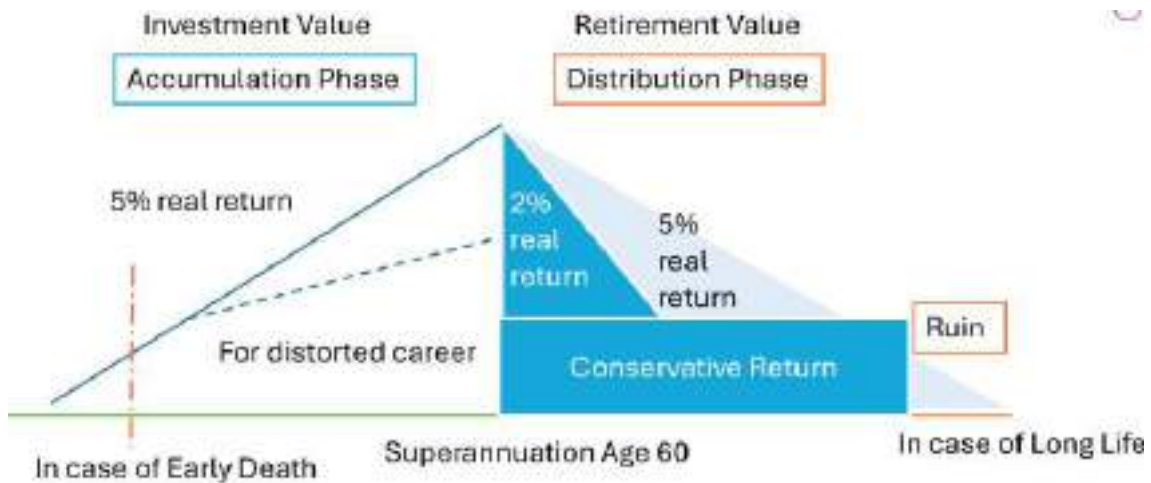


The figure 6 depicted the situation where in accumulation stage the investment value is increasing at any of the three cases – i) Constant rate or ii) increasing rate or iii) decreasing rate. In case it is a constant rate may be 6.5% flat in debt market then the real return of fund is nil as Rate of return – inflation is nil. If the increasing rate becomes 8% to 11 % then the real return would be 2% to 5% or it may be an average of 4% to 7% as per his appetite. Again, if it is as per case iii), then the return may be 3.5% to 5 %, the real return may be negative 3% to 1%.

The figure 6 showing the same that without compromising the lifestyle or increasing the rate of return the retiree may face ruin in his lifetime with a conservative constant

return or lower return. To generate a real return of 5% throughout his accumulation phase he must earn 11% rate of return in average from the investment. This is only possible if he includes equity in his retirement portfolio in Indian investment market situation.

**Figure -6**



Source: Author own illustration

Currently three types of pension fund management are visible in India. The benefit is fixed at a predefined rate (Defined Benefit) or as per a fixed contribution rate (Defined Contribution) the standard payout is much lesser. If we mix these two, we may find hybrid benefit too. Then it is obvious to increase the working period or the pension amount to avoid the risk of ruin at older age.

### **How Much Investment is Enough for Retirement.**

A person when retired he retired with a dream that savings for his entire working life will be enough to survive the rest of his life with his savings. But due to inflation and the macro effect the savings is getting down every year. The estimated approximate expenses have been calculated below in figure 7 for an idea only. If the retiree's savings amount is Rs. 100,00,000 then the same will be reduced to 56,00,000 after 10 years and almost one third of original amount after 20 years. If the savings is lesser like Rs. 25 lacs at the time of retirement then the same amount will be equivalent to 8 lacs after 20 years of retirement. Now the question is how much money is required for a sustainable retirement life.

**Figure 7****The average anticipated annual inflation effect on Retirement Saving**

Amount in hand in 2024 (Rs.)	After 10 years	After 20 years
25,00,000	14,00,000	8,00,000
50,00,000	28,00,000	16,00,000
100,00,000	56,00,000	32,00,000

Source: Researchers own calculations based on current inflation rate.

We have taken an estimation for expected minimum expenses required for a senior citizen in Kolkata only. It will be 50% more for Delhi or Mumbai. 30% less for rural Bengal or other small cities.

The average expense of a senior citizen is taken as per below figure 8 as per pilot project in West Bengal.

**Figure 8****Average Expenses of a Senior Citizen in West Bengal**

Sl. No.	Average Monthly expenses	Cost in INR
1	House rent 3BHK	30000
2	Utilities (electric, gas, etc.)	6000
3	Helper	4000
4	Groceries and food	4800
5	Telephone & internet	1000
6	Healthcare	9500
7	Other expenses and social involvement	6000
	Total	61300

A retiree who is eligible to spent Rs. 60,000 per month is also paying tax on his or her income. This cost is increasing every year by 6% to 7%. For consumption smoothening he needs to optimize the retirement life by balancing between consumption and savings in post-retirement life. This implies that MPC tends to zero. In an average of a 50% to 60% reduction of the last average standard living is prescribed by the government for central government employees.

At the same time if we consider the price escalation for next 10 years or 20 years then minimum requirement of 7 lacs + would also be manifolded for a retiree. We can

conclude that if we are unable to control inflation down at the same time rate of return is not increasing then sustainability raises the question in post-retirement life.

### **Annuity**

At the time of superannuating age, a person may get the opportunity to buy an annuity for a regular income for his or her future. There are various options available for annuities viz. annuity for life, annuity for a fixed period, annuity for joint life, annuity for joint life with return of purchase price, etc.

In general, we can split into two categories of annuities – fixed and variable. Fixed annuities are a traditional concept and conservative approach that provides a fixed income (may be monthly, quarterly, semi-annually, or annually) for a predefined period guaranteed by an annuity service provider or an insurance company. The earnings and payouts are fixed during the contract period. A variable annuity is a market-linked annuity whose payout depends on the principal amount plus gain or loss of investment as per the risk appetite of the annuity purchaser. The lump sum received net of gain or loss may be taken as various payment streams (monthly, quarterly, semi-annually, or annually). In a fixed annuity, the risk of earning is with insurance companies, and in a variable annuity, it is with contributors. The cost of managing a variable annuity is less than a fixed annuity. A fixed annuity is straight from the cost point of view, but a variable annuity is complex. An annuity is always advantageous if it is planned for the long term in advance of 10 to 20 years before retirement age.

### **Pension Fund Management in Working Period.**

There are two three types of Superannuation we can observe. If the benefit is fixed or defined and does not depend on employees' contribution may be called a defined benefit superannuation plan. If the contribution is fixed irrespective of benefits or payout, it may be called a defined contribution superannuation plan. The third option is a mix of both defined benefit and defined contribution funds called a hybrid pension plan.

**Figure 9**

Source: Authors own illustration

The Annuities options available in Indian Annuity market are mentioned below –

- Pension for Life with Return of Corpus
- Pension for Life without Return of Corpus
- Pension Guaranteed for 5 years and thereafter
- Pension Guaranteed for 10 years and thereafter
- Pension Guaranteed for 15 years and thereafter
- Pension Guaranteed for 20 years and thereafter
- Joint Pension with 50% of the pension to Spouse
- Joint Pension with 100% of the pension to Spouse
- Joint Pension with 100% of the pension to Spouse and return of Corpus
- Joint Pension for life with return of purchase price on diagnosis of Critical Illness
- Pension for Life without Return of Corpus on Parts
- Life Pension with Return of Corpus on Death or Survival
- Life Pension with Return of Corpus on Death or in Instalments on Survival
- Increasing Pension

From the above the few are very popular – immediate annuity and joint life with return of purchase price. Though recent trend is coming on increasing annuity which tries to match the gap between the return & inflation risk. The annuity rates or returns are (July – August 2024) mentioned from various IRDA regulated insurer.

**Figure – 10****Rate of Annuity in the market**

Minimum amount of Corpus required for getting Pension @ Rs. 1000/- per month	HDFC Life	SBI Life	LIC	ICICI	Bajaj Allianz	Kotak Life	Max Life
<b>without return of corpus for Joint Life Age: Self 68, Spouse 63</b>	1,46,668	1,62,274	<b>1,45,420</b>	1,57,186	1,69,763	1,56,250	1,53,330
<b>without return of corpus for Single Life Age: 68</b>	1,18,893	1,30,652	<b>1,14,998</b>	1,27,851	1,32,105	1,26,775	1,16,733

Source: IRDA website

From the above we can find an average annuitant if he is looking for a fixed monthly income of Rs. 25000 then he needs to accumulate Rs. 28,74,950/- minimum as corpus for without return of corpus or Rs. 36,35,500 for a joint life pension for life. This Rs. 25000 is not enough to sustain in future where every year the cost of living is increasing.

In both fixed and variable annuities, therefore, return plays a vital role. The microeconomics and macroeconomics impacts are there on return too. The macro variables that influence returns are inflation, money supply, Gross domestic product, and exchange rate (Mangla et al 2023). Behavioural or micro variables like changes in demographic characteristics of the society, individual spending patterns, changes in family dynamics, retirement planning, as well as changes in pension product availabilities also influence the pension or annuities.

The following are the pros & cons on Annuity depicted in figure 11.

**Figure-11****Pros and cons of annuity**

Pros	Cons
Guaranteed Income	Subject to withdrawal with penalties & charges
Options for family pension	Higher charges & hidden cost involved
No Capital appreciation no capital retention	Taxable income

May provide certain probate and creditor protections	Complex in nature
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**Model Fitting.**

The objective is to minimize impact subject to the constraint faced by the retirement.

The function can be written as

$$\Rightarrow = \alpha t + \beta c + \gamma S + \delta T + \theta r + \eta +$$

Where, as parameters are

t = Investment period

S= Retirement savings which is directly linked to income.

T = retirement age

= Replacement ratio

r=Real return,

c= consumption

= other influencing factors or dummies

$\alpha, \beta, \gamma, \delta, \theta, \eta$  are coefficients

Subject to the retirees' constraints, which is

$$\lambda (Y, M,$$

Where  $Y = S (y)$

C = = may be written as C(Y)

risk faced by retirees)

M= macro factors

$\lambda = multiplier$

sum of Income (Fixed or downward) which is retirement savings, Consumption or Expenses which may be derived from the budget constraint at the retirement time. The budget constraint is depending on Food, health care, transportation and travel, personal expenses like insurance, social expenses, donations, internet, entertainment, etc., Mortality and Macro Factors.

We need to minimize the impact of annuity subject to retirement constraint. For that we will be using LaGrange multiplier and then by doing two stage condition First order condition and second order conditions for impact minimization. The result came out from the calculation is parameter which have minimum impact on sustainability.

### **Impact on Finance of a Retiree**

From the results we can find that a) the impact is on uncertainty of yearly retiral real income is coming down as well as the interest risk is influencing his /her other secured investment too. b) shortfall due to the risk associated with retirement investment and their savings at the same time the increment of regular expenses including health care cost. c) More ages indicating more loneliness translate behavioral risk. At the same time every old person becoming dependent on others as they are getting older. The cost of managing dependency risk is increasing & behavioral risk.

There are several financial risks a retiree faces during this lifetime; some are direct some are indirect and correlation of the other risk<sup>1</sup>.

### **Scope of Further Studies**

The work is very initial steps towards annuity and retirement which gave us the scope of further studies from this paper. We may find how much income is sufficient for retirees in India. Need to find whether the traditional annuity good enough for future? Finding out what would be replacement ratio for retiree? Whether the retirement age should increase from the current age in India? How much pension is enough to avoid ruin?

### **Conclusion**

As per our study we can conclude that the following steps can improve the situation of Retiree of India-

- Start investing early for retirement.
- More contribution should be introduced.
- Longer working age if health permit, People should continue to work post the formal superannuation age.
- A standard replacement ratio should be laid down and redefined for common people.
- Higher investment return should be earned from Pension Fund.
- Inflation adjusted pension plan or product to be introduced. At least basic return in addition inflation should be earned from pension. Rate of return should be minimum around 6% to 7% in addition to current rate of inflation.
- Mix of equity investment in Pension Fund or individual life from early days only

As per government of India the following policies to be implemented for the economic

challenges for elderly people -

- A comprehensive financial system needs to be implemented for old age financial security.
- Financial literacy policy to be implemented for older age.
- Proper financial planning for senior citizens.
- Protection against fraud and abuse for the older people.

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**(Endnotes)**

1

<b>Risk Factor</b>	<b>Correlation: Factors and sustainability</b>
Financial Risk	Market risk, Interest rate risk, Inflation risk, Reinvestment risk
Longevity Risk	Behavioural risk, Ruin Risk,
Liquidity Risk	Precautionary risk

## DISPLACEMENT, ALIENATION, TRAUMA: REVIEWING THE PARTITION OF INDIA THROUGH PARTITION LITERATURE AND CINEMA

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### **Abstract**

The Partition of British India was not only a geo-political event causing humongous loss of life, livelihood and habitat, but the massive ramifications of dividing a land with shared history and culture was felt by the affected populace ontologically in terms of loss of identity and belongingness, and feelings of alienation and spiritual uprootedness. The horrific communal violence created new chasms, and deepened existing ones, of doubt and mutual suspicion between communities cohabiting a common geo-cultural space. Literature and films depicting the partition of India explore the human cost of the geo-political process. This paper explores this human cost of British India's partition as represented in the texts of Bapsi Sidwa's *Ice Candy Man* and Deepa Mehta's *1947 Earth*.

**Keywords:** partition, identity, trauma, communal violence, displacement

### **Displacement, Alienation, Trauma: Reviewing the Partition of India through Partition Literature and Cinema**

Prime Minister Jawaharlal Nehru, in his iconic "Tryst with Destiny" speech delivered in Parliament, on the eve of India's Independence, said: "At the stroke of the midnight hour, when the world sleeps, India will awake to life and freedom." However, as India awoke to new-found statehood, it also awoke to death and butchery as the saga of Partition continued to unfold. The Partition of British India was not only a geo-political event causing humongous loss of life, livelihood and habitat, but the massive ramifications of dividing a land with shared history and culture was felt by the affected populace ontologically in terms of loss of identity and belongingness, and feelings of alienation

and spiritual uprootedness. The horrific communal violence created new chasms, and deepened existing ones, of doubt and mutual suspicion between communities cohabiting a common geo-cultural space.

Literature and films depicting the partition of India explore the human cost of the geo-political process. They capture the tragic and the horrific by-products of Indian independence – the chaos, the butchery, the exodus to the ‘other side’ – when known faces transformed into predators and prey. They bring down the experience of partition from the abstractness of statistics and figures to the realm of familiarity and relatability by providing names and faces to both perpetrators and victims. Yet there is no generalized narrative of the experience of partition. Every work of artistic representation differs in tone and focus. Each writer and film-maker has his or her unique perspective while recreating this single traumatic experience.

Bapsi Sidhwa’s *Ice Candy Man*, also published under the title *Cracking India*, is primarily set in Lahore. It begins towards the very end of the British Raj, in the last few months leading up to the partition of British India and the birth of two new nations: India and Pakistan. It revolves around an eight year old Parsee girl, Lenny, who lives in Lahore with her affluent parents, and her perceptions of the tumultuous time through her personal experience. It is also a coming-of-age story, with the political currents shaping and shifting personal dynamics in Lenny’s life and influencing her psychological and emotional development. Though we view the events through the eyes of young Lenny, the voice is that of an adult Lenny who recounts the experiences and perceptions of her younger self. The adult narratorial voice is not completely detached or neutral, but intervenes with reflections and observations not only on her direct personal experiences but also on the inordinately complex and multifaceted political developments of that time.

The characters in the novel are those that surround Lenny: her parents, her Godmother, Electric-aunt, Cousin, her Ayah, Shanta, the members of the Sethi household staff, and the members of Ayah’s coterie of admirers. The characters thus have varying religious and socio-economic backgrounds. Their role and significance in the novel are directly linked with the space and time they occupy in Lenny’s life. Though Lenny comes from an affluent Parsee family, most of her time is spent with her Ayah, and hence we encounter Sikh, Hindu, Muslim characters belonging to the lower economic strata than the affluent Parsee community. Besides, the household staff – Imam Din, Hari, Yousuf, Ayah herself

– and members of Ayah’s coterie – Ice-candy man, Masseur, Butcher, Sher Singh, Sharbat Khan – speak openly and unreservedly among each other in Lenny’s presence, hence we get to hear their thoughts directly; whereas Lenny’s family treats her like the child she is, perhaps even more protectively due to her physical difficulties, trying to shield her from the turmoil and horrors and complex political processes of the larger world. Thus, though we have a Parsee protagonist, we scarcely get the Parsee perspective on partition. The only time we get a comprehensible glimpse into the Parsee community is towards the beginning of the novel, when the Parsees hold a Jashan prayer at the Fire Temple to mark the culmination of World War II and the Victory of the Allied powers. What follows is more significant, as after the holy rites, the community hold something of a town-hall debate and discussion, presided by Col. Bharucha, to deliberate on the most beneficial course of action for the community in case British India is divided into two new countries. In 1944 the Partition is a matter of mere speculation, a distant possibility. Yet the Parsees, a community historically evicted from their own land and forced to migrate to India where they found shelter, pragmatically think it imperative to discuss and decide their allegiances and course of actions well in advance, for whatever political mayhem and shifts and subversions of power-dynamics that the future may bring, in a manner that best secures the peace and prosperity of their minority community.

It is a struggle for power. Who is going to rule once we get Swaraj? ... Hindus, Muslims, and even Sikhs are going to jockey for power ... Let whoever wishes rule! Hindu, Muslim, Sikh, Christian! We will abide by the rules of their land ... As long as we do not interfere, we have nothing to fear. (Sidhwa, 1989, p.39)

The tone of the novel is initially leisurely and anecdotal. But as the narrative proceeds towards Partition, the tone becomes more tense and the pace increases. As the spatial radius of Lenny’s outings with Ayah increases from the lanes surrounding their house and Godmother’s house to various parts of Lahore, the adult world of politics, political changes and their consequences infiltrate into her life, mainly through the discussions among Ayah’s admirers. The aimless light-hearted banter and petty rivalry over winning Ayah’s attention in the Queen’s garden gradually transform in content and tone. The possibility of Partition, and what changes it will entail for them personally come to occupy maximum time. Initially these involve speculations whether partition will happen, whether Pakistan will be formed, debates about the comparative cunning and acumen of

major political leaders – who will trump whom, and who will emerge the winner, and discussions about each other's plans if Lahore falls in Pakistan, ending with pledges of solidarity on the basis of their friendship.

But as the possibility of Partition becomes a certainty, and Punjab is threatened to be ripped in two halves, uncertainties regarding which village and city will fall in which side of the border, thus transforming and formulating every individual's nationality and identity irrevocably, give rise to confusion, doubt, fear. Religious amity gradually changes into skepticism and mutual suspicion. The preeminent criterion for group belongingness and sense of community change – defined no longer by friendship or human relationships but on religious lines – and identities get reformed:

I become aware of religious differences... One day everybody is themselves – and the next day they are Hindu, Muslim, Sikh, Christian. People shrink, dwindling into symbols. Ayah is no longer my all encompassing ayah – she is also a token. A Hindu ... Imam Din and Yousuf, turning into religious zealots, warn mother they will take Friday afternoons off for the Jumha prayers ... Crammed into narrow religious slots they too are diminished: as are Jinnah and Iqbal, Ice-candy-man and Masseur ... Hari and Moti the sweeper and his wife Muccho, and their untouchable daughter papoo, become ever more untouchable ... While the Sharmas and the Daulatrams, Brahmins like Nehru, are dehumanized by their lofty cast and caste marks ... Godmother, Slavesister, Electric-aunt and my nuclear family are reduced to irrelevant nomenclatures – we are Parsee. (Sidhwa, 1989, pp.93-94)

Soon Lahore starts to burn as violence and hatred are unleashed. The frenzied mobs embark upon successive rounds of competitive inhumanity: arson, torture, mutilation, butchery and mindless brutality. Lenny and ayah are invited and escorted by Ice-candy-man to the roof of his tenements to watch the 'tamasha' as a banya with a Gandhi cap is split in half, pulled by two jeeps, and the houses of Hindu locality Shalmi are sprayed with petrol and set ablaze, the explosion escalated by the dynamites stored in them by the Hindus themselves for driving away the Muslims from Mochi Gate.

Once the trains from eastern Punjab start rolling in, with refugees, raped women, mutilated bodies and tales of horror, the vicious circle of violence and vengeance begins. Ice-candy-man becomes its personalized depiction. He was expecting his relatives to arrive from Gurdaspur, when he experiences the trauma, the horror and unhinging shock of the massacres first-hand.

A train from Gurdaspur has just come in ... everyone in it is dead. Butchered. They are all Muslim. There are no young women among the dead! Only two gunny bags full of women's breasts! (Sidhwa, 1989, p.149)

His grief and shock transform into rage, hatred and an uncontrollable urge for violent revenge. His former individual bonds of friendship and fellowship across race and religion are superseded by his identity as a Muslim and his animosity for all non-Muslims.

I lose my senses when I think of the mutilated bodies on that train from Gurdaspur ... that night I went mad ... I lobbed grenades through the windows of Hindus and Sikhs I'd known all my life! ... I want to kill someone for each of the breasts they cut off the Muslim women. (Sidhwa, 1989, p.156)

Yet, violence is inherent in human nature. It is not solely circumstantially or situationally instilled. Hints of Ice-candy-man's innate taste for violence becomes apparent through the thrill and glee with which he observes the '*tamasha*' of Shalmi burning from his roof top, long before he encounters the mutilated bodies and sack of women's breasts in the Gurdaspur train. The direct, intimate contact and connection with the horrific massacre of his kin and community in the train, and his sense of individual and communal victimhood triggers his rage, catalyzing his streak of violence to inhuman proportions. His de-individuation and de-humanization comes full circle when he manipulates Lenny to reveal her Hindu Ayah's location, and then betrays both Lenny and Shanta, whom he had purported to love, by disclosing it to the mob of Muslim *goondas*, resulting in Shanta's abduction.

Sidhwa parallelly portrays the situation in the rural areas through the impact the decision of partition and the partition itself have on the predominantly Muslim village Pir Pindo, where Imam Din's grandson lives, and the neighbouring village Dera Tek Singh inhabited by Sikhs. Initially there is disbelief; partition and communal disharmony seem distant and improbable to communities who have resided side-by-side for generations. During Lenny's first visit to Pir Pindo, when Imam Din gives news of escalating communal violence in the cities to a congregation of Sikh and Muslim elders, his cautionary message is ignored:

All that is in the cities ... It won't affect our lives ... Muslim or Sikh, we are basically Jats. We are brothers. How can we fight each other? ... To us villagers, what does it matter if a peasant is a Hindu or a Muslim or a Sikh? ... The madness will not infect the villages.

(Sidhwa, 1989, pp.56-57)

The situation in Pir Pindo and Dera Tek Singh, the oblivion of the villagers to the tension brewing beyond their tightly knit rural community, parallel the atmosphere in Mano Majra, the setting of Khushwant Singh's *Train to Pakistan*.

Lenny visits Pir Pindo with Imam Din for the second time during the Baisakhi fair. Rumors of violence have eventually penetrated the bubble of harmony, and when they travel to Dera Tek Singh to visit the fair, despite the festive occasion, the tension is palpable, aggravated by the presence of non-resident Akalis. The Muslims are escorted half way back to Pir Pindo by the Sikhs of Dera Tek Singh.

Yet they refuse to accept the reality. Unable to imagine abandoning their lands, their ancestors, their roots, they cling to forced denial. When military trucks come to Pir Pindo to evacuate the villagers, the majority refuse to budge.

Do you expect us to walk away with our hand and feet? What use will they serve us without our lands? Can you evacuate our land?" ... "And what about our harvest ... the crop we have just sown? And our cattle? Who will evacuate them? (Sidhwa, 1989, pp.110-111)

Pir Pindo had no direct access to the events unfolding in the larger world. The messages by the Congress, Muslim League and Sikh leaders over the radio "warn(ing) the peasants not to heed mischievous rumours" and urging them to "remain where they are" (Sidhwa, 1989, p.108) contradicted the word-of-mouth reports they were getting from visiting relatives and friends.

No one realized the speed at which the destruction and the rampage advanced. They didn't know the extent to which it surrounded them ... The uncertainty they faced made them discredit the danger. (Sidhwa, 1989, p.195)

The horrifying massacre of Pir Pindo, the "superhuman inhumanities" inflicted upon the villagers, is retold by Lenny in absentee omniscient narratorial voice, based on Ranna's recounting of his nightmarish experience.

Deepa Mehta's cinematic adaptation of *Ice-Candy-Man*, titled *1947 Earth*, does not cover the entire span of the novel. As the film's title suggests the focus is solely on the Partition of British India and the horror and violence it instigated. The film begins with Lenny wondering if India will be partitioned, and if the line of demarcation will go through their house. The film is exclusively set in Lahore, leaving out Sidhwa's depiction

of the rural landscape and the impact of Partition on the village communities. The film follows the text closely as far as the incidents in Lahore involving Ayah's coterie are concerned, but excludes the Parsee characters except Lenny's immediate family. Though the film begins and ends with adult Lenny's voice-over, the incidents are not shown from the personal perspective of Lenny, but through the detached, omniscient view of the director's camera.

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# A STUDY OF EDUCATIONAL THOUGHTS AND CONCEPT OF MAHATMA JYOTIBA PHULE AND THEIR RELEVANCE TO PRESENT EDUCATIONAL SYSTEM

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**Abstract :** In 19th century one of the greatest philosopher and educator is Jyotiba Phule. his educational thought and social views were very modern. he was always active in the development of all levels of the society, forgetting the social differences and committed to spread education irrespective of caste, classe, community and gender. He used education as one of the tools for the development of the country and nation. This work has been done to explore the current relevance of his philosophical and educational thoughts. In doing this work we have not on the highlighted her Educational views as well as his contribution to women's education and also focusing how his thoughts are helping to reform or develop various aspects of present education system. This Research work is based on data collection by using self made questionnaire form 60 teachers in schools and colleges in Murshidabad district of West Bengal. As a result it is clear that his Educational thoughts have considerable importance in current education system and the women empowerment. His thoughts play a significant role to reform present education system in India.

Keywords : social equality, women empowerment, creative education, downtrodden people , oppression .

## **1. Introduction :**

“Without education wisdom was lost; without wisdom morals were lost; without

morals development was lost; without development wealth was lost; without wealth the Shudras were ruined; so much has happened through lack of educations.”

Mahatma Jyotiba Phule

This paper is an attempt to discuss the educational thoughts of Jyotiba Phule a global philosopher in 19th century. He raised the problem of women's oppression and his thoughts on resolving women's oppression through their own efforts and autonomy makes him join the company of other 19th century western philosophers and male feminist like J.S. Mill and F. Engels. In the small work I would like to focus on the educational thoughts of Mahatma Jyotiba Phule and their relevance to present educational system.

Phule suggested compulsory, universal and creative education. Educations of women and the lower caste; he believed, deserved priority. He opened girl's first school India in August in 1848 and 2 more schools during the 1851 -52. Thus the pioneering work done by Phule in the field of female and lower castes education was unparalleled in the history of education in India. Phule was the first Indian social reformers who repeatedly urged the alien government to pay attention to primary education which was neglected.

Jyotiba believed in equality of men and women. He stressed on women's education, emancipation of women. He brought women in public life. He said equality and oneness is necessary for the development of the country. In order to empower the women, he opposed child marriage. He initiated widow- remarriage and started a home for widows. Exploitation of women and underprivileged class and protection of human rights all these issues and their rational humanist treatment was the agenda of the philosophy of Phule.

## **2. REVIEWS OF RELATED LITERATURE :**

R. Mukherjee, [2023]: – “Legacy of Mahatma Jyotiba Phule on Women's Empowerment”-Conducted a study on Mahatma Jyotiba Phule's social revolution. Mahatma Phule is hailed as the father of the social revolution in India but not many know that he was the original architect of Indian's gender revolution as well. Mahatma Phule fought all his life fought women and educating them, his aim was that all lives should be treated equally. He was the first Indian citizen to advocate

the ideas that primary education should be compulsory and free. Mahatma Phule's feminist thought has evolved out of intuitive understanding, respect for the dignity of all human beings and belief in their equality.

R. Sumedh B. [2023] :- “ Mahatma Jyotiba Phule And Satya Shodhak Samaj: A Social Reform Movement In Maharashtra in the second half of 19th century” – He want to focus on Mahatma Phule's fight for women education. He fought all his life for women, to educate them and to give them equal opportunities. Jyotirao saw that a thousand teachers or masters could not mould a child more than an educated mother. In this study he focused on his philosophical aspect, his thoughts about the women and his contribution to construct a society with equality by empowering women.

Dr. B. Mathur, [2022]: – “The Ideology of Mahatma Jyotirao Phule and its influence on society today “- The purpose of his study is to show how Mahatma Jyotirao Phule's ideas has influenced the modern society. Mahatma Jyotirao Phule was a social reformer and educator in India. In many aspects, his contribution to modern society is enormous and significant. He impacted nationalism, gender equality, corporate social responsibility, community development, and secularism ideology.

S. Shamarai and Dr. Sarvodaya S.S [2018]: “Socio Educational Philosophy of Jyotiba Phule” – In this paper they want to focus on social and educational history of India, Mahatma Jyotirao Phule and his wife Savitribai Phule stand out as an exceptional couple. They were engaged in a passionate struggle to build a movement for equality between men and women and for social justice. Recognising that knowledge is power and that the progress of women and lower class was impossible without it, they dedicated their entire life for spreading education.

Dr. D. R. Sirswal, [2013]: “Mahatma Jyotiba Phule: A modern Indian Philosopher” - The main focus of the study is The essential concept of women empowerment. “The dominance of men over women is an age-old practice, but after the advent of democracy and democratic institution, almost every nation recognized the freedom, equality and human rights of women. Now, women are entitled to live with self-respect and dignity by exercising various rights to women in the past and its ongoing effects in the present should be properly addressed by way of empowering women in all spheres of social life.”

Dr. A. M.Goure, [2013]:– “ Jyotiba Phule : Global Philosopher and Maker of Modern India”This paper is an attempt to discuss Jyotiba Phule as global Philosopher in 19th century. He initiated social change in 19th century India especially inMaharashtra through his Philosophy. He raised the problem of women’s oppression and his thoughts on resolving women’s oppression through their own efforts, an autonomy makes him join the company of other 19th century Western Philosophers and male feminists like J.S Mill and F. Engels.

### 3. OBJECTIVES OF THE STUDY:

- To analyse the educational thoughts of Phule with special emphasis on women’s education.
- To identify the areas where Jyotiba Phule’s view points on education may be found relevant for Modern Indian Settings.
- To make suggestions for the improvement of the contemporary Indian Educational system.

### 4. RESEARCH QUESTIONS :

- What are the educational systems and women education proposed by Jyotiba Phule?
- What is the impact of Mahatma Jyotiba Phule’s educational thoughts in the present Indian education system?
- How would we improve the contemporary Indian Educational system through phule’s opinion?

### 5. Methodology :

5.1 Sample : The samples of the present study are the different higher secondary schools and colleges from Murshidabad District. Researcher has collected total 60 samples from the different schools and the colleges. Here is the list of the school and colleges and the number of male and female teachers and professors of that concerned schools and colleges of Murshidabad District.

Table: 1: list of selected schools and colleges from Murshidabad for the study:

<b>NAME OF THE SCHOOLS AND COLLEGES</b>	<b>LOCATION</b>	<b>TOTAL NUMBER OF TEACHERS AND PROFESSORS</b>	<b>NUMBER OF MALE TEACHERS AND PROFESSORS</b>	<b>NUMBER OF FEMALE TEACHERS AND PROFESSORS</b>
<b>CHHABGHATI K.D VIDYALAYA</b>	<b>AURANGABAD, MURSHIDABAD (RURAL)</b>	<b>15</b>	<b>08</b>	<b>07</b>
<b>AURANGABAD B.ED COLLEGE</b>	<b>AURANGABAD, MURSHIDABAD (RURAL)</b>	<b>15</b>	<b>10</b>	<b>05</b>
<b>ENGLISH ORIENTAL ACADEMY</b>	<b>HAPANIA, MURSHIDABAD (URBAN)</b>	<b>15</b>	<b>06</b>	<b>09</b>
<b>NUR MOHAMMAD SMRITI MAHAVIDLAYA</b>	<b>DHULIAN, MURSHIDABAD (URBAN)</b>	<b>15</b>	<b>08</b>	<b>07</b>

5.2 Area of study : the study was conducted with different schools and colleges mainly murshidabad district in West Bengal.

5.3 Tools : For the present qualitative and descriptive research study, a self made questionnaire is used as a tool by the researcher. The questionnaire is verified by the guide. The questionnaire consists of 8 closed ended questions with multiple answers options.

5.4 Procedure: The researcher has visited some secondary government and private schools and some colleges of Murshidabad district and interacted with the teachers and professors of that concerned institutions. She requested them about filling up the questionnaire. The time allotted 20 minutes. She also explained each item of the tools to the teachers and professors. Finally the researcher collected the sheets. After collecting the raw data, analyses of data have been done by using descriptive statistics with the interpretation and analysis method. After this a conclusion will be drawn on the analyzed data and the whole topic.

## 6. Results and Discussion :

Q:1 What are the educational systems and women education proposed by Jyotiba Phule?

social justice and equality. In fact he saw education as the harbinger of a social revolution. The essence of the philosophy of Mahatma Phule was that 'education is a human right.' He was indeed the protagonist of the ideas of universalisation of educational opportunities. Jyotiba Phule was the first Indian educationist whose pragmatic views on education were honoured by the British rulers of India at that time. His thoughts and ideas were revolutionary. His single most concern was universalisation of primary education. He concentrated on such aspects as the need for primary education, the essential qualities to be possessed by primary school teachers and the curriculum of primary education. He gave importance to the upliftment of lower castes and women through education and took necessary steps for achieving this.

To answer this question among out of 60 samples 40% male and 30% female teachers and professors are think that the statement is 100% true with this present condition., because without education we cannot overcome from all this social stigma, education is the only thing which can help the people to change their point of view. By educating people we can change our society, that is the only way, and that was described by Mahatma Phule. 15% male and 15% female teachers and professors give the average response to the statement is still relevant to the present educational system, because they thought that Indian people are educated enough to think that what is good for our society and what is bad for our society. But they all agree that statement. None of the among are disagreed with this statement.

As all the male and female teachers and the professors are aware about the value of education, they are trying to uproot the illiteracy from the grass root level. They all are agreed with the statement made by Mahatma Jyotiba Phule. Education is the only weapon by which we can fight to all the social problems. By educating people we can solve all these problems, among of these 70% of positive response given people who are agreed with the statement given by Jyotiba Phule, 50% male and 20% female teachers and professors are from the urban area and from the 30% average response,

20% male and 10% female teachers and professors are from rural areas are agree with this.

The main contribution of Jyotirao Phule was to launch the first school for girls from the lower strata of society. He also pioneered the anti-caste movement and promoted education for women. Jyotiba Phule made a significant contribution to women's empowerment and lower caste girls' education. He put a lot of effort into emancipating women and ending caste and untouchability. He saw the future and for that he want to educate the girl child, because women are the pillar of a society. They can make the society beautiful in all aspects.

The main barriers to the girls child educations are -poverty, child marriage and gender-based violence that is normally seen throughout the country and the different communities, especially in lower caste communities. Poor families often favour to invest in boys education rather than the girl child education. In some places, schools do not meet the safety, hygiene or sanitation needs by the girl students also. To answer this question among out of 60 samples 40% of male and 35% female teachers and professors are think that the statement is still relevant to the present scenario. But 15% of male and 10% of female teachers thought that it is not appropriate in the present scenario, because they think that the present conditions are totally changed. Government has launched so many schemes for the lower caste, and maximum girl child are now under the mandatory Sarbasiksha abhijan to complete the primary education and upper primary education. But though all the above facts are true, girl child must be educated up to higher secondary level and so on. That leads our country at the first row and made our country a 1st world country.

Q:2 What is the impact of Mahatma Jyotiba Phule's educational thoughts in the present Indian education system?

Phule's bold efforts to educate women, Shudras and the untouchables had a deep effect on the values, beliefs and ideologies relating to the movement for social justice through education. His efforts unleashed the forces of awakening among the common masses. Education made women more knowledgeable. They became conscious of the differences between the right and the wrong and could analyse these differences with a scientific approach. They began to question the age-old customs which degraded them. Similarly, Shudras started claiming equality with upper castes in all areas of

life. In short, Jyotiba Phule launched a movement for liberating women and Shudras from the control of vested interests and laid the foundation for a Backward Class Movement in India.

In order to know the impact of Mahatma Jyotiba Phule's educational thoughts in present Indian education system, researcher collected data from four different schools and colleges from Murshidabad district, in West Bengal and she collected total 60 sample papers. In this case researcher is trying to analyse the collected information based on the categorical variables.

In today's educational scenario Phule's thoughts on education are very relevant. As we know, today education has been mostly reduced to information transmission. There is always a fear of examination because of bookish education. But for Phule knowledge was not just information. It involves questioning, understanding critiquing and interpreting knowledge. As early as in the 19th century Phule had given alternative education models. For him, 'Education is the power to think clearly, the power to act well in the world's work, and the power to appreciate life'. For Phule knowledge matters because it can question, change and transform the individual and society. Education can empower and make society more democratic. It can help in reconstructing, rethinking and in interpreting tradition. This thought of Phule is extremely relevant in the paradoxical context of caste in contemporary India- where despite constitutional provisions, caste discrimination is widespread. To answer this question among out of 60 samples 40% of male and 40% female teachers and professors are think that the impact is still effected in present Indian scenario, because all the impacts are as useful as before. But 10% of male and 10% of female teachers thought that it is not fully appropriate in the present conditions, because somewhere in India the caste discrimination, gender biasness, etc are not abolished totally, It is still persists in some communities, to overcome this and make our nation to be a Proud country we have to work hard and look after all these matter seriously, and for this education is the only weapon to us to fulfil the dream of Jyotiba Phule. No one among the male and female teachers and professors has given the negative reviews.

Table : 2 : Gender wise response on the Impact of Jyotiba Phule's Educational Thoughts:

TYPES OF GENDER	POSITIVE RESPONSE	AVERAGE RESPONSE	NEGATIVE RESPONSE
<b>MALE TEACHERS AND PROFESSORS</b>	<b>40%</b>	<b>10%</b>	<b>NILL</b>
<b>FEMALE TEACHERS AND PROFESSORS</b>	<b>40%</b>	<b>10%</b>	<b>NILL</b>

Phule also sought an education system that would educate the masses to think critically and to exercise their own independent reasoning rather than mechanically accepting assertions by persons in positions of authority. To Phule, the chief evil in Brahmanical domination over the masses was the promotion of unquestioning faith in religious texts and authorities that were imposed as divinely imposed. He strongly critiqued unthinking belief, superstitions and rituals, and sought to lay these open to empirical and logical rational inquiry. Phule argued that the first step to the liberation of the lower castes was to bring them out of the ideologies of Brahminism. To understand the system of oppression in order to be able to dismantle it, Phule's views on education were closely in consonance with the thoughts expounded. The goal in promoting education for the masses was not simply to temporarily raise the temporary standard of living for a few individuals, but to reshape the entire future of the nation. Jyotiba Phule included all children which included boys and girls and her special concern was for those ostracised by oppressive caste practices. He was the man who challenged gender stereotypes, caste hierarchies and stands as a stellar role model to all those who want to usher in a new social order. . To answer that what is a role of a ideal teachers as per Mahatma Jyotiba Phule's educational thoughts in present Indian educational system ,among out of 60 samples 30% of male and 20% of female teachers and professors are agreed with role of an ideal teacher as per Mahatma Jyotiba Phule's thought in present Indian scenario, are from the urban area, and 25% of male and 15% of female teachers and professors are from rural area , who thinks that the impact is still effected in present Indian scenario, because all the impacts are as useful as before. But 3% of male and 2% of female from rural area and 3% male and 2% female from urban area thought that all the impacts are persist in the present educational system but there are some places where all the impacts are

not work properly. So we have to look after this matter to solve the problems from the root level. No one among the male and female teachers and professors has given the negative reviews

Table : 3 : Location wise response on the Impact of Jyotiba Phule's Educational Thoughts:

<b>TYPES OF LOCATION</b>	<b>POSITIVE SPONSE</b>	<b>RE- AVERAGE RESPONSE</b>	<b>NEGATIVE RESPONSE</b>
<b>MALE TEACHERS AND PROFESSORS FROM URBAN AREA</b>	<b>30%</b>	<b>3%</b>	<b>NIL</b>
<b>FEMALE TEACHERS AND PROFESSORS FROM URBAN AREA</b>	<b>20%</b>	<b>2%</b>	<b>NIL</b>
<b>MALE TEACHERS AND PROFESSORS FROM RURAL AREA</b>	<b>25%</b>	<b>3%</b>	<b>NIL</b>
<b>FEMALE TEACHERS AND PROFESSORS FROM RURAL AREA</b>	<b>15%</b>	<b>2%</b>	<b>NIL</b>

Q:3 how would we improve the contemporary Indian Educational system according to his opinions ?

It's absolutely true that the future and overall development of any country depends upon the fact that how educated its citizens are. Though, gaining a professional degree is not possible for everyone due to various reasons, but what actually matters is the basic education. That is, one should know how to read and how to write. India has shown significant improvement in education since 1947 until today. However, we believe that there is always some room for improvement in every field. Education is the top priority of nations across the India. Initiatives to help children attend school and improve the quality of education can change the scenario of growth and prosperity. Improving the quality of education in the school will create an enabling environment that will embed the concept of lifelong learning. The students will remain enrolled in the school and learn and become enablers and productive whereby they can participate in nation-building. These are some criteria how would we improve the Indian education system, we can introduce skill based learning - Schools should

be allowed to provide skill based training. It can be done best by recognizing the areas of interest on any student. We can focus on the rural education - We should have schemes and schools that provide good education to children living in villages. Also, it should be assured that good and experienced teachers are there to impart education to children. We can improvise the free basic computer skill - The reason that we suggest this point is very straightforward. It is the era of Information Technology and hence, education is nearly incomplete without having basic computer training in it. Teachers Training is the most important part to improve the education system. Teachers should be trained in such a way that they know their rights as well as duties. We can start the smart classes and the E- library- Though many of the Indian schools and institutes are already following this concept, but we should take a step where all educational institutes can be connected with the concept of smart classes. With the help of different audio-video devices, multimedia concepts and other necessary IT elements, we can make our students learn and understand in a much better and modern way. Health education is the other way to improve the educational system, We should try to include Yoga or various other workouts in our education system so that children get to learn the value of good health and maintain the same. We can try for some subsidies and grants for professional courses, in the way aspiring students will not have to leave their studies in between due to their personal financial limitations. And least but not the least we have to educate the parents because educating parents is equally important so that they do not force their children for Career which do not actually interest them. Also, necessary steps should be taken to augment and improve the communication between teachers and parents.

In this era of globalization and technological revolution, education is considered as a first step for every human activity. It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living. Indian education system has changed now, the new curriculum is added in the system but Considerable improvements have been noticed in the urban areas but in the rural areas the situation is little bit poor. A widening gap is very much discernable between the achievement levels of the urban and rural students. This needs to be studied and addressed so as to identify and rectify the various factors that have been behind the gulf. This would help the stake holders to frame policies and take appropriate measures to improve the educational system of India. Here is a graph to show the thoughts, and the mentality of the male and female teachers and

professors from rural and the urban area to improve the quality of contemporary Indian Educational system.

### **7. Conclusion:**

Today education has been reduced to transmitting information. There is a fear of examination because of bookish education. Little bit we have to be practical in system, we have to brought life oriented education. In this context, Mahatma Jyotiba Phule's education system is still very relevant. For him knowledge was not just information. It involves questioning, understanding, critiquing the knowledge. Interpretation, critique and values all three are the central idea to Phule who way back in the 19th century gave an alternative option to the information approaches to knowledge. For him, " Education is the power to think clearly, the power to act well in the world's work, and the power to appreciate life." For phule knowledge matters because it can question, change and transform the individual's life and the society. Thus education can empower and make society more democratic. It can help in reconstructing, rethinking, interpreting tradition. This aspect of phule is extremely relevant in the paradoxical context of caste in contemporary India , where despite constitutional provision, caste discrimination is widespread. In the end it is also added that the philosophy of Mahatma Jyotiba Phule was based on justice , equality , liberty, and the fraternity. All the suggestion given by him as right to education to all, specially for women, minorities, downtrodden etc. Government should take different action in the schools and the colleges specially in the rural area about these matter.

We are now in 21st century, though all the educational thoughts of Mahatma Jyotiba Phule is still relevant to the present educational system. Education should plead democratic way of life and the nation should become "one nation" through education. The policy of state education should free and compulsory up to the age of 12. It should be co-related to the life and children should be pragmatic and be able to learn from their everyday life experience. Education in rural area should be suitable to rural conditions and well planned. Education should discover the talents among the learners and help them to progress, according to their ability. Education of the lower caste and the shudras could over throw their slavery of the upper caste. Education should make the upper class to realize the basic fact that all men are equal and free and boldly plead and practice the humanitarian principles. Education along could destroy the beastly tendencies in human being. Right type of education is needed to those who exploited the masses.

Only through the education the scientific progress of nation and green revolution would become truth. Primary education should be compulsory for each and every child of India, The medium of instruction for education should be in mother tongue, the curriculum in Rural and Urban area should be different. Technology, moral science, arts and the monetary value should be taught in the school. Subjects relating to agriculture, hygiene, cottage industry, and small scale industries and various arts and crafts should be taught in schools. Secondary school education should be more practical and well equipped to child to face the future life. Due to phule's women educational movement, a long change can be noticed. As a result the rate of female education in the present society has increasing rapidly. Therefore, judging from all aspects, it can be said that not only the society and education system of that time, but also in the present educational system in this 21st century, his contribution is relevant. Therefore various aspects related to his educational thoughts need to be include in the curriculum. He still revered and remembered today for his educational contribution to the modern Indian educational system.

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Barnita manna Gupta

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# THE ROLE OF WOMEN IN INDIAN ARMED FORCES SINCE INDEPENDENCE

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## **Abstract**

Women have played a substantial role in warfare since ancient times in India. Since India gained independence in 1947, women have played an increasingly significant role in its armed forces. Their contributions have evolved from support roles to active combat and leadership positions. This paper examines the historical progression of women's roles in the Indian armed forces, their gradual increase in the armed forces of the military, highlighting the challenges and advancements in gender integration within the military. The paper starts with a structural breakdown of Indian military and paramilitary forces, and shows how the situation regarding induction of women changed as time progressed. It proceeds to focus over some of the key events that played a big role in the change and finally concludes that although there has been a gradual, albeit fluctuating trend of increase of women in the armed forces, they still face substantial challenges in many aspects. Steps should be taken to address these issues.

**Keywords:** Women, Military, Paramilitary, Empowerment

## **Introduction**

Indian armed forces have changed and evolved substantially since Independence. One of the key evolutions has been the participation of Women in the armed forces. Although ancient India has a history of producing capable female warriors, after independence Women's contribution in the Indian military was initially limited to medical and support roles. Subsequently women's participation has expanded to include combat roles and leadership positions. However, challenges still exist . This research paper explores this

evolution, analyzing the structural breakdown of Indian Armed Forces, historical context, key milestones, and the impact of women in the armed forces during both wartime and peacetime while discussing the challenges women face in Indian armed forces. This paper excludes the state police forces, as well as non-combative forces such as Border Roads Organization(BRO), and National Disaster Response Force (NDRF) as these organizations are not created keeping military combat in mind.

There has been severe debate on whether women should be allowed to join the armed forces, and to which extent they should be able to join. There are issues regarding effectiveness of the organization, empowerment of women, role of military in the society among many. The condition of women was appalling during the era of India's independence. India was and is still considered as a misogynistic patriarchal society by many, where women are looked down as weak and vulnerable by society, especially by men. But in the present context, women are engaged in earnings or jobs both in rural and urban areas across sectors such as the military, education, etc. (Krishna 2017). Aside from the standard benefits of inclusivity, there are certain areas where participation of women in the military has a proven positive impact. For example, In the United Nations, it has been observed that "women peacekeepers broaden the range of skills and capacities among all categories of personnel, enhance the operational effectiveness of all tasks, and improve the mission's image, accessibility, and credibility visà-vis the local population" (UN 2015). In 2007, the United Nations' first all-women peacekeeping force of 105 Indian policewomen were deployed to Liberia.

However, there are concerns about adverse effects on the efficiency of the military due to women joining, especially in combat roles. Various authors have pointed out universal issues related to Women joining combat arms ( Kamark 2016). According to Kamark, Research on cohesion and performance in mixed-gender military groups is inconsistent, with some studies finding higher levels of conflict and tension, and some studies showing no effects from gender diversity. Nevertheless, other studies have shown that women in predominantly male settings are "treated with hostility and less socially integrated by their male co-workers."<sup>[1]</sup> Others have pointed out India specific probable issues (Bhattacharyya 2012). Some of the common issues associated with women in military are the lack of infrastructure, issues of sexual harassment, patriarchal mindset of soldiers among others.

## **Structural Breakdown of Indian Armed Forces**

When it comes to the classification “Indian armed forces” the branches that are mainly referred to are the ones under Indian Ministry of Defence (MoD). The branches which has the MoD as it’s governing body are-

- Indian Army (IA)
- Indian Navy (IN)
- Indian Air Force (IAF)
- Indian Coast Guard (ICG)

However, MoD is not the only governing body which overlooks the Armed services. Indian Ministry of Home Affairs (MoHA) has been the Governing body of the following organizations, unofficially referred to as the Paramilitary forces of India. By 2024, 8 such organizations exist-

- Border Security Force (BSF)
- Central Industrial Security Force (CISF)
- National Security Guard (NSG)
- Central Reserve Police Force (CRPF)
- Indo-Tibetan Border Police (ITBP)
- Railway Protection Force (RPF)
- Sashastra Seema Bal (SSB)
- Assam Rifles (AR)

The Cabinet Secretariat of India also overlooks the following armed organizations-

- Special Frontier Force (SFF)
- Special Protection Group (SPG)

Altogether, these are the organizations which, along with the various state police forces, make up the Indian armed forces.

## **Historic Context up to Indian Independence**

From the pre-British and British era, the Indian subcontinent has produced some capable female warriors who were combat leaders. Notable examples include Rani Lakshmibai, Rani Durgavati among others. However, the British Indian Military, which is the precursor of the modern Indian military, did not have any provision for women up until 1888. In 1888, the British Indian Army (BIA) established a military branch known

as the Indian Military Nursing Service (IMNS), which recruited female nurses. This was the first time that the BIA recruited female service members into its ranks.<sup>[2]</sup> The role of women kept gradually increasing as time passed. Women like Noor Inayat Khan were serving in British intelligence apparatus, the Special Operations Executive (SOE) during World War 2. Most importantly, in 1942, Women's Auxiliary Corps of India or WAC(I) was created to help the BIA. These women would serve in clerical or administrative roles. A total of 11500 women, mainly from the Anglo-Indian community would serve. The WAC(I) had an autonomous Air Wing, which served as the Indian counterpart of the WAAF: the women operated switchboards and similar duties at airfields and air headquarters (AHQ). In the earlier part of the war there was likewise a Naval Wing. This department was formally hived-off, in 1944, to become: the Women's Royal Indian Naval Service (WRINS), with its own uniform.<sup>[3]</sup> However, aside from BIA, we need to look at Indian National Army (INA) to understand the situation of female soldiers in India pre-independence. INA is not a direct predecessor of the modern Indian military but it still played a big role in shaping up modern practices. INA had the Jhansi regiment, led by Captain Lakshmi Sehgal. By 1944, Jhansi Regiment had 500 female troops with combat training.<sup>[4]</sup> However, they did not see combat by choice, although they did suffer casualties during retreat after Fall of Rangoon.

### **Situation during and after Independence (1947-92)**

With the independence of India taking place, Indian military found itself in a peculiar situation. On one side, the creation of Pakistan resulted in BIA breaking into the the Indian military and the Pakistan military. This resulted in the loss of manpower on all branches of the military, and the resources it had stretched thin. The newly independent country didn't have stability in many of its regions, and it got Invaded by Pakistan in 1947. Due to this, Indian military had to do military operations frequently, and they needed personnel. However, Army Act, 1950 prohibited any of the armed forces of India from recruiting women in regular services. The Government of India issued Army Instruction 274/50 to set the terms and conditions of the grant of regular commission in the Military Nursing Service (MNS) forming part of the regular army, and the members of the erstwhile IMNS got absorbed as officers in MNS. This included the regular military branches as well as the reserve forces and the Territorial army except "such corps, departments or branches

which the central government may specify by way of notifications.”. Women were allowed to participate only in auxiliary forces<sup>[5]</sup>. However, the situation started changing by 1958 when the Medical corps started appointing female doctors in their ranks as a regular commission.<sup>[6]</sup> Other services were quick to induct females in their ranks albeit with restrictions. The Navy opened up in 1961. By October 1976, Dr. Barbara Ghosh became the first woman officer in the Indian Navy to attain the rank of commander<sup>[7]</sup> while the Air Force waited until 1971 when Vijayalakshmi Ramanan, was commissioned into the Army Medical Corps and was seconded to the Air Force.<sup>[8]</sup> Among the paramilitary organizations, some were more progressive than others. Arguably, first paramilitary force to open up positions for women was SFF, which inducted 500 female recruits in 1972.<sup>[9]</sup> They were followed by RPF in 1984, and CRPF in 1986. The first paramilitary force to have a dedicated role for females was CISF which started inducting women as constables in 1987, and Officers (SI) in 1990.

### **Situation after 1992**

1992 was in many ways a watershed moment for female participation in the Indian military. On 30 January 1992 The Union Government issued a notification named SRO-11<sup>[10]</sup> making women eligible for appointment as officers in the specific branches/cadres of the Army. These included Army Postal Service; Judge Advocate General’s Department; Army Education Corps; Army Ordnance Corps (Central Ammunition Depots and Material Management); and Army Service Corps (Food Scientists and Catering Officers). Another notification named SRO-1<sup>[10]</sup> dated 31 December 1992, expanded the eligibility of Women for enrollment in the following corps/departments of the regular Army- Corps of Signals, Intelligence Corps, Corps of Engineers, Corps of Electrical and Mechanical Engineering, Regiment of Artillery. All in all aside from frontline combat units, women were now eligible to join all the other departments.

This resulted in a massive increase in the number of female personnel in Indian military and paramilitary organizations. For example, IAF authorized female personnel as officers in 1993.<sup>[11]</sup> ICG started training women since 1997 as a permanent appointee as Assistant Commandant in General Duty (GoI 2019). As time has passed, among the paramilitary forces, institutions such as BSF(2009)<sup>[12]</sup>, SPG(2013)<sup>[13]</sup>, SSB(2014)<sup>[14]</sup>, AR (2016)<sup>[15]</sup>, ITBP(2021)<sup>[16]</sup> have started admitting females in them. NSG, however, as of

2024 still doesn't have any female representation.

### **Situation during modern times (2010-2024)**

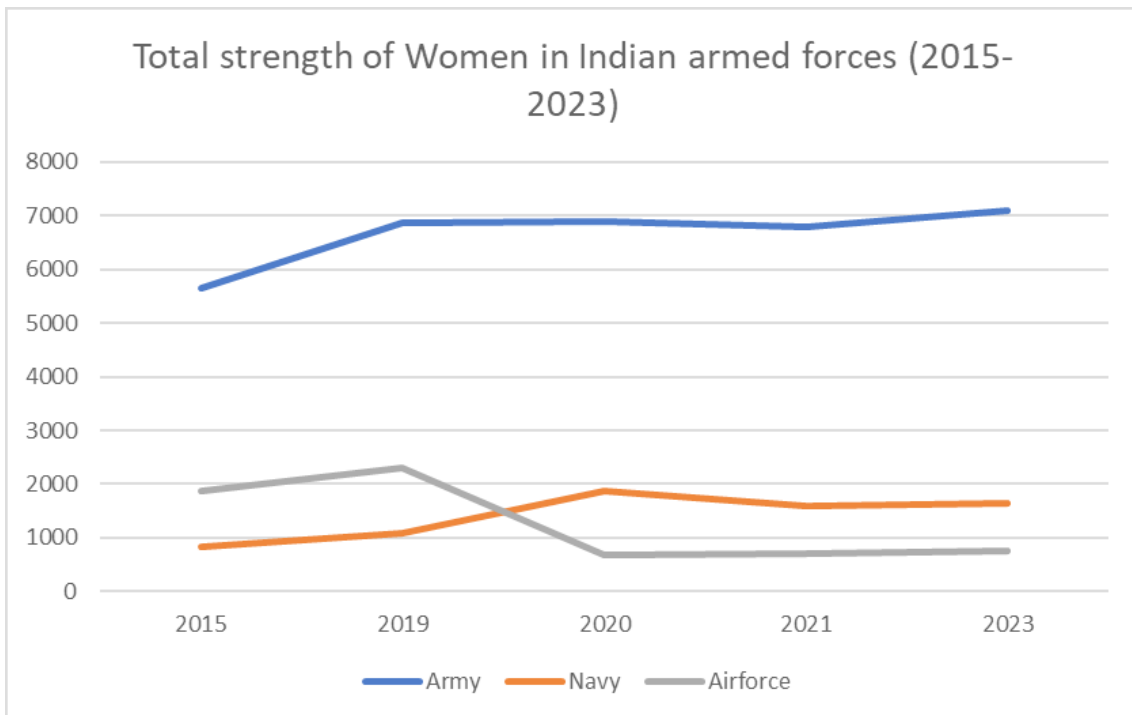
Consequently, the Supreme Court of India in the year 2010 made a verdict that each woman may be assigned to act in combat actions and also get command posts along with their male counterparts and permanent commissioned posts shall be available from the government (Lama and Paul 2020). As time has passed, the increasing recruitment of women in the armed forces as something imposed on them or that they voluntarily seek for, the roles assigned to women in the armed forces are becoming increasingly diversified. The Supreme Court of India made a judgment in response to the complaints filed by women officers against the short service commission (SSC). SC Supported the notion that women and men officers should be treated equally. A recent order was made by the Supreme Court on extending permanent service to female officers, which applied to their male counterparts only, that is, a move toward gender equality and women emancipation. The recent SC ruling and HC judgment to allow a permanent commission to women has made all the three services to consider the future role of women in the Indian Armed Forces.

Across the country, the strength of women in the three services was 3653, whereas the strength of men was 62,507 in the year 2018 as per the data presented in the Parliament (Bhatia and Devulapalli 2020). Recruitment in the armed forces is highly skewed and men still monopolize the key positions, but over the years the number of women in the armed forces has increased albeit in a fluctuating manner. In 2008, Women Officers in AEC and JAG were granted permanent commission. Since then, the time limit for them to serve in the army has been extended to 14 years. With the implementation of the permanent commission of women, they now receive the same benefits that are being received by the male officers<sup>[17]</sup>. The following table shows the total strength of women in the three services under the Ministry of Defence. The Number of women in the Armed Forces in the coming years is likely to increase with the implementation of the permanent commission (Table 1).

Year	2015	2019	2020	2021	2023
Army	5660	6868	6892	6796	7093
Navy	819	1077	1878	1602	1636
Airforce	1871	2302	685	696	748

Source: Government of India<sup>[18][19][20]</sup>

Table 1: Total strength of Women in Indian army, navy, airforce (2015-2023)

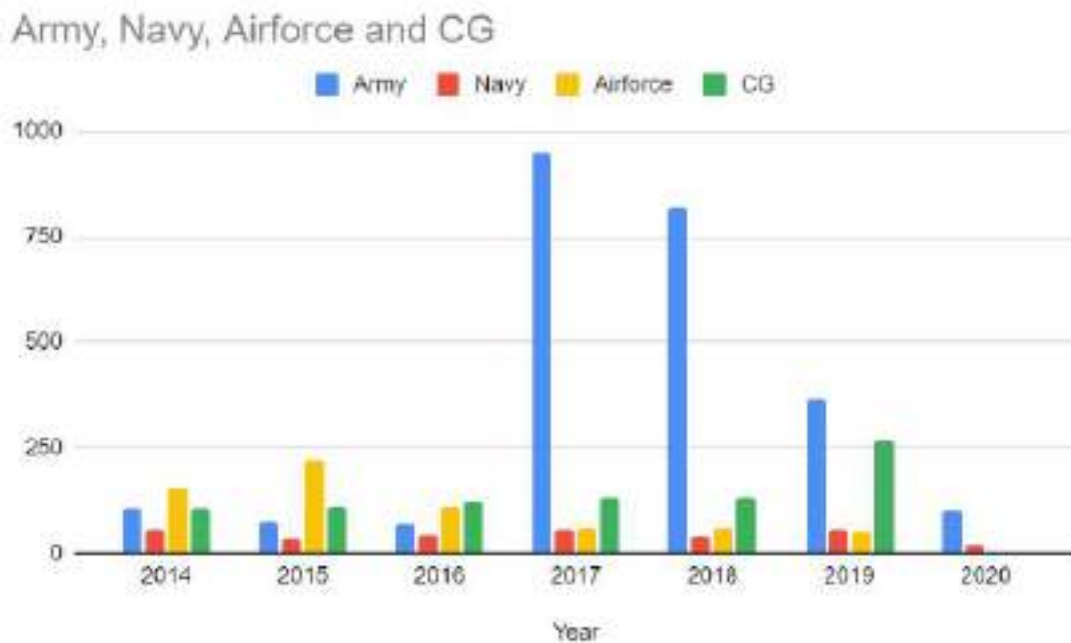


The Induction of Women in the armed forces have gradually increased albeit with fluctuations. The army has seen the largest gradual strength increase in absolute terms. The Navy and Airforce meanwhile, has seen fluctuating trends. As the Indian Coast Guard is also a part of the Ministry of Defence, it can also be called a military service. The Coast Guard has seen the most steady positive increase. The data in Table 2 shows the increasing yet fluctuating induction of women in all the four wings of the armed forces under the Ministry of Defence.

Year	2014	2015	2016	2017	2018	2019	2020
Army	104	72	69	949	819	364	102
Navy	57	35	43	57	38	54	18
Airforce	155	223	108	59	59	51	00
CG	103	108	123	130	133	266	NA

Source: Government of India <sup>[21]</sup> <sup>[22]</sup>

Table 2: Number of Women recruited in Indian armed forces



Regarding the situation of the paramilitaries, the Ministry of Home Affairs on 5.1.2016, declared through a govt notice that all CAPF institutions would need to have 33% reservation for women.<sup>[23]</sup> This has resulted in some increase of the female personnel in these forces. However, they have not managed to fulfill their target quota till 2021. Table 3 shows the number of women recruited into the six paramilitary organizations from the period 2016 up to 2021 .

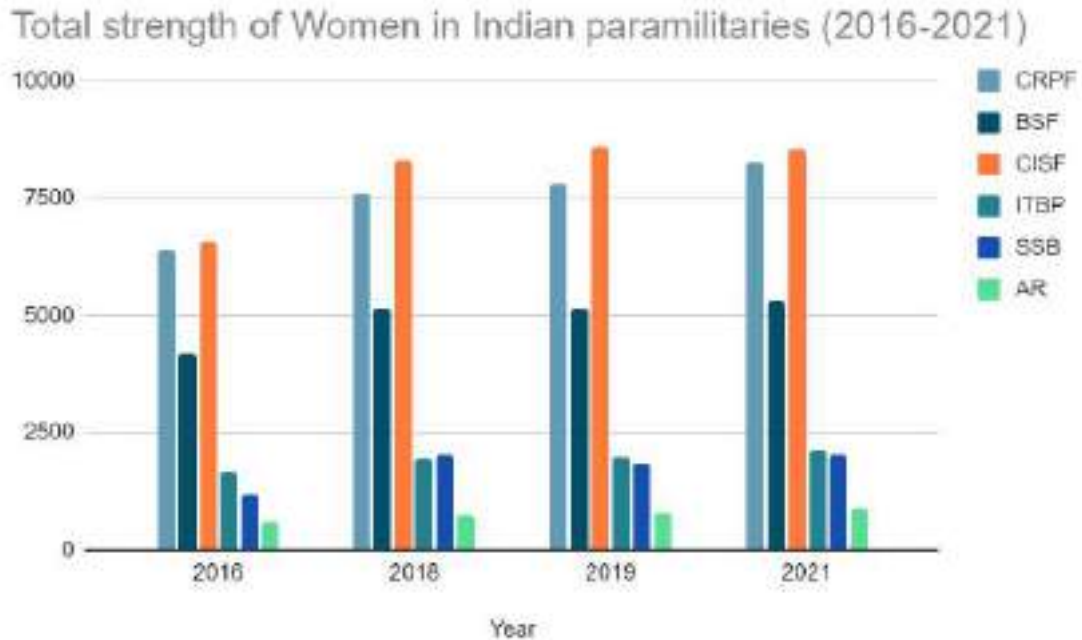
Year	2016	2018	2019	2021
CRPF	6385	7607	7824	8248
BSF	4179	5138	5129	5319
CISF	6546	8303	8588	8557
ITBP	1662	1956	2000	2106
SSB	1204	2040	1817	2052
AR	592	755	790	885

Source: Government of India <sup>[24]</sup> <sup>[25]</sup> <sup>[26]</sup>

Number of Women recruited in Indian armed forces



Table 3: Total strength of Women in Indian paramilitaries (2016-2021)



### Challenges faced by Women in Indian armed forces

Women in Indian Armed forces have faced various challenges over the years, even after being able to enter the forces. Among some of the notable issues is lack of Infrastructure. The adequate infrastructure needed for women are not present in many places. For example, in 2024 Indian Coast guard admitted that their ships are not designed for Women.<sup>[27]</sup>

The issue of Sexual harassment is also prevalent. There has been many cases of harassment, abuse towards the female personnel in the military across the years.<sup>[28]</sup> To prohibit any kind of harassment against women in the workplace, Visakha Guidelines and the Sexual Harassment of Women at Workplace (Preventive, Prohibition, and Redressal) Act, 2013 have been implemented in all the military and paramilitary forces. (GoI 2019)

Furthermore, there are critics who view participation of women as detrimental to the effectiveness of combat arms. It is argued that unit cohesion of any military combat team can be affected negatively by inclusion of Women (Simons, 2001). In India, The central

government submitted an affidavit in 2019, laying out its justification for the alleged unsuitability of women officers to discharge this role: “Psychological limitations”, lower physical standards, domestic obligations and absence due to pregnancy. The government argued that the “composition of rank and file being male predominantly drawn from the rural background with prevailing societal norms, troops are not yet mentally schooled to accept women officers in command of units”.<sup>[29]</sup>

However, counterpoints can be given to these claims. Women officers are already commanding platoons and companies successfully in other non-combat units, with male soldiers accepting orders from them as part of the military. A professional force should not discriminate on the basis of gender, it mitigates the issue using training, norms and culture. Regarding the issue of Sexual harassment, it is the duty of the institution to provide safety to the women working there. The Prevalence of Strict and timely justice can tremendously help the women facing these issues.

### **Conclusion**

Upliftment of women has been one of the pertinent aims of almost every nation in the current era. Women have reached great heights in almost all fields which were once male centric. The Indian armed forces has been no exception. Various decisions have been taken consequently by either the Supreme court or the Government of India over the years which has increased the participation of women in the armed forces, albeit at a fluctuating rate. Some forces have been more inclusive than others on this behalf. Among the military, the Indian army has recruited the most number of women over the years. Among the paramilitary forces, the CISF has been the frontrunner at inducting women in their forces through the years.

However, there is still a long way to go in achieving equality in the armed forces. There is a need for more policies and proper frameworks for the induction of women in combat roles. If we go by absolute numbers only, even then recruitment of women in the forces is below a desirable level. The military and paramilitary forces have often failed to achieve goals to include women in them in sufficient numbers. There are issues regarding the women currently employed in the forces also. They face various challenges like gender discrimination or lack of infrastructure. To counter these issues, steps need to be taken. Better facilities for women should be provided. Perpetrators of Sexual abuse

should be identified and acted against promptly, and career advancement of the women in armed forces need to be fair and properly done. The forces should take steps to achieve the equality enshrined in the Constitution of India.

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## স্বাধীনতা সংগ্রামে বিদ্রোহী কবি কাজী নজরুল ইসলামের শিক্ষা ও সমাজ চেতনা

### ড. জয়তী মাইতি

সহ অধ্যাপিকা, শিক্ষাবিভাগ, স্বামী বিবেকানন্দ বিশ্ববিদ্যালয়

সারসংক্ষেপঃ স্বাধীনতার সময়ে, বাংলা সাহিত্যের পাশাপাশি দেশ মাতৃকা সেবার এবং সমস্ত অন্যায় ও অসত্যের বিরুদ্ধে প্রতিবাদী রূপ যিনি তরুণ সমাজে আলোড়ন সৃষ্টি করেছিলেন, ব্রিটিশ শাসকরূপী দানব মুক্ত করে তোলার জন্য একটি সু সংগঠিত দলীও নেতৃত্বের ভূমিকা গ্রহণ করেছিলেন, তিনি কাজী নজরুল ইসলাম। সমাজ, ব্যক্তির অন্তরে বিদ্রোহী সত্ত্বার আগ্নেয়গিরির স্ফুংলিঙ্গ তাঁর গান, কবিতা, সাহিত্য প্রতিটি লেখনী শক্তির মাধ্যমে স্পষ্টতা দেখা যায়। সাম্যবাদ নামক স্বাধীনতার মুক্তি চিন্তার মাধ্যমে সমাজ গঠন ছিল তাঁর প্রধান উদ্দেশ্য।

শব্দসূচকঃ সাহিত্য, সমাজ, স্বাধীনতা, শিক্ষা।

নিজের অধীনতা ত্যাগকেই আমরা পরাধীনতা আখ্যায়িত করি। স্ব-অধীনতার জন্য চাই সজ্ঞানতা। অতি সাধারণ এবং ইংরাজী শিক্ষায় শিক্ষিত মানুষ এই পরাধীনতাকেই ভবিতব্য বা আশির্বাদ রূপে মেনে নিয়েছিল। নব্য শিক্ষিত যুব সমাজ মাতৃ ভাষায় ঘরে-বাইরে বাক্যালাপেও নিষ্পৃহ হয়ে উঠল। ১৮৪৮ সালে অক্ষয়কুমার দত্ত মন্ত্র দান করলেন, “জননী জন্মভূমি স্বর্গদর্শি গরীয়সী”। তিনি নব্য-শিক্ষিতদের উদ্দেশ্য করে স্মরণ করিয়ে দেন যে মাতৃভূমি ও মাতৃভাষার প্রতি উদাসীনতা অপরাধ। এই সচেতনতা ছিল নজরুল-মানসের মৌল প্রবণতা। তিনিই হয়ে উঠলেন বাঙ্গা ভাষার প্রথম রাজনীতি সচেতন কবি।

ভাববিলাসী সমাজ সাহিত্য-কর্মকে কেবল শিল্পের প্রকাশ ভাবে। তাই অনেকের সমালোচনায় তিনি হয়ে উঠেছিলেন ‘হুজুগের কবি’। নজরুল কখনও তাঁতে পূজ্য রবীন্দ্রনাথ হতে চাননি, আবার কবিগুরুই সমকালে সবচেয়ে ভালো বুঝেছিলেন নজরুল-স্বরূপকে। বঙ্কিমচন্দ্র তাঁর ‘কপালকুন্ডলা’ উপন্যাসে মন্তব্য করেছিলেন, “বাঙ্গালী অবস্থার বশীভূত, অবস্থা বাঙ্গালীর বশীভূত নয়।” নজরুল তা মানতে চাননি। সে জন্য নজরুল এমন ‘আঁধারে’ যখন ‘অগ্নিসেতু’ বাঁধতে চাইলেন; কবিগুরুই প্রথম অভিনন্দিত করলেন ‘বসন্ত’ নাটিকা উৎসর্গ করে। কেবল আনন্দ-বিনোদনের জন্য রসমিষ্ট শিল্পের প্রয়োজনীয়তা অনস্বীকার্য, কারণ সমাজে রুচিসম্পন্ন মানুষ দুর্লভ নয়, কিন্তু নজরুল তাঁর কাব্য-সাহিত্যকে শিল্পবোধ বজায় রেখেও দু-চারজন বিদগ্ধ শিল্প-সমালোচকের খোরাক না বানিয়ে গণমানুষের স্বাধীনতার হাতিয়ার করে তুললেন।

বিবেক একদিকে ব্যক্তিগত, আবার একই সঙ্গে ব্যক্তি-অতিক্রমী। তিনি মানবের সেই বিবেকেই চাবুক কষালেন, “হৃদয়ের চেয়ে বড় কোন মন্দির-কাবা” জগতে নেই। এই হৃদয়ই তো বিবেক। ঊনবিংশ ও বিংশ শতকে স্বদেশিকতা এবং প্রগতিশীলতা বোধের প্রতি শ্রদ্ধা তাঁর কাব্য-সাহিত্য নিয়ন্ত্রণ করেছে। জাতি ও

ধর্মের গভীর উর্ধ্বে উঠে মানুষের প্রতি শ্রদ্ধা ও ভালোবাসায় বিশ্বাস রেখে তিনি বললেন, “মানুষের চেয়ে বড় কিছু নাই, নহে কিছু মহীয়ান”, প্রকৃত অর্থে তিনি সাম্য ও স্বাধীনতার কবি।

কাজী নজরুল ইসলাম ছিলেন বিস্ময়কর প্রতিভার অধিকারী। তিনি বাংলা কাব্য ও সাহিত্যের প্রচণ্ড বিপ্লব ঘটিয়েছিলেন। দেশে স্বাধীনতা ও মানবিক মর্যাদা প্রতিষ্ঠার জন্য অত্যাচারী শাসক গোষ্ঠীর বিরুদ্ধে তিনি কলমকে অস্ত্র হিসেবে বেছে নিয়েছিলেন। তার কবিতা, গান, নাট, গজল, গল্প এবং উপন্যাস প্রতিটি বাঙালির মনকে করে তুলেছিল জাগরিত। নজরুল রাজনৈতিক সংগ্রামে বিশ্বাস করতেন। তিনি নিজে সমগ্র অবিভক্ত বাংলায় চেষ্টা বেড়িয়েছেন ও অবিভাষণ দিয়েছেন। ‘আমার সুন্দর’ প্রবন্ধে তিনি লিখলেন, “আট বৎসর ধরে বাংলাদেশের প্রায় প্রতি জেলায়, প্রতি মহকুমায়, ছোট বড় গ্রামে ভ্রমণ করে দেশের স্বাধীনতার জন্য গান গেয়ে, কখনো কখনো বক্তৃতা দিয়ে বেড়ালাম। এই প্রথম আমার মাতৃভূমি বাংলাদেশকে ভালোবাসলাম। মনে হল, এই আমার মা। তাঁর শ্যাম-স্নিগ্ধ মমতায়, তাঁর গভীর স্নেহ-রসে, তাঁর উদার প্রশান্ত আকাশে কখনো ঘন, কখনো ফিরোজা-নীলে আমার দেহ-মন-প্রাণ শান্ত-উদার আনন্দ-হৃদয়িত হয়ে উঠল।” এ চেতনা মস্তিষ্ক প্রসূত নয় — বিবেক প্রসূত। তাঁর গান, তাঁর কবিতা হয়ে উঠেছিল স্বাধীনতা সৈনিকদের বীজ-মন্ত্র। তাই আচার্য প্রফুল্ল চন্দ্র-নেতাজী প্রমুখ ব্যক্তি বর্গ ১৯২৯ সালের ডিসেম্বর এলবার্ট হলে তাঁকে ‘জাতীয় কবি’-র তত্ত্বা দিলেন। তাঁরা ঘোষণা করলেন যে নজরুল একজন ‘জ্যেষ্ঠ কবি’।

ব্রিটিশ পরাধীনতার শৃঙ্খল থেকে মুক্তির জন্য কাঙ্ক্ষিত বিপ্লবে ধর্ম-বর্ণ নির্বিশেষ ভারতীয় সব নাগরিকের সমান অংশগ্রহণ তিনি প্রত্যাশা করেছেন। তাই অন্তরে মানবতার মশাল জ্বালিয়ে সব সংকীর্ণতার উর্ধ্বে উঠে সম্মিলিত প্রতিরোধের আহ্বান জানিয়েছেন তিনি এ প্রবন্ধে- ‘এস ভাই হিন্দু! এস মুসলমান! এস বৌদ্ধ! এস খ্রিস্টিয়ান! আজ আমরা সব কাটাইয়া, সব সংকীর্ণতা, সব মিথ্যা, সব স্বার্থ চিরতরে পরিহার করিয়া প্রাণ ভরিয়া ভাইকে ভাই বলিয়া ডাকি। আজ আমরা আর কলহ করিব না। চাহিয়া দেখ, পাশে তোমাদের মহাশয়নে শায়িত ঐ বীর ভ্রাতৃগণের শব।’ নজরুল বিশ্বাস করতেন স্বচ্ছ বিবেকশক্তির অধিকারী ও সঠিক কর্তব্যজ্ঞানসম্পন্ন মানুষই জাতির সঙ্কটকালে পথ নির্দেশ করতে পারেন। ব্রিটিশ বন্দিদশায় আচ্ছন্ন মানুষের অধিকার লঙ্ঘনে মর্মান্বিত নজরুল আত্মমর্যাদাহীন, পরাধীন জাতিকে সর্বোচ্চ ত্যাগের মহিমায় উজ্জীবিত করার প্রয়াস পেয়েছেন। ফলে প্রবন্ধটিতে জাতিকে জাগিয়ে তোলার তীব্র চেতনার প্রতিফলন ঘটেছে। নজরুল বলেছেন-“... বাহিরের স্বাধীনতা গিয়াছে বলিয়া অন্তরের স্বাধীনতাকেও আমরা যেন বিসর্জন না দেই। আজ যখন সমস্ত বিশ্ব মুক্তির জন্য, শৃঙ্খল ছিড়বার জন্য উন্মাদের মত সমস্ত শক্তি প্রয়োগ করিতেছে, স্বাধীনতা যজ্ঞের হোমানলে আবাল-বৃদ্ধ-বণিতা দলে দলে আসিয়া নিজের হৃৎপিণ্ড- উপড়াইয়া দিতেছে, তাহাদের মুখে শুধু এক বুলি, ‘মুক্তি-মুক্তি-মুক্তি’।” সাপ্তাহিক ‘বিজলী’ এবং ‘মোসলেম ভারত’ পত্রিকায় নজরুলের বিদ্রোহী কবিতাটা যুগপত প্রকাশিত হয়ে কবিকে খ্যাতির তুঙ্গ শীর্ষে তুলে দিয়েছিলেন। মানুষের হকের মধ্যে অবরুদ্ধ ক্ষোভ, আবেগ এবং বেদনা এই কবিতার মধ্যে যৌবন জলতরঙ্গের মতো উচ্ছ্বাসিত হয়ে উঠেছিল।

বিপ্লবীদের স্বপক্ষে লেখনী ধারণে সাক্ষী রূপে নজরুল ইসলাম ‘অগ্নিবীণা’ কাব্যের ‘প্রলয়োল্লাস’ ‘আগমনী’ ‘রক্তস্বরধারিণী মা’ ‘ধূমকেতু’, ‘রণভেরী’ ইত্যাদি কবিতার মাধ্যমে দেশের তরুণদের ইংরেজ বিরোধী শক্তি হিসেবে দাঁড় করাতে চেয়েছেন। এই সব কবিতার মাধ্যমে নজরুল ইসলাম ইংরেজ সাম্রাজ্যবাদী

শহিদ আখাসী চেহারাটি তরুণ সমাজের কাছে তুলে ধরতে চেয়েছেন। সাম্রাজ্যবাদী ঔপনিবেশিক ব্রিটিশ বেনিয়াদের কবল থেকে মুক্তির জন্য যে প্রবল শক্তিমত্তার প্রয়োজন ‘অগ্নিবীণা’ কাব্যে নজরুল প্রগলভ, উদ্দামতা ও সাহসিকতার উপস্থাপন করেছেন। বিদ্রোহী কবিতায় নিজের রণোন্মত্ততার ভবিষ্যৎ সম্পর্কে তিনি স্পষ্ট করে জানিয়েছিলেন যে বিশ্ব নবসৃষ্টির মহানন্দে তিনি সেইদিন শান্ত হবেন যেদিন উৎপীড়িতের ক্রন্দনরোল আকাশে বাতাসে ধ্বনিত হবেনা এবং অত্যাচারীর খড়গ রণভূমে রণিবে না। এই প্রসঙ্গে তিনি বলেন-

“আমি মহামারী আমি ভীতি ও ধরিত্রীর

শাসন প্রকাশ সংহার, আমি উন্মু চির অধীর।”

(‘অগ্নি-বীণা’ কাব্যগ্রন্থ, বিদ্রোহী কবিতা, কাজী নজরুল ইসলাম, ১৯২৩ (পৃ. ১৮-২৪))

এখানে ‘আমি’ বলতে কবির অন্তর্সারিত এক বিদ্রোহী সত্তা, যা কবির সৃজনী কল্পনার মধ্যে জগতের যাবতীয় শাস্ত্র, পুরাণ, জ্ঞান-বিজ্ঞানের সর্ববিধ উপকরণের যোগে এক ভাব স্বরূপে সম্মুণ্ডাসিত। চির দুরন্ত, দুর্ধর্ষ, দুর্মর এই বিদ্রোহী সত্তা আপনাকে ছাড়া কাউকে কুর্নীর করে না। মহাশক্তিশালীর এই সংহার মূর্তির মধ্যে কবি প্রেম ও করুণার এক অন্তঃলীলা প্রসবণ বহমান রেখেছেন। কারণ বিদ্রোহ তো জাতের কল্যাণের জন্য দুঃখ মোচনের জন্য। এই জন্যই কবির এক হাতে বাঁশের বাঁশরী অন্য হাতে রণতুর্য। ইন্দ্রানী সমাজের স্তরে সব পাপ ও জঞ্জাল ধ্বংস করে প্রচণ্ড আঘাতে মানুষের বেদনার অবসান ঘটাতে তিনি আবির্ভূত। কবি ভীরুতা ও কাপুরুষতাকে ত্যাগ করার আহ্বান প্রসঙ্গে ব্রিটিশ সাম্রাজ্যবাদের কবল থেকে পূর্ণ স্বাধীনতা ছিনিয়ে আনা বেশ কঠিন কাজ। এই কঠিনকে সম্ভব করতে পারে একমাত্র যুবশক্তি। তাই কবি স্বাধীনতার জন্য দেশের যুবকদের ভীরুতা ও কাপুরুষতাকে ত্যাগ করে রক্তচক্ষু দুঃশাসনকে চ্যালেঞ্জ করার উদাত্ত আহ্বান জানান নজরুল রাজনৈতিক পত্রিকা প্রকাশ করলেন — ‘ধূমকেতু’। তিনি অনেকের কাছে আশীর্বানী’-র প্রার্থনা করলেও একমাত্র রবীন্দ্রনাথ দ্বিধাহীন এগিয়ে এলেন।

“আয় চলে আয়, রে ধূমকেতু,

আঁধারে বাঁধ অগ্নিসেতু,

দুর্দিনেরই দুর্গশিরে

উড়িয়ে দে তো বিজয় কেতন !

অলক্ষণের তিলকরেখা

রাতের ভালে হোক না লেখা,

জাগিয়ে দে রে চমক মেরে’

আছে যারা অর্ধচেতন।”

(‘ধূমকেতু’, কাজী নজরুল ইসলাম , ১৯২২ খ্রিষ্টাব্দের ১২ই অগাস্ট )

সমাজ-স্বাধীনতা-রাজনীতি সচেতন কবি এটিও উপলব্ধি করেছিলেন যে সমাজকে শুধু পরাধীন মোচন করলেই হবে না। তার সঙ্গে চাই শিক্ষা। কবিগুরুও এ ব্যাপারে সচেতন ছিলেন এবং নিজস্ব শিক্ষা-ভাবনাকে বাস্তবে রূপায়ণ করতে বিশ্বভারতী বিশ্ববিদ্যালয়ও প্রতিষ্ঠা করেছিলেন। নজরুলের সে সংগতিও ছিল না বটে,

তবে তাঁর রাজনৈতিক পত্রিকার মাধ্যমে শিক্ষা সম্পর্কে বক্তব্য পেশ করেছেন। তিনি বিভিন্ন সময়ে একাধিক পত্রিকা সম্পাদন করেছেন। পূর্বোল্লিখিত ধূমকেতু ছাড়াও ছিল নবযুগ, লাঙল, গণবাণী প্রভৃতি।

তিনি শিশুকালে গ্রামের মক্তবে শিক্ষা গ্রহণ করেছেন। নিজে উপলব্ধি করেছেন মুসলিম শিশুদের শুধু ধর্মীয় শিক্ষা দিলেই হবে না। তার সাথে তাদের জ্ঞান-বিজ্ঞানেও বিকশিত করতে হবে। তাই মক্তব-এ পাঠরত ছাত্র-ছাত্রীদের জন্য রচনা করে লন স্কুলপাঠ্য গ্রন্থ। ৩১শে জুলাই ১৯৩৫-এ প্রকাশিত হয় ‘মক্তব সাহিত্য’। এই গ্রন্থে যেমন ইসলাম-চেতনা প্রকাশ পায়, সাথে সাথে প্রথম ভারতীয় রসায়ন অধ্যাপক ড. চুনীলাল বসুর ‘আমাদের খাদ্য’ রচনা, কবিগুরু দুটি কবিতা, কুসুমকুমারী দাসের একটি কবিতা প্রভৃতিও পাঠ্য-গ্রন্থের অন্তর্ভুক্ত করেন। শিশু অবস্থায় যাতে তাদের মনে ধর্মভাব অঙ্কুরিত হওয়ার সাথে সুনাগরিক ও সং ব্যক্তি হয়ে ওঠার প্রবণতা সৃষ্টি হয়। ১৯২০ সালে তিনি যে সামান্য দৈনিক ‘নবযুগ’ পত্রিকা সম্পাদন করেন, তার কতকগুলি সম্পাদকীয় প্রবন্ধ গ্রন্থবদ্ধ করে ১৯২২ খ্রিষ্টাব্দের অক্টোবরে প্রকাশ করেন ‘যুগবাণী’ গ্রন্থ। একটি সংখ্যায় তৎকালীন জাতীয় শিক্ষা বলিয়া যে বিপুল সাড়া পড়েছিল, তার প্রতি ব্যঙ্গোক্তি করিয়া প্রবাদ ব্যবহার করেন ‘টকের ভয়ে পালিয়ে গিয়ে তেঁতুল তলে বাসা’। সমালোচনায় তিনি উল্লেখ করেন, “শুনিয়াছি, ‘বন্দে মাতরমের’ যুগে যখন স্বদেশি জিনিসের সওদা লইয়া দেশময় একটা হে হে ব্যাপার, রৈ রৈ কাশ পড়িয়া গিয়াছিল, তখন অনেক দোকানদার বা ব্যবসায়িগণ বিলাতি জিনিসের ট্রেডমার্ক বা চিহ্ন দিব্যি চাঁচিয়া-ছুলিয়া উঠাইয়া দিয়া তাহাতে একটা স্বদেশী মার্ক মারিয়া লোকের নিকট বিক্রয় করিতেন। এখন যে পদ্ধতিতে জাতীয় শিক্ষা আমাদের ভবিষ্যৎ আশা-ভরসা স্থল নব-উদ্ভাবিত জাতীয় বিদ্যালয়ে দেওয়া হইতেছে, তাহাও ঠিক ঐ রকম বিলাতি শিক্ষারই ট্রেডমার্ক উঠাইয়া ‘স্বদেশী’ মার্ক লাগাইয়া দেওয়ার মতো”। তিনি ঐ প্রবন্ধে প্রশ্ন তুলেছেন, “শুধু চরকা দিয়া সূতা কাটানো ছাড়া এ-ন্যাশানাল বিদ্যালয়ে তেমন কিছু নূতন পদ্ধতি অবলম্বন করা হয় নাই, যাহা সম্পূর্ণরূপে আমাদের দেশের ছেলেদের মনের বা এ-দেশের আবহাওয়া উপযোগী।” তিনি নতুন শিক্ষা নীতিকে কটাক্ষ করেছেন ‘সাহেবকে ধুতি ও মেমকে শাড়ি পরাইয়া বাবু ও বিবি সাজানো’ বলে। কবি পরিশেষে আক্ষেপ করেছেন, “দেশবন্ধু চিত্তরঞ্জন বা দেশের লোক কতকগুলি ভূতের বাথান ও আখড়া পাকাইবার জন্য বুকের রক্তসম টাকার আড়ি হুড় হুড় করিয়া ঢালিয়া দেন নাই।”

আসলে শিশুকাল থেকেই শিক্ষার প্রতি তাঁর আকর্ষণ লক্ষ্য করা যায়। অনেকেই তাঁর বাউন্ডুলেপনা ও স্কুল পালানো নিয়ে নানান মুখরোচক গল্প পরিবেশন করেন। তাই যদি হবে তবে একটানা চার বছর পড়ে নিয়ম মতো দশ বছর বয়সে প্রাথমিক পরীক্ষায় পাস করেন কিভাবে ? জীবনে শত বাধা সত্ত্বেও কত ছুটেছেন। বর্তমান বাংলাদেশের ময়মনসিংহ জেলায় দরিরামপুর। শিমলা থেকে জলকাদায় হেঁটে পাঁচ মাইল দূরে স্কুলে যাতায়াত করেছেন। পরে ছাত্রীও পড়িয়েছেন এবং ভাল ছাত্র হওয়ায় স্কুলের কাছেই লজিং-এ থাকার-খাওয়ার করেছেন। প্রথমে চুরুলিয়ায় বিনোদবিহারী চট্টোপাধ্যায়ের পাঠশালায় কিছুদিন পাঠ নেওয়ার পর ছয় বৎসর বয়সে স্থানীয় মক্তবে ভর্তি হয়ে দশ বৎসর বয়সে নিম্ন প্রাথমিক ফাইনাল উত্তীর্ণ হন। দূর সম্পর্কের এক আত্মীয়ের সহায়তায় মাথরুন নবীন চন্দ্র ইনস্টিটিউশনে পঞ্চম ও ষষ্ঠ শ্রেণীর পাঠ নেন। রোজগারের প্রয়োজনে ১৯১২-১৩ শিক্ষাবর্ষ নষ্ট হয়। গ্রামে ফিরে লেটোর দলে গান, লেখা, আসানসোলে রেলের নেটিভ ক্রিস্চান গার্ড সাহেবের বাড়ীতে বয়ের কাজ, মহম্মদ আহাদ বখসের বেকারী ও রুটির দেকানে

শিশু শ্রমিক, দারোগা কাজী রফিজউল্লাহর বাসায় ভৃত্য ইত্যাদি বাধা অতিক্রম করে দরিরামপুরে সপ্তম শ্রেণী। এসে ভর্তি হন বর্ধমান শহরে Albert Victoria Institute বা নিউ স্কুলে। কিন্তু কিছুদিন পরেই স্কুলটি উঠে যায়। ঐ বিদ্যালয়ের প্রধান শিক্ষক নগেন্দ্রনাথ বন্দ্যোপাধ্যায় শিয়ারশোল রাজস্কুলের নবনিযুক্ত প্রধান পদে নিযুক্ত হন। তাঁর সদয় আনুকূল্যে কবি অষ্টম শ্রেণীতে ভর্তি হন গ্রীষ্মের ছুটির আগে অথবা পরে। ১৯১৭ সালে দশম শ্রেণীতে পড়া কালীন সেনাবাহিনীতে যোগ দেন। এর মধ্যে একবার মেখার জন্য ডবল প্রমোশনও পেয়েছেন। তাঁর সাহিত্য ও পত্রাদি থেকে বোঝা যায় আরবি-ফারসি-হিন্দি-উর্দু ভাষাগুলিতে তাঁর নৈপুণ্য ছিল।

এ হেন শিক্ষাপ্রেমী কবির শিক্ষা সম্পর্কে আগ্রহ স্বাভাবিক। তিনি উপলব্ধি করতেন শিক্ষাই জাতি গঠনের সোপান। তাই ‘জাতীয় শিক্ষা’ সম্পাদকীয় প্রকাশের পর আবার ‘যুগবাণী’ পত্রিকায় সম্পাদকের কলমে প্রশ্ন তুললেন, “.... জাতীয় বিশ্ববিদ্যালয়ের কারিকুলাম কি ? স্ট্যাম্পার্ডেরই বা কোনো একটা নিয়ম-কানুন বা প্রোগ্রাম আছে কি ? হইবে কখন ?” শেষে আবারও লিখলেন, “আমরা চাই, আমাদের শিক্ষা-পদ্ধতি এমন হউক, যাহা আমাদের জীবন-শক্তিকে ক্রমেই সজাগ, জীবন্ত করিয়া তুলিবে। যে শিক্ষা ছেলেদের দেহ-মন দুইকেই পুষ্ট করে, তাহাই হইবে আমাদের শিক্ষা। ‘মেদা মারা’ ছেলের চেয়ে সে হিসাবে ‘ডানপিটে’ ছেলে বরং অনেক ভালো। কারণ পূর্বোক্ত নিরীহ জীবরূপী ছেলেদের ‘জান’ থাকে না; আর হইবেও না। এই দুই শক্তিকে — প্রাণ-শক্তি আর কর্ম-শক্তিকে একত্রীভূত করাই যেন আমাদের শিক্ষার বা জাতীয় বিশ্ববিদ্যালয়ের উদ্দেশ্য ও লক্ষ্য হয়, ইহাই আমাদের একান্ত প্রার্থনা”। বাস্তবিক তিনি নিজেও ছিলেন প্রাণ-চঞ্চল, শিক্ষানুরাগী, বন্ধু-বৎসল, দেশমাতৃকার পায়ে নিবেদিত প্রাণ, ধর্মান্বিতা বর্জিত, সাম্যবাদী একটি সম্পূর্ণ মানুষ। শিক্ষা তাঁর সাহিত্য সৃষ্টির প্রতি ছত্রে ছত্রে। যখন তিনি শিশু-কাব্য লেখেন, তখন নিজে দাদু সেজে নাতি-নাতনিদের উপদেশ দেন না — ‘কদাচ মিত্যা বলিবে না’। বরং নিজেই শিশু হয়ে বাবুদের তাল-পুকুরের কাছে যে লিচু গাছের ডালে চড়ে নিচু চুরি করতে গিয়ে মড়াং করে ডাল ভেবে সড়াং করে মালির ঘাড়েই পড়ে কিল ও ঘুসি খান। দুষ্ট বাচ্চা পড়তে মজা পায় নিজের মত সাথী পেয়ে। দাদুর উপদেশের বিপদে পড়তে হয় না, কিন্তু লিচু চোর কবির করে বিপথে চালিত হয় না। শেষে যখন দেখে —

“..... যার ফের ? কান মলি ভাই,

চুরিতে আর যদি যাই!

তবে মোর নামই মিছা!

কুকুরের চামড়া খিঁচা

সে কি ভাই যায় রে ভুলা —

মালির ঐ পিটনিগুলা!

কি বলিস? ফের হপ্তা

তৌবা নাক খপ্তা।”

(ঝিঙে ফুল’ কাব্যগ্রন্থ, ‘লিচু চোর’ কবিতা, কাজী নজরুল ইসলাম, ১৩৩৩ সাল )

হ্যাঁ, এই আট পঙ্কতি আর পাঠ্য থাকে না, এ যেন তারই বলা। কারণ সে বুঝেছে কু-কর্মের কু-ফল। বলা যায় এ হল নজরুলী শিক্ষা। তাঁর শিশু-নাটিকা ‘পুতুলের বিয়ে’ নিছক মজার নয়, তাতেও শিশুদের নৈতিক

জীবন গড়ে ওঠে ধর্মা-ধর্মের বিভেদ ঘুচিয়ে এক অভেদ-ধর্মের বোধে।

গণ সঙ্গীতকেও তিনি অন্য মাত্রায় নিয়ে গেছেন। সেখানে তিনি রাজনৈতিক নেতা হয়ে শ্রমিকদের না-বোঝা আন্দোলনের শরীক বানাননি। ধীবনর-চাষি সকল শ্রমিকের মেরুদণ্ড সোজা করে বাঁচতে শিখিয়েছেন। ছাত্রদলকে কেবল পুঁথি গলাদ্ধকরণ করে শুষ্ক-পন্ডিত না হয়ে প্রাণবন্ত চলমান করেছেন, —

“... সবাই যখন বুদ্ধি যোগায়, আমরা করি ভুল।

সাবধানিরাই বাঁধ বাঁধে সব, আমরা ভাবি কূল।

দারুণ রাতে আমরা তরুণ রক্তে করি পথ পিছল!

আমরা ছাত্রদল।”

(‘সর্বহারা’ কাব্যগ্রন্থ, কাজী নজরুল ইসলাম ১৯২৬ খ্রিষ্টাব্দের ২৫ অক্টোবর (৮ কার্তিক ১৩৩৩))

আবার বেতারে ধর্মীয় গীতি-আলেখ্য করছেন — ‘দেবীস্তুতি, তা কেবল ভক্ত-মনের দশমহাবিদ্যার স্তব নয়; বরং দেবীর বিভিন্ন প্রকাশের দর্শন তত্ত্ব ব্যাখ্যাও হয়েছে। অর্থাৎ সব কিছুর মধ্যেই শিক্ষা। কলকাতা বিশ্ববিদ্যালয় সৌভাগ্যবান, রবীন্দ্রনাথ ঠাকুর ও কাজী নজরুল ইসলামের মত প্রাতিষ্ঠানিক শিক্ষায় বিদ্যালয়ের গভী না পেরোন দুই মহান শিক্ষাবিদকে এক্টটারন্যাল এক্সামিনর রুপে বরণ করে। সুতরাং শিল্পীর বহুমুখীর অধিকারী তাঁর কবিতা, গান, সাহিত্য, লোকসঙ্গিত, ভাঙ্কারে গজল, ইসলামিক আধ্যাত্মিক গান হল এর সুরের মিলন যা মানবতা, আধ্যাত্মিকতা, দেশপ্রেম, সমতাবাদ অবদান দেখা যায় আর এখানেই কবির অবদান।

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## মহাকবি কালিদাসের সংস্কৃত গীতিকাব্য-সমূহে পরিবেশ ভাবনা

ড. রাহুল দেব বিশ্বাস

সহকারী অধ্যাপক, সংস্কৃত বিভাগ, কালিনগর মহাবিদ্যালয়

### সারসংক্ষেপ :

মহাকবি কালিদাসের সংস্কৃত গীতিকাব্যসমূহে অর্থাৎ ‘ঋতুসংহার’ ও ‘মেঘদূত’ গীতিকাব্যে ‘পরিবেশ ভাবনা’ এই নিবন্ধে আলোচনা করা হয়েছে। প্রকৃতি কবি কালিদাসের লেখনীতে নিসর্গ প্রকৃতি ও মানব প্রকৃতির লীলা-বৈচিত্র্য সুন্দরভাবে অঙ্কিত হয়েছে। কালিদাস নিসর্গ সুন্দরীর প্রিয় সেবক। ঋতুসংহারে ছয়টি ঋতুর বর্ণনা পাওয়া যায়। এক একটি সর্গে এক একটি ঋতুর বর্ণনা আছে। পরিবেশের ঋতু এবং মানুষের জীবনের মধ্যে নিবিড় সম্পর্ক ওতপ্রোতভাবে জড়িত। আর মেঘদূত গীতিকাব্যে বিরহী যক্ষ মেঘকে দূত করে তার প্রিয়ার কাছে পাঠিয়েছে। কালিদাস যক্ষের বর্ষার মেঘকে দূতরূপে নির্বাচন করার পশ্চাতে পরিবেশ ভাবনা অবশ্যই আছে। মেঘ এক জায়গা থেকে অন্য জায়গায় স্থানান্তরিত হয়। মেঘের সৃষ্টি সম্বন্ধে কালিদাস যা দেখিয়েছেন তা বিজ্ঞান-সম্মত। ধূম, জ্যোতি, জল ও বায়ুর সংস্পর্শে মেঘের সৃষ্টি হয়। পরিবেশ বিষয়ে জ্ঞান এই দুই গীতিকাব্যে মহাকবি কালিদাস ভারতবাসী তথা বিশ্ববাসীর সামনে সুস্পষ্টভাবে ফুটিয়ে তুলেছেন।

**শব্দসূচক :** কালিদাস, মানুষ, গীতিকাব্য, পরিবেশ ভাবনা, ঋতু, মেঘ, প্রকৃতি, সংস্কৃত।

কালিদাসের ঋতুসংহার একখানি গীতিকাব্য বা খণ্ডকাব্য। এটি মহাকবির প্রথম জীবনের রচনা। সমগ্র গীতিকাব্যখানি ছয়টি সর্গে বিভক্ত। কালিদাস ভারতবর্ষ তথা ভারত-বিলাসিনী নিসর্গ-সুন্দরীর প্রিয় সেবক ও চিত্রকর। এই কাব্যে মহাকবির পরিণত কবিত্বের প্রকাশ দেখা যায়। ‘সংহার’-শব্দের অর্থ বর্ণনা। ঋতু-সংহারে ছয়টি ঋতুর বর্ণনা পাওয়া যায়। এক একটি সর্গে এক একটি ঋতুর বর্ণনা আছে। গ্রীষ্ম, বর্ষা, শরৎ, হেমন্ত, শীত ও বসন্ত — এই ছটি ঋতুর সমাগম লক্ষ্য করা যায়।

ছটি ঋতুর প্রভাবে মানুষের বিশেষ করে প্রেমিক জনের মানসিক অবস্থার মনোরম চিত্র এই গীতিকাব্যে পরিলক্ষিত হয়। এক একটি ঋতুকে প্রকৃতির বৃকে এক এক রকমের রূপ-রস-গন্ধের বাহার ফুটে ওঠে। মানব মানবীর মননে মিলন অনুরাগের এক একটি সুর ধ্বনিত হয়। প্রকৃতি কবি কালিদাসের লেখনীতে নিসর্গ প্রকৃতি ও মানব প্রকৃতির এই লীলা-বৈচিত্র্য সুন্দরভাবে চিত্রিত হয়েছে। আর এই সম্পর্কের উপস্থাপনার মাধ্যমে মহাকবির পরিবেশ ভাবনা রূপ নিয়েছে।

পরিবেশের ঋতু এবং মানুষের জীবনের মধ্যে নিবিড় সম্পর্ক ওতপ্রোতভাবে জড়িত। আর এই সম্পর্কের উপস্থাপনার মাধ্যমেই মহাকবির পরিবেশ ভাবনা লক্ষ্য করা গেছে।

ঋতুসংহার গীতিকাব্যের শুরু হয়েছে গ্রীষ্মের বর্ণনার মাধ্যমে। গ্রীষ্মের নিসর্গ প্রকৃতির দুটি রূপ — একটি ভয়ঙ্কর, অন্যটি মনোরম। মনোরম রূপটি মূলতঃ অপরাহ্ন আর রাত্রিকালের।

প্রবল গ্রীষ্মের উপস্থিতিতে সূর্যের প্রচণ্ড উত্তাপ, কিন্তু চন্দ্র প্রীতিপদ। অনবরত স্নানের ফলে জলাশয় মলিন এবং শুষ্কপ্রায়, অপরাহ্ন এখন রমণীয় —

প্রচণ্ড সূর্য্যঃ স্পৃহণীয়-চন্দ্রমাঃ সদাবগাহক্ষম-বারি-সঞ্চয়ঃ।

দিনান্তরম্যোঃভূপশান্তমন্মথো নিদাঘকালোঃয়মুপাগতঃ প্রিয়ে।<sup>১</sup>

সূর্যের প্রখরতাপে দন্ধ হরিণের তালু প্রবল তৃষ্ণায় শুষ্ক হয়ে যায়। দলিত কাজলের মতো নীল আকাশ নিরীক্ষণ করে জলের আশায় সে ছুটে চলে বন থেকে বনান্তরে —

মৃগাঃ প্রচণ্ডতপতাপিতা ভৃশং ত্বা মহত্যা পরিশুকতালবঃ।

বনান্তরে তোয়মিতি প্রথাবিতা নিরীক্ষ্য ভিন্নাঙ্গনসন্নিভং নভঃ।<sup>২</sup>

প্রবল তৃষ্ণায় সিংহের পরাক্রমের উদ্যোগ থাকে না। ঘন ঘন নিঃশ্বাস পড়ে, দূর থেকেই তার মুখ বিধ্বংসিত হয়ে থাকে। জিহ্বা চঞ্চল হয়ে ওঠে। কেশরের অগ্রভাগ কাঁপতে থাকে। নিকটবর্তী হাতিকেও হত্যা করে না —

তৃষ্ণা মহত্যা হতবিক্রমোদ্যমঃ শ্বসন্মুহূর্দূরবিদারিতাননঃ।

ন হস্ত্যদূরেঃপি গজান্মগেশ্বরো বিলোলজিহ্বাচলিতাগ্রকেশরঃ।<sup>৩</sup>

সূর্যের কিরণে তাপিত হাতির শুকনো গলায় জলকণা উদ্ভূত হয়। প্রবল তৃষ্ণায় হাতি জলের খোঁজে সিংহকেও ভয় পায় না —

বিশুককষ্ঠাহতশীকরাভ্রসো গভস্তিভির্ভানুমতোঃনুতাপিতাঃ।

প্রবৃদ্ধতৃষ্ণোপহতা জলার্থিনো ন দস্তিনঃ কেশরিণোঃপি বিভ্রতি।<sup>৪</sup>

হাতিরা সরোবরের সমস্ত মৃগাল তুলে ফেলে এবং ঘন-মর্দনে সরোবর কর্দমাক্ত করে। মাছেরা বিপদে পড়ে এবং সারসেরা ভয়ে পালিয়ে যায় —

সমুদ্ভূতশেষমৃগালজালকং বিপন্নমীনং দ্রুতভীতসারসম।

পরস্পরোৎপীড়মসংহতৈর্গর্জেঃ কৃতং সরঃ সান্দ্রবিমর্দকর্দমম।<sup>৫</sup>

পাতা ঝরা গাছে বসে পাখীরা দীর্ঘশ্বাস ফেলে। ক্লান্ত বানরগুলি পর্বতের লতাকুঞ্জে প্রবেশ করে। গবয়ের দল জলের আশায় চতুর্দিকে ঘুরে বেড়ায়। আর শরতের দল কূপ থেকে জল তোলে —

শ্বসিতি বিহগবর্গঃ শীর্ণ-পর্ণ-ক্রমস্থঃ কপিকুলমুপযাতি ক্লান্তমর্দৈর্নিকুঞ্জম।

ভ্রমতি গবয়যূথঃ সর্বতস্তোয়মিচ্ছ্ণুরভকুলমজিস্তং প্রোদ্ধরত্যমুকূপাৎ।<sup>৬</sup>

গ্রীষ্মের প্রভাবে বিভিন্ন পশু-পাখী যেমন হরিণ, সিংহ, হাতী, সারস, বানর ও গবয় প্রভৃতির অবস্থা প্রকৃতির কবি কালিদাস সুস্পষ্টভাবে বর্ণনা করেছেন। আর এখানেই পরিবেশ ভাবনা সুন্দরভাবে প্রস্ফুটিত হয়েছে।

ঋতুসংহারে দ্বিতীয় সর্গে বর্ষাকালের উল্লেখ রয়েছে। বর্ষা বিরহের ঋতু। রাজকীয়ভাবে তার আগমন ঘটে। কামিজনের প্রিয় বর্ষা আসে রাজার ভঙ্গীতে —

সমাগতো রাজবদুদুতদ্যুতির্ঘনাগমঃ কামিজনপ্রিয়ঃ প্রিয়ে।<sup>৭</sup>

মেঘের মনোরম গর্জনে উল্লসিত ময়ূর-ময়ূরীর দলকে প্রসারিত কলাপের শোভায় সুন্দর দেখায়। চুম্বন আলিঙ্গনের চেষ্টায় তারা ব্যাকুল হয়ে ওঠে এবং নৃত্য করে —

সদা মনোজ্ঞান্দুদনাদস্যোৎসুকং বিভাতি বিস্তীর্ণকলাপশোভিতম।

স সংভ্রমালিঙ্গনচুম্বনাকুলং প্রবৃত্ত-নৃত্যং কুলমদ্য বর্হিণাম।<sup>৮</sup>

বর্ষাকালে ময়ূর, হাতী, হরিণ, গিরির সৌন্দর্য, মালতী, বকুল, কদম প্রভৃতি ফুলের শোভা মহাকবি সুন্দরভাবে ফুটিয়ে তুলেছেন। বর্ষা প্রাণীদের আনন্দদায়ক, প্রাণস্বরূপ, সকলের কামনা পূরণ করে। তাই কবি বলেছেন —

জলদসময় এষ প্রাণিনাং প্রাণভূতো দিশতু তব হিতানি প্রায়শো বাঞ্ছিতানি।<sup>৯</sup>

তৃতীয় সর্গে শরৎকালের বর্ণনা পরিলক্ষিত হয়। কাশফুলের মতো যার পরিধান, প্রস্ফুটিত পদ্মের মত যার মুখ, উন্মত্ত হংসের রব, পাকা শালিধানের মতো শরতের আগমন সূচিত হয়। আর সে যেন নববধূর মতো —

কাশাংশুকা বিকচপদ্মমনোজ্ঞবক্রা সোম্মাদহংসরবনুপূরনাদরম্যা।

আপক্কশালিরুচিরা তনুগাত্রযষ্টিঃ প্রাপ্তা শরন্নবধূরিব রূপরম্যা।<sup>১০</sup>

শারদশোভাকে নারীর শোভার সঙ্গে তুলনা করে কবি ব্যক্তিমনের ছায়ার দ্বারা রঞ্জিত কোনও এক প্রকৃতিচিত্রকে সহৃদয় পাঠককে উপহার দিয়েছেন।

শিউলিফুলের মনোরম গন্ধে, পক্ষিকুলের কলধ্বনিতে এবং প্রান্তে অবস্থিত মৃগীকুলের নয়নরূপ নীলপদ্মের শোভায় উপবনগুলি প্রেমিক পুরুষের চিত্তকে ব্যাকুলিত করে —

শেফালিকা-কুসুমগন্ধ-মনোহরাগি স্বস্থস্থিতাণ্ডজকুলপ্রতিনাদিতানি।

পর্যন্তসংস্থিতমৃগীনয়োৎপলানি প্রোৎকর্ষয়ন্ত্যপবনানি মনাংসি পুংসাম।<sup>১১</sup>

কাশ ফুল, শিউলি ফুল, পথিক, বিভিন্ন পাখি যেমন ময়ূর, হাঁস, সারস প্রভৃতির বর্ণনা মহাকবি দিয়েছেন এই সর্গে। আর এখানেই কবির পরিবেশ সচেতনতা স্পষ্টভাবে ফুটে উঠেছে।

চতুর্থ সর্গে হেমন্তের সূচনা লক্ষ্য করা যায়। লোধফুল, পাকা শালিধান, হিম প্রভৃতির উপস্থিতি দেখা যায় —

নবপ্রবালোদগমশস্যরম্যঃ প্রফুল্ললোপ্রঃ পরিপক্কশালিঃ।

বিলীনপদ্মঃ প্রপতভূষারো হেমন্তকালঃ সমুপাগতোঽয়ম।<sup>১২</sup>

পরিপূর্ণ শস্যে, হরিণদের বিচরণে এবং মনোহর ক্রৌঞ্চরবে মুখরিত প্রান্তরগুলি চিত্ত ব্যাকুল করে তোলে—

প্রভূতশালিপ্রসবৈশ্চিতানি মৃগাঙ্গনায়ুথবিভূষিতানি।

মনোহরক্রৌঞ্চনিদিতানি সীমান্তরাণ্যৎসুকয়ন্তি চেতঃ।<sup>১৩</sup>

বকের মালায় সুশোভিত এই হেমন্ত যেন সকল ভোগ সুখ দান করতে পারে। তাই কবি বলেছেন —

সততমতিমনোজ্ঞঃ ক্রৌঞ্চমালাপরীতঃ প্রদিশতু হিমযুক্তঃ কাল এষঃ সুখং বঃ।<sup>১৪</sup>

পঞ্চমসর্গে শীতকালের প্রভাব লক্ষ্য করা যায়। হেমন্তের মতো শীতকালও সম্ভোগপ্রধান। এই ঋতু শালিধান ও আখের প্রাচুর্যে মনোহর, ক্রৌঞ্চপাখীর নিনাদ শোনা যায়, রমণীদের প্রিয়—

প্ররুঢ়শালীক্ষুচয়ৈর্মনোহরং ক্রচিৎ স্থিতক্রৌঞ্চনিনাদরাজিতম।

প্রকামকামং প্রমদাজনপ্রিয়ং বরোরু কালং শিশিরাহুয়ং শৃণু।<sup>২৫</sup>

জানালাবন্ধ গৃহের ভিতর, আশু, সূর্যকিরণ স্থূলবসন মানুষ এইসময় ভালবাসে। এবং যুবতী রমণীরা এইসময়ে পুরুষের কাছে উপভোগ্য হয়ে ওঠে —

নিরুদ্ভবাতায়নমন্দিরোদরং হৃতাশনো ভানুমতো গভস্তয়ঃ।

গুরুণি বাসাংস্যবলাঃ সযৌবনাঃ প্রয়াস্তি কালেদ্য জনস্য সেব্যতাম।<sup>২৬</sup>

শীতকালে গুড়জাত মিষ্টদ্রব্যের প্রাচুর্য, সুস্বাদু শালিধান, আখে এই ঋতু রমণীয় হয়ে ওঠে। রতিক্রিয়া প্রবল, কামদেব গর্বিত। প্রিয়জন বিযুক্ত মানবজনের কাছে এই কাল অত্যন্ত দুঃসহ —

প্রচুরগুড়বিকারঃ স্বাদুশালীক্ষুরম্যঃ প্রবলসুরতকেলিজাত-কন্দর্পদর্পঃ।

প্রিয়জনরহিতানাং চিত্তসন্তাপহেতুঃ শিশিরসময় এষ শ্রেয়সে বোদন্ত নিত্যম।<sup>২৭</sup>

ষষ্ঠ সর্গে বসন্তের আবির্ভাব লক্ষ্য করা যায়। বসন্ত ঋতুদের মধ্যে রাজা। রাজকীয় ঐশ্বর্য। আশ্র মুকুল, গুঞ্জরত ভ্রমর, গাছে গাছে ফুল, পদ্মের সুগন্ধি বাতাস — এ সমস্ত কিছু নিয়েই বসন্তের সমাগম। এই সময় সন্ধ্যা ও দিন অত্যন্ত মনোরম থাকে —

ক্রমাঃ সপুষ্পাঃ সলিলং সপদ্মং স্ত্রিয়ঃ সকামাঃ পবনঃ সুগন্ধিঃ।

সুখাঃ প্রদোষা দিবসাশ্চ রম্যাঃ সর্বং প্রিয়ে ! চারুতরং বসন্তে।<sup>২৮</sup>

বসন্তের আগমনে কবি প্রমদাগণের, সহকার, অশোক, পলাশ প্রভৃতি গাছের এবং কোকিল, ভ্রমর প্রভৃতি প্রাণীর অবস্থা সুন্দরভাবে ফুটিয়ে তুলেছেন। ঋতুগুলির যে ছবি কবি তুলে ধরেছেন, তা থেকে পরিবেশের ঋতুচক্র, আবহাওয়া সম্পর্কে জ্ঞানের পরিচয় লক্ষ্য করা যায়। ছটি ঋতু বর্ণনার মাধ্যমে জানা যায় যে যথাসময়ে প্রকৃতিতে উপস্থিত হত। প্রকৃতিতে ভারসাম্যের কোনো অভাব ছিল না। অরণ্যের বিনাশ, দূষণ সে সময়ে তেমন ছিল না। মহাকবি এর মাধ্যমেই পরিবেশ সচেতনতা ফুটিয়ে তুলেছেন।

মহাকবি কালিদাসের অপূর্ব সৃষ্টি গীতিকাব্য মেঘদূত। এই কাব্যের দুইটি বিভাগ – পূর্বমেঘ ও উত্তরমেঘ। এই গীতিকাব্যে বিরহী যক্ষ মেঘকে দূত করে তার প্রিয়ার কাছে পাঠিয়েছে। আষাঢ়ের প্রথম দিবসে যক্ষ পাহাড়ের কোলে একখণ্ড মেঘ দেখল। সেই মেঘ হাতীর মত বপ্রক্রীড়ায় রত —

আষাঢ়স্য প্রথমদিবসে মেঘমাল্লিষ্টসানুং

বপ্রক্রীড়া-পরিণত-গজপ্রেক্ষণীয়ং দদর্শ।<sup>২৯</sup>

তখন যক্ষ মেঘকে দূত করে পাঠাতে চাইল। কিন্তু মেঘ তো জড় পদার্থ — ধূম, জ্যোতি, জল ও বায়ুর সমষ্টি। একথা তার বিবেচনায় থাকল না। যারা কামার্ত—চেতন অচেতনে ভেদজ্ঞান তাদের কাছে আশা করা যায় না —

ধূমজ্যোতিঃ সলিলমরুতাং সন্নিপাতঃ ক্ব মেঘঃ

সন্দেশার্থাঃক্বপটুকরণৈঃ প্রাণিভিঃ প্রাপণীয়াঃ।

ইতোৎসুক্যাদপরিগণয়ন্ গুহ্যকস্তং যযাচে

কামার্তা হি প্রকৃতিকৃপণাশ্চেতনাচেতনেষু।<sup>২০</sup>

অর্থাৎ এখানে কালিদাস যক্ষের বর্ষার মেঘকে দূতরূপে নির্বাচন পশ্চাতে পরিবেশ ভাবনা অবশ্যই আছে। মেঘ এক জায়গা থেকে অন্য জায়গায় উড়ে যায়। শুধুমাত্র তাই নয় মেঘের সৃষ্টি সম্বন্ধে মহাকবি যা দেখিয়েছেন তা বিজ্ঞানসম্মত। ধূম, জ্যোতি, জল ও বায়ুর সংস্পর্শে মেঘের সৃষ্টি হয়।

পরিবেশ বিষয়ে জ্ঞান এই গীতিকাব্যে মহাকবি ফুটিয়ে তুলেছেন। যক্ষের নির্দেশিত মেঘের গতিপথ রামগিরি থেকে অলকা—

গন্তব্যে তে বসতিরলকা নাম যক্ষেশ্বরানাম।<sup>২১</sup>

রেবা, শিপ্রা, বেত্রবতী, গভীরী, নির্বিদ্ধা, সিন্ধু, সরস্বতী নদী —

মেঘের গতিপথে পড়বে। নীচে, চিত্রকূট, আশ্রকূট, বিন্দ্য ও কৈলাস পর্বত। দশার্ণ, বিদিশা, অবন্তী, উজ্জয়নী, ব্রহ্মাবর্ত, বক্ষ্ম প্রভৃতি জনপদ মেঘের গতিপথে পড়বে। এখানে পরিবেশ নিজ মহিমায় প্রকাশিত।

দাবানলে দন্ধ হওয়ার সময় মেঘের বর্ষণে দাবদাহ নির্বাপিত হয়। রক্ষা হয় বনজ সম্পদের —

ত্বামাসারপ্রশমিতবনোপপ্লবং সাধু মূর্ধ্না।<sup>২২</sup>

বর্ষণের পর মেঘ হাল্কা হয়। জলপূর্ণ মেঘকে বায়ু যত্র তত্র উড়িয়ে নিয়ে যেতে পারে না —

অন্তঃসারং ঘন! তুলয়িতুং নানিলঃ শক্ষ্যতি ত্বাং

রিক্তঃ সর্বো ভবতি হি লঘুঃ পূর্ণতা গৌরবায়।<sup>২৩</sup>

মেঘের বর্ষণে মাটি থেকে এক প্রকার মধুর গন্ধ বের হয়। সেই গন্ধ আশ্রাণ করতে করতে চিত্রিত হরিণগুলি বর্ষণসিক্ত পথে ছুটে যাবে —

জঙ্ঘারণ্যেধিকসুরভিঃ গন্ধমাস্রায় চোর্ব্যাঃ

সারঙ্গাস্তে জললবমুচঃ সূচয়িষ্যন্তি মার্গম্।<sup>২৪</sup>

বর্ষাকালে মেঘ দেখে ময়ূরেরা পুলকিত হয় —

শুক্রাপাট্টৈঃ সজলনয়নৈঃ স্বাগতীকৃত্য কেকাঃ।<sup>২৫</sup>

মেঘবর্ষণে নদী-নালা জলে পরিপূর্ণ হয় —

কার্ষ্যং যেন ত্যজতি বিধিনা স ত্বয়ৈবোপপাদ্যঃ।<sup>২৬</sup>

মেঘ কখনও কখনও বিদ্যুতের আলোক দ্বারা মার্গ প্রদর্শক হয় —

সৌদামন্যা কনকনিকষন্নিধিয়া দর্শয়ৌর্বিম্।<sup>২৭</sup>

পূর্বমেঘেই উল্লিখিত হয়েছে মানস সরোবর - যা স্বর্ণকমলে ভরা। এর জল পান কোরো। জলভরা দেহের কোমল অংশ ঐরাবতের মুখে বিছিয়ে দিও, তাতে প্রীতি জন্মাবে —

হেমান্তোজপ্রসবি সলিলং মানসস্যাদদানঃ

কুবর্ন কামং ক্ষণমুখপটপ্রীতিমৈরাবতস্য।<sup>২৮</sup>

উপরিউক্ত আলোচনা থেকে পরিবেশ সচেতনতারই উল্লেখ পাওয়া যায়। উত্তরমেঘেও পরিবেশ ভাবনা

সুস্পষ্টভাবে লক্ষ্য করা যায়। এখানে কিছু ফুলের উল্লেখ আছে। সেই সব ফুল যা বধূরা আভরণ রূপে ব্যবহার করতেন। যক্ষ প্রিয়ার আভরণরূপে যে সকল পুষ্প ব্যবহার করা হয়েছে, তার উল্লেখ আছে। যেমন – পদ্ম, কুন্দ, কুরুবক, শিরীষ, কদম্ব প্রভৃতি। বিভিন্ন ঋতুতে বিভিন্ন ফুলের সমাবেশ এখানে একসঙ্গে উল্লিখিত হয়েছে —

হস্তে লীলাকমলমলকে বালকুন্দানুবিক্রং  
নীতা লোভপ্রসবরজসা পাণ্ডুতামাননে শ্রীঃ।  
চূড়াপাশে নবকুরুবকং চারু কর্ণে শিরীষং  
সীমন্তে চ ত্বদুপগমজং যত্র নীপং বধূনাম্।<sup>২৯</sup>

মেঘের সঙ্গে বিদ্যুতের সম্পর্ক চিরস্থায়ী —

ইষ্টান্ দেশান্ জলদ ! বিচর প্রাবৃষা সন্তৃতশ্রী  
মার্ভূদেবং ক্ষণমপি চ তে বিদ্যুতা বিপ্রয়োগঃ।<sup>৩০</sup>

মেঘদূতকে আমরা যদি শুধুমাত্র কাব্যগ্রন্থ হিসেবে দেখি তাহলে সেটি হয় – ভারতবর্ষের দক্ষিণ পশ্চিম মৌসুমী বায়ুর যাত্রাপথের বিবরণ। রামগিরি থেকে অলকা পর্যন্ত যে মেঘের গমনপথ, তার সঙ্গে বর্তমানকালের আঘাট-শ্রাবণের দক্ষিণ-পশ্চিম মৌসুমী বায়ুর গতিপথের মিল দেখা যায়। মেঘদূতের নির্বাসিত বিরহী যক্ষ দূত হিসেবে মেঘকে তার প্রিয়ার কাছে পাঠানোটা কবিকল্পনা। মহাকবি, নিজ মনের মাধুরী মিশিয়ে যক্ষের বিরহের যে মর্মস্পর্শী ছবি অঙ্কন করেছেন, তা বিশ্বের সমস্ত বিরহী মানুষের আত্মার আকৃতির রূপ নিয়েছে। বিরহ দুঃখই তার হৃদয়কে পৃথিবীর সমস্ত নদ-নদী-অরণ্য-নগরীর মধ্যে পরিব্যাপ্ত করে দিয়েছে। মেঘদূতে পাহাড়, নদী, অরণ্য, নগর, প্রাসাদ, পশু-পাখী, নর-নারী প্রভৃতি যেন বিশ্ববাসীর সামনে তাদের সমস্ত রূপ ও ঐশ্বর্যের পসরা নিয়ে প্রাণবন্ত ও প্রত্যক্ষ হয়ে ওঠে।

অন্ত্যটীকা :

1.	ঋতুসংহার	১/১
2.	ঐ	১/১১
3.	ঐ	১/১৪
4.	ঐ	১/১৫
5.	ঐ	১/১৯
6.	ঐ	১/২৩
7.	ঐ	২/১
8.	ঐ	২/৬
9.	ঐ	২/২৮
10.	ঐ	৩/১
11.	ঐ	৩/১৪
12.	ঐ	৪/১

13.	ঐ	৪/৮
14.	ঐ	৪/১৮
15.	ঐ	৫/১
16.	ঐ	৫/২
17.	ঐ	৫/১৬
18.	ঐ	৬/২
19.	মেঘদূত	পূর্বমেঘ/২
20.	ঐ	পূর্বমেঘ/৫
21.	ঐ	পূর্বমেঘ/৭
22.	ঐ	পূর্বমেঘ/১৭
23.	ঐ	পূর্বমেঘ/২০
24.	ঐ	পূর্বমেঘ/২১
25.	ঐ	পূর্বমেঘ/২৩
26.	ঐ	পূর্বমেঘ/৩০
27.	ঐ	পূর্বমেঘ/৩৮
28.	ঐ	পূর্বমেঘ/৬৩
29.	ঐ	উত্তরমেঘ/২
30.	ঐ	উত্তরমেঘ/৫৪

#### ঋণস্বীকার :

- 1) বন্দ্যোপাধ্যায়, ধীরেন্দ্রনাথ; সংস্কৃত সাহিত্যের ইতিহাস, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্যদ, ৬এ, সুবোধ মল্লিক স্কোয়ার, কলিকাতা - ১৩।
- 2) বসু, রথীন্দ্রনারায়ণ; (২০০১) পরিবেশ, কলিকাতা বিশ্ববিদ্যালয়।
- 3) ভট্টাচার্য, ড. রথীন্দ্রনাথ; (২০১৫) পরিবেশ ভাবনায় সংস্কৃত সাহিত্য, সংস্কৃত পুস্তক ভান্ডার, কোলকাতা - ৬।
- 4) ভট্টাচার্য, বিষ্ণুপদ; কালিদাস ও রথীন্দ্রনাথ, জিজ্ঞাসা ৩৩, কোলকাতা - ৯।
- 5) বিদ্যাভূষণ, পন্ডিত রাজেন্দ্রনাথ; (২০১৫) কালিদাস গ্রন্থাবলী - প্রথম ভাগ, বসুমতী সাহিত্য মন্দির, কোলকাতা - ১২।
- 6) বিদ্যাভূষণ, পন্ডিত রাজেন্দ্রনাথ; কালিদাস গ্রন্থাবলী - দ্বিতীয় ভাগ, বসুমতী সাহিত্য মন্দির, কোলকাতা - ১২।
- 7) ঘোষ, বিদ্যুৎবরণ; (২০০৬) সংস্কৃত রচনায় প্রতিফলিত পরিবেশ সচেতনতা, সংস্কৃত পুস্তক ভান্ডার, ৩৮, বিধান সরণী, কোলাকাতা - ৬।
- 8) চক্রবর্তী, সত্যনারায়ণ; (২০০৫) মেঘদূত ও সৌদামনী, সংস্কৃত পুস্তক ভান্ডার, ৩৮, বিধান সরণী, কলকাতা - ৬।
- 9) শাস্ত্রী, ড. গৌরীনাথ, প্রধান উপদেষ্টা; (২০১৫) সংস্কৃত সাহিত্য সম্ভার (২য় খন্ড), নবপত্র প্রকাশন, ৬, বঙ্কিম চ্যাটার্জী স্ট্রীট, কোলকাতা - ৭৩।
- 10) শাস্ত্রী, ড. গৌরীনাথ, প্রধান উপদেষ্টা; (২০১৪) সংস্কৃত সাহিত্য সম্ভার (১১ খন্ড), নবপত্র প্রকাশন, ৬, বঙ্কিম চ্যাটার্জী স্ট্রীট, কোলকাতা - ৭৩।

## আরবী চর্চার বিকাশে পশ্চিমবঙ্গ : সমস্যা ও সমাধান

সৈয়দ মহঃ নিজামুল হক

আরবী বিভাগ, শোভারানী মেমোরিয়াল কলেজ, হাওড়া।

### ভূমিকা

আরবী ভাষা সামী ভাষা পরিবারের একটি ভাষা। ইয়ারিব বিন কাহতান এই ভাষার জনক হিসাবে পরিচিত। ইসলামের পবিত্র গ্রন্থ আল কুরআনের ভাষা হিসাবে সমগ্র মুসলিম বিশ্বে ব্যবহৃত হয়। এই ভাষা জাতিসংঘের অফিসিয়াল ভাষা গুলির মধ্যে একটি। আজ এই ভাষা ২২ টি দেশের সরকারী ভাষা। আরব বিশ্বের আঠাশ কোটিরও বেশি লোকের দ্বারা কথ্য এবং বিশ্বের দেড় মিলিয়নেরও বেশি মুসলমান আরবী ভাষা ব্যবহার করে। ইউএনও, ওআইসি, আরব লীগের দাপ্তরিক ভাষা হল আরবী। ভারত অনেক ভাষা ও সংস্কৃতির জন্মভূমি। পশ্চিমবঙ্গ হল ভারতের রাজ্যগুলির মধ্যে অন্যতম। এখানকার জনগণের মধ্যে ধর্ম ও সংস্কৃতির সাথে প্রাসঙ্গিকতা রয়েছে এমন পঁচিশ শতাংশ ছেলে-মেয়ে আরবী ভাষা শিখতে চায়। কিন্তু সেক্ষেত্রে বিভিন্ন সমস্যা রয়েছে। সেই সমস্যাগুলোর মধ্যে একটি গুরুত্বপূর্ণ সমস্যা হলো তাদের বেশিরভাগই মাতৃভাষা হলো বাংলা বা অন্য কোনো ভাষা। এই প্রবন্ধটি পশ্চিমবঙ্গের শিক্ষার্থীদের আরবী চর্চা এবং ভাষা অধ্যয়নের সমস্যাগুলি চিহ্নিত করবে এবং সমস্যার সমাধানের পথ উন্মোচন করবে।

### আরবী ভাষার উৎপত্তি

আরবীয়দের সাথে ভারতের মূল ভূখণ্ডের নাগরিকদের যোগাযোগ হয়েছিল যখন আরবীয় নাবিকরা প্রারম্ভিক ইসলামী যুগে মশলা গ্রহণের জন্যে ভারতীয় ডকে নোঙর ফেলেছিল। ভারত এবং আরবীয়দের মধ্যে সংযোগ অত্যন্ত প্রাচীন যুগে শুরু হয়েছিল এবং আরব ব্যবসায়ীরা দুই দেশের মধ্যে সাংস্কৃতিক সম্পর্ককে শক্তিশালী করেছিল।<sup>1</sup> আরব বণিকদের মাধ্যমে ভারতীয়দের বাণিজ্যিক যোগাযোগ অব্যাহত ছিল ফলে ভারতীয়দের মধ্যে আরবী ভাষা বোঝার ও শেখার প্রয়োজনীয়তা দেখা দেয়েছিল।<sup>2</sup> এই ঘটনার পরে আরবীয়রা সিন্ধু প্রদেশে বসবাস শুরু করে। ফলে ভারতীয়রা আরবী ভাষা এবং ইসলামের সংস্পর্শে আসে। আরবীয় বণিক এবং ধর্ম প্রচারকদের ইসলামের চেতনায় অনুপ্রাণিত হয়ে সমগ্র ভারতে ইসলাম ছড়িয়ে পড়ে। তারা উপদেশ, দিক নির্দেশনা এবং উত্তম উদাহরণের মাধ্যমে সত্য ধর্মকে ছড়িয়ে দেওয়ার চেষ্টা করেছিল।

- 1 Oueslati, Oumaima, et al. "A review of sentiment analysis research in Arabic language." *Future Generation Computer Systems* 112 (2020): 408-430.
- 2 Abdelhamid, Abdelaziz A., et al. "End-to-end arabic speech recognition: A review." *Proceedings of the 19th Conference of Language Engineering (ESOLEC'19), Alexandria, Egypt. 2020.*

৭১১ খ্রিস্টাব্দে মুহাম্মদ বিন আল কাসিম<sup>3</sup> সিন্ধু জয় করার পর এটি বৃদ্ধি পায়। আব্দুল করিম বলেছেন “বাংলায় ইসলাম এসেছিল খ্রিস্টীয় অষ্টম শতাব্দীতে এবং তার আগে বণিকদের আগমন”। জগদীশ সরকার নারায়ণ লিখেছেন “ইসলামের বিকাশ ঘটেছিল ইখতিয়ার আল-দীন মুহাম্মদ বখতিয়ার খিলজির<sup>4</sup> বাংলা বিজয়ের পর”।<sup>5</sup>

### আরবী ভাষার গুরুত্ব

আরবী ভাষার সাথে এ দেশের সংখ্যাগরিষ্ঠ লোকের আত্মার সম্পর্ক। এদেশের আপামর জনসাধারণ আরবী ভাষাকে পরম শ্রদ্ধা করে। মন থেকে ভক্তি করে। হৃদয় দিয়ে ভালোবাসে। আরবী ভাষার যেমন রয়েছে ধর্মীয় গুরুত্ব তেমন রয়েছে বৈষয়িক গুরুত্ব। পৃথিবীর প্রায় ২৮ কোটি জনগোষ্ঠীর মাতৃভাষা আরবী। ২৫ কোটি মানুষ আরবীকে দ্বিতীয় ভাষা হিসেবে ব্যবহার করে। অপর দিকে অর্থনৈতিক বিবেচনায় আরবী ভাষা ভারতের জন্য অতি গুরুত্বপূর্ণ ভূমিকা রাখে। রেমিটেন্সকে দেশের অর্থনীতির অন্যতম শক্তি ধরা হয়। এ রেমিটেন্সের সিংহভাগই অর্জিত হয় আরবী ভাষার দেশসমূহ থেকে। এদেশের জনগণ যখন আরব দেশে যায় তখন তারা ভাষা না জানায় বেশ বিড়ম্বনায় পড়ে। তারা যদি ভালোভাবে আরবী ভাষা জানতো তবে তারা আরব দেশে নিজেদের অবস্থান আরও মজবুত করতে পারতো। তাদের ন্যায্য সুযোগ-সুবিধা আরো বেশি আদায় করে নিতে পারতো। তাই ভারতকে অর্থনৈতিক ভাবে আরো চাঙ্গা করার লক্ষ্যে আরবী ভাষাকে রাষ্ট্রীয়ভাবে গুরুত্ব দেওয়া দরকার।

ধর্মীয় দৃষ্টিকোণ থেকে আরবী ভাষার কোনো বিকল্প নেই। ইসলামের যে কোনো বিধান অনুধাবন করতে হলে আরবী ভাষা জানতে হবে। আল-কোরআন ও হাদিসের সঠিক মর্ম বের করতে হলে আরবী ভাষা জানা প্রয়োজন। আরবী ভাষা অধ্যয়ন বা আয়ত্ত্ব করা ছাড়া কোনো লোক ইসলামের কোনো বিষয়ের ওপর ফতোয়া দিতে পারবে না। তাফসির বা আল-কোরআনের ব্যাখ্যা অন্যকে শিখাতে, বিধানগুলি বলতে হলে অবশ্যই তাকে আরবী ভাষায় দক্ষ হতে হবে। সুতরাং আমরা দেখতে পাচ্ছি যে আরবী ভাষা সর্বদিক থেকে আমাদের জন্য অতি প্রয়োজন। তাই আরবী ভাষা শিখার প্রতি আমাদেরকে আরো উৎসাহী হওয়া দরকার। এভাষা আরো বিস্তারের ক্ষেত্রে সরকারেরও পদক্ষেপ নেওয়া প্রয়োজন।

আরবী ভাষা আমাদের জীবনে চলার পথে প্রয়োজন তা আমরা সবাই কমবেশী জানি। যে জাতি যে ভাষাকে কেন্দ্র করে জীবন পরিচালিত করে সেই জাতির ওই ভাষার মধ্যে তাদের সংস্কৃতি ও কৃষ্টি-কালচার প্রস্ফুটিত হয়। একটি জাতির সংস্কৃতি বহন করে সেই জাতির ভাষা। সেভাষা যত মানুষের দৌড়গোড়ায়

3 মুহাম্মদ বিন আল কাসিম (মু. ৭১৫ খ্রি.) ছিলেন একজন উমাইয়া সেনাপতি ও মুসলিম বিজেতা। তিনি ভারতীয় উপমহাদেশে অন্তর্ভুক্ত সিন্ধু নদসহ সিন্ধু এবং মুলতান জয় করে তা ইসলামী উমাইয়া খেলাফতের অন্তর্ভুক্ত করেন। উইকিপিডিয়া, bn.wikipedia.org সংগ্রহের তারিখ- ০১ / ০৪ / ২০২৪

4 ইখতিয়ার আল-দীন মুহাম্মদ বখতিয়ার খিলজি (মু. ১২০৬ খ্রি.) ছিলেন তুর্কি আফগান যিনি বাংলা ও বিহারের পূর্ব ভারতীয় অঞ্চলে মুসলিম বিজয়ের নেতৃত্ব দিয়েছিলেন এবং নিজেকে তাদের শাসক হিসাবে প্রতিষ্ঠিত করেছিলেন। উইকিপিডিয়া, en.wikipedia.org সংগ্রহের তারিখ- ০১ / ০৪ / ২০২৪

5 Taslim Ahmad, (2020). *The Arabic language in West Bengal: Problems and Solutions*, International journal of creative research thoughts ( IJCRT)volume 10 (842p)

পৌছবে সে জাতির সংস্কৃতিও তার কাছে পৌছে যাবে। আরবী ভাষা ইসলামের সংস্কৃতি বহন করেছে। ইসলামী সংস্কৃতি বুঝতে হলে আরবী ভাষাকে বুঝতে হবে। আমাদের শিক্ষাঙ্গনগুলোতে আরবী বলা, লেখা ও বুঝার ব্যাপারে আরো উদ্যোগী হতে হবে। বিশ্ববিদ্যালয় ও মাদ্রাসার আরবী বিভাগের প্রতিটি শিক্ষার্থী অনর্গল আরবীতে কথা বলতে পারে সেদিকে সজাগ দৃষ্টি দিতে হবে।

আরবী ভাষার গুরুত্ব অপরিসীম। আল-কোরআন ও সুন্নাহ আরবী ভাষায় বর্ণিত হওয়ায় এর গুরুত্ব সর্বকালে প্রায় সমান। আরবী ভাষা ইসলামী জ্ঞানচর্চা ও মুসলিম সমাজ-সংস্কৃতির অবিচ্ছেদ্য অংশ। মহান আল্লাহ তাআলা বলেছেন " **اَنَا أَنْزَلْنَاهُ قُرْآنًا عَرَبِيًّا لَعَلَّكُمْ تَعْقِلُونَ** " অর্থাৎ আরবী ভাষায় কোরআন অবতরণ করেছে, যাতে তোমরা উপলব্ধি করতে পারো।<sup>6</sup>

### আরবী ভাষা শিক্ষার্থীদের সমস্যা

প্রকৃতপক্ষে ব্যাকরণ, বাক্য গঠন, উচ্চারণ ব্যুৎপত্তিগত দিক থেকে আরবী ভাষা অনেক সমৃদ্ধ। এর অধ্যয়ন এবং শেখা আরবী শিক্ষার্থীদের জন্য বেশ কঠিন। শিক্ষার্থীদের সবচেয়ে গুরুত্বপূর্ণ সমস্যাগুলির মধ্যে রয়েছে:

### আরবী ও বাংলা ভাষার প্রকৃতিগত পার্থক্য

আরবী ভাষায় বর্ণমালা, উচ্চারণ, ধ্বনি, শৈলী ও লেখার ধরন ইত্যাদির ক্ষেত্রে আরবী ডানদিকে লেখা হয়। আর বাংলা ভাষায় বাম দিক থেকে। বাঙালিরা তাদের মাতৃভাষায় এটি উচ্চারণ করতে গেলে বেশ কঠিন মনে হয়। যেমন س (সীন), ش (শীন), ص (ছোয়াদ), ث (থা) ح (হা), ه (হা), ع (আইন), ء (হামজা), ذ (জাল), ض (দ্বাদ)। তারা (عرب) আরবের পরিবর্তে (أرب) আরব পড়ে, شريف পরিবর্তে (سريف) (সম্মানস্ত ব্যক্তি), এবং حمد পরিবর্তে (همد) (প্রশংসা) পড়ে।

তারা দীর্ঘ অক্ষরের কোন হিসাব নেয় না। কখনও কখনও তারা মুক্ত শব্দ দীর্ঘ সিলেবলকে প্রসারিত করে আবার কখনও কখনও তারা দীর্ঘ উচ্চারণ হলেও শব্দটিকে প্রসারিত করে না। মাতৃভাষা বাংলায় আরবী ভাষা শেখা বা সঠিক শব্দ ও উচ্চারণে কথা বলা শিক্ষার্থীদের জন্য একটি বড় সমস্যা।

### অব্যবহৃত ব্যাকরণগত বা রূপগত নিয়মের উপস্থিতি

ব্যাকরণগত এবং রূপগত দিক থেকে বাঙালিদের আরবী ভাষা শেখার ক্ষেত্রে সবচেয়ে গুরুত্বপূর্ণ সমস্যাগুলির মধ্যে একটি হল আরবী বাক্যের নিয়মগুলি (فاعلক্রিয়া) তারপর مفعول (কর্তা) তারপর مفعول (কর্ম) দিয়ে শুরু হয়। কিন্তু বাংলা বাক্য শুরু হয় বিষয় দিয়ে subject (উদ্দেশ্য) তারপর object (বিধেয়) দ্বারা। আরবী ভাষায় সংখ্যা পদ্ধতি অন্যান্য ভাষার তুলনায় কঠিন। এই ব্যাকরণগত নিয়ম এবং শর্তাবলী বাংলা ভাষায় পাওয়া যায় না। তাই এর শিক্ষার্থীরা এভাষা শেখায় অনীহা প্রকাশ করে। ছাত্ররা যখন পরবর্তী ক্লাসে উন্নীত হয় সেখানেও তারা প্রচুর ব্যাকরণের সম্মুখীন হয়। তারা তাদের গ্রামার মুখস্থ করতে বাধ্য হয়।

6 আল-কুরআন কারীম (১২: ০২)

অবশেষে তারা ধারণা পায় যে ব্যাকরণ ছাড়া আরবী ভাষা সম্ভব নয়।

#### সমস্যা সমাধানের জন্য কিছু পরামর্শ

১) ছাত্র, শিক্ষক এবং কর্তৃপক্ষের অবিরাম প্রচেষ্টা এবং দৃঢ় সংকল্পের মাধ্যমে এই আরবী ভাষা অধ্যয়নের সমস্যাগুলি কাটিয়ে তুলতে হবে। আধুনিক সময়ের চাহিদা এবং সেই অনুযায়ী ছাত্রদের বয়স ও আগ্রহ অনুযায়ী একাডেমিক কোর্সগুলো খোলা দরকার। আমাদের শিক্ষার্থীদের জন্য পাঠ্যপুস্তক প্রস্তুত করা উচিত যেখানে আমরা শব্দভান্ডার এবং সহজ শব্দ চয়ন করতে পারি।

২) আমাদের দৈনন্দিন জীবনে আমাদের অনুভূতি এবং চিন্তাভাবনা প্রকাশ করতে হবে। বিভিন্ন স্কুল, কলেজ ও বিশ্ববিদ্যালয়ে আরবী ভাষা শেখানোর জন্য যোগ্য শিক্ষক নির্বাচন করতে হবে। যাতে তারা একটি আকর্ষণীয় শিক্ষণ ও শেখার পরিবেশ গড়ে তুলতে পারে।

৩) আরবী গবেষণায় আধুনিক অডিও-ভিজুয়াল প্রযুক্তির ব্যবহার, যেমন ভাষা পরীক্ষাগার, শোনার ডিভাইস, ভিডিও টেপ, ভিডিও স্লাইড, কম্পিউটার ডিস্ক ইত্যাদি।

৪) পশ্চিমবঙ্গের সরকারী স্কুল, কলেজ এবং বিশ্ববিদ্যালয়ে আরবী ভাষা শিক্ষার জন্য একটি স্বাধীন পরিবেশ তৈরি করা দরকার। শিক্ষার্থীদের ভাষার দক্ষতার বিকাশের জন্য আধুনিক প্রযুক্তির ব্যবহার অত্যন্ত প্রয়োজন।

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- ১) Ahmad, Taslim,(2022).*the Arabic language in west Bengal: Problem and solutions*, International journal of creative research thoughts(IJCRT) volume 10.
- ২) Oueslati, Oumaima, et al. “A review of sentiment analysis research in Arabic language.” *Future Generation Computer Systems* 430-408 :(2020) 112.
- ৩) Abdelhamid, Abdelaziz A., et al. “End-to-end arabic speech recognition: A review.” *Proceedings of the 19th Conference of Language Engineering (ESOLEC’19)*, Alexandria, Egypt. 2020.
- ৪) করিম, ড. আবদুল “ভারতীয় উপমহাদেশে মুসলিম শাসন” (ঢাকা, বাংলা একাডেমী, ১৯৯৯)
- ৫) মুহাম্মাদ, ড. কাজী দ্বীন “বাংলাদেশে ইসলামের আবির্ভাব ও ক্রমবিকাশ” (ঢাকা, ইসলামিক ফাউন্ডেশন, বাংলাদেশ, ১৯৯৫)
- ৬) <https://roar.media/bangla/main/history/origin-and-evolution-of-arabic-language> Date: 20.02.2024

# IMPORTANCE OF ONLINE EDUCATION IN 21<sup>st</sup> CENTURY

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## **Abstract:**

Online education, also known as distance learning or e-learning, has revolutionized the way people learn. This educational approach utilizes technology, primarily the internet, to deliver educational content and facilitate learning experiences. It offers a flexible and accessible alternative to traditional classroom settings, allowing learners to access educational resources from anywhere at any time.

While online education has gained significant popularity due to its convenience and accessibility, it also presents unique challenges and considerations. Factors such as technological infrastructure, student engagement, and quality assurance play crucial roles in the success of online learning programs. As technology continues to advance, online education is poised to become an even more integral part of the global educational landscape.

The abstract of online education in the 21<sup>st</sup> century highlights the transformative impact of digital technologies on learning. As traditional boundaries of time and space blur, online education offers flexibility and accessibility. It leverages diverse multimedia resources, fosters interactive collaboration, and adapts to individualized learning styles. Challenges include digital divides and the need for pedagogical innovation. The abstract underscores the dynamic evolution of education in the digital age, shaping a globalized, technology-driven learning landscape.

## **Introduction:**

The 21<sup>st</sup> century has witnessed a transformative shift in education with the widespread introduction of online learning. Enabled by advancing technology, online education

provides flexible access to diverse courses, fostering global connectivity and personalized learning experiences. This paradigm shift has redefined traditional classroom boundaries, making education more accessible, interactive, and adaptable to individual needs.

**Key Words:** Virtual classrooms, e-learning, webinars, asynchronous learning, MOOCs (Massive Open Online Courses), online collaboration, interactive content.

### **Features of Online Education:**

**Flexibility:** Online education offers flexibility in terms of when and where learning occurs, allowing students to create a schedule that fits their needs.

**Accessibility:** Students can access course materials and lectures from anywhere with an internet connection, making education more accessible to a global audience.

**Diverse Learning Resources:** Online platforms often provide a variety of multimedia resources, such as videos, interactive simulations, and digital textbooks, enhancing the learning experience.

**Self-Paced Learning:** Many online courses allow students to progress at their own pace, accommodating different learning styles and preferences.

**Cost-Effective:** Online education can be more affordable than traditional on-campus options, as it eliminates commuting and may have lower tuition fees.

**Global Collaboration:** Students can collaborate with peers from around the world, fostering a diverse and enriching educational experience.

**Personalized Learning:** Some online platforms use adaptive learning technologies, tailoring content to individual student needs and providing targeted feedback.

**Career Advancement:** Online courses often allow individuals to acquire new skills and credentials without interrupting their careers, enabling professional development.

**Interactive Communication:** Online education platforms facilitate communication through discussion forums, chat, and video conferencing, promoting interaction between students and instructors.

**Up-to-Date Content:** Digital platforms can be updated easily, ensuring that course content remains current and relevant in rapidly changing fields.

**Reduced Environmental Impact:** Online education can contribute to sustainability by minimizing the need for commuting and printed materials.

**Diverse Course Offerings:** Online education provides access to a wide range of courses, including niche subjects that might not be available locally.

Keep in mind that the effectiveness of online education can vary based on individual preferences, the nature of the subject matter, and the level of engagement from both students and instructors.

**Various Forms of Online Education :** Online education comes in various forms, including:

**Synchronous Learning:** Real-time interaction with instructors and classmates through video conferences or live chats.

**Asynchronous Learning:** Self-paced learning with pre-recorded lectures, discussion forums, and assignments that can be accessed at any time.

**MOOCs (Massive Open Online Courses):** Courses designed for large-scale participation, often offered by universities and organizations, accessible to anyone with an internet connection.

**Hybrid or Blended Learning:** Combining online instruction with traditional in-person classes.

**Virtual Classrooms:** Platforms that simulate a traditional classroom environment with features like video conferencing, chat, and collaborative tools.

**E-learning Platforms:** Dedicated platforms providing a wide range of courses and resources, often with interactive elements.

**Corporate Training:** Online programs designed for employee skill development and training within organizations.

**Microlearning:** Bite-sized, focused learning modules that address specific topics or skills.

**Gamified Learning:** Incorporating game elements to engage and motivate learners.

**Language Learning Apps:** Apps designed for learning languages, offering interactive lessons and exercises. Each type has its advantages and is suited to different learning preferences and goals.

**Benefits of online Teaching and Learning :** Online teaching and learning offer several benefits, including flexibility in scheduling, accessibility from anywhere, diverse learning resources, personalized learning experiences, and the ability to accommodate different

learning styles. Additionally, online education often promotes self-discipline and fosters technological skills, preparing learners for the digital age.

**Effect of Online Teaching and Learning in Higher Education:** Effective online teaching and learning in higher education involves creating engaging, interactive, and accessible digital environments. This includes clear communication, well-organized content, and opportunities for student collaboration. Utilizing various multimedia formats, providing timely feedback, and fostering a sense of community through virtual discussions can enhance the overall learning experience. Additionally, incorporating assessment strategies that align with online delivery methods and leveraging technology to facilitate active participation are key aspects of successful online education.

**Online Courses VS Face to- Face Courses:** Online courses are typically conducted over the internet, allowing students to learn remotely. Face-to-face on the other hand, involve in-person interaction in a physical classroom. Online courses offer flexibility, while face-to-face courses provide immediate feedback, direct interaction with instructors and classmates. Online courses often rely on digital materials, while face-to-face courses may use physical textbooks. Each format has the choice depending on individual preferences, learning styles, and logistical considerations.

**About Online Student's Retention:** Student retention in online education can be influenced by factors like engagement, course design, and support services. Establishing clear communication channels, interactive content, and addressing technological challenges can contribute to better retention rates. Regular feedback and a sense of community can also enhance the online learning experience, fostering a higher likelihood of students staying engaged and completing their courses.

**Online Interaction:** Online interaction in online education refers to the various ways students and educators engage with each other over the internet. This can include live discussions through video conferencing, participation in virtual classrooms, exchanging messages on discussion forums, collaborative projects, and submitting assignments electronically. It aims to replicate the interactive aspects of traditional classroom settings in a digital environment, fostering communication, collaboration, and active learning.

### **Why is Online Learning the Future of Education?**

Effective Online learning in 2023 is increasingly considered the future of education

due to its flexibility, accessibility, and adaptability. It allows students to access a wide range of courses from anywhere, at any time, fostering a more personalized learning experience. Additionally, advancements in technology enable interactive and engaging online platforms, making education more dynamic and inclusive. The convenience and cost-effectiveness of online learning contribute to its growing prominence in shaping the future of education.

### **Advantages of Online Learning:**

**Flexibility** : Online education offers flexibility in terms of scheduling, allowing students to access materials and lectures at their own pace. This flexibility accommodates diverse learning styles and enables individuals to balance education with work or other commitments.

**Reduced Costs**: Reducing costs in online education can involve leveraging open-source resources, minimizing administrative expenses, and exploring partnerships for shared resources. Additionally, optimizing technology infrastructure and embracing scalable solutions can contribute to cost efficiency.

**More Free Time** : If you have more free time for online education, consider exploring new subjects or deepening your knowledge in areas of interest. Many platforms offer free courses, such as Coursera, Khan Academy, and edX. Find a topic you're passionate about and enjoy the learning process!

**Increased Course Variety** : The expansion of online education has led to a diverse range of courses, catering to varied interests and professional needs. This increased variety offers learners more flexibility and opportunities to pursue specific areas of interest.

**Career Advancement Opportunities**: Online education offers various career advancement opportunities by providing accessible and flexible learning options. It allows individuals to acquire new skills and credentials, enhancing their qualifications for promotions or career shifts. Additionally, online courses often focus on practical, in-demand skills, making graduates more competitive in the job market. Continuous learning through online platforms can demonstrate dedication to professional development, contributing to career growth and increased opportunities.

**Increased Collaboration** : The increased collaboration in online education has fostered diverse perspectives, enriched learning experiences, and facilitated global knowledge sharing among students and educators.

**Personalized Education** : Personalized education in online learning tailors the

learning experience to individual needs, adapting content and pace to suit each learner's strengths and weaknesses. This approach fosters a more effective and engaging learning environment, promoting better understanding and retention of information.

**Enhanced Time Management Skills:** To enhance time management skills in online education, create a schedule, set clear goals, minimize distractions, take regular breaks, and use productivity tools. Consistency and self-discipline are key.

**Immediate Feedback :** Online education provides the advantage of immediate feedback through features like quizzes, instant grading, and discussion forums, enhancing the learning experience by allowing students to address misconceptions promptly.

**Disadvantages of Online Education:**

**Repeated Access to Course Materials :** Repeated access to course materials in online education can have some disadvantages. Firstly, it may lead to a lack of engagement as students might procrastinate, assuming they can revisit materials later. Additionally, constant revisiting without active participation or interaction can hinder a deeper understanding of the content compared to live discussions or face-to-face interactions in traditional classrooms.

**Teacher Training :** Teacher training for online education may face challenges in providing hands-on experience and real-time feedback. Educators may find it difficult to adapt instructional methods to the online environment, leading to potential gaps in effective pedagogy. Additionally, online platforms may lack the immediacy and spontaneity of face-to-face interactions, impacting the development of dynamic teaching skills. Limited opportunities for peer collaboration and observation can also hinder the sharing of best practices among educators, potentially impeding the overall quality of online teaching.

**Network and other Technological problems :** Online education faces various challenges, including:

**Internet Connectivity:** Unequal access to reliable high-speed internet can hinder participation for students in remote or underserved areas. **Technical Issues:** Students may encounter hardware or software problems, such as outdated devices or incompatible software, impacting their ability to engage in online classes.

**Digital Literacy:** Some students and educators may lack proficiency in using online tools, leading to difficulties in navigating virtual learning environments.

**Security Concerns:** Online platforms may be vulnerable to security breaches, risking

the exposure of sensitive information or disruptions to the learning process.

**Engagement and Motivation:** Maintaining student engagement and motivation can be challenging in virtual settings, as students may feel isolated or struggle with self-discipline.

**Economic Barriers:** Affordability of necessary devices and internet services can be a barrier, particularly for economically disadvantaged students.

**Accessibility:** Ensuring that online content is accessible to students with disabilities is crucial, yet it can be challenging without proper design and accommodations.

**Teacher Training:** Educators may need training to effectively utilize online tools and methodologies, impacting the quality of online instruction. Addressing these challenges requires a comprehensive approach involving infrastructure development, digital literacy initiatives, and ongoing support for both students and educators.

**Lack of Interpersonal Communication:** Certainly, the lack of face-to-face interaction in online education can lead to challenges in interpersonal communication. Students may miss out on non-verbal cues, spontaneous discussions, and the personal connections that often occur in traditional classrooms, impacting their overall learning experience and social development.

**Parents increased accountability:** Parents' increased accountability in online education can come with challenges such as the need for technical proficiency, time commitment, and the responsibility to provide a conducive learning environment. Additionally, parents may face difficulties in monitoring and supporting their child's progress, especially if they are not well-versed in the subject matter being taught. Balancing work and parenting responsibilities can also become more demanding in the context of online education.

**Manage Screen Time:** Managing screen time is a challenge in online education due to the following disadvantages:

**Eye Strain and Fatigue:** Prolonged screen exposure can lead to eye strain and fatigue, impacting students' focus and overall well-being.

**Limited Physical Activity:** Online learning often involves extended periods of sitting, contributing to a sedentary lifestyle and potential health issues.

**Distractions and Multitasking:** Students may be prone to distractions from other digital devices or unrelated activities, reducing their engagement and comprehension of the educational content.

**Social Isolation:** Excessive screen time may lead to social isolation as students miss out on face-to-face interactions with peers and instructors, hindering the development of social skills.

**Technical Issues:** Connectivity problems, software glitches, or device malfunctions can disrupt the learning process, causing frustration and hindering educational progress.

**Digital Fatigue:** Continuous exposure to digital content can lead to digital fatigue, impacting cognitive function and concentration during online classes.

**Dependency on Technology:** Online education's heavy reliance on technology may create a dependency that could be problematic if students struggle to adapt to non-digital learning environments.

**Screen Addiction Concerns:** Excessive screen time may contribute to screen addiction, with students finding it challenging to disconnect and allocate time to non-screen-related activities. Addressing these challenges requires a balanced approach to screen time management, incorporating breaks, physical activities, and strategies to minimize distractions for a more effective online learning experience.

**Applications of Online Education:** Online education has various applications, including:

**Accessibility:** Enables access to education from anywhere, overcoming geographical barriers.

**Flexibility:** Allows learners to study at their own pace and schedule, accommodating diverse learning styles.

**Cost-effectiveness:** Reduces the need for physical infrastructure, travel, and printed materials, making education more affordable.

**Global learning community :** Connects learners with diverse perspectives, fostering a global learning community.

**Lifelong Learning:** Facilitates continuous skill development and education throughout one's life.

**Personalization:** Offers adaptive learning platforms that cater to individual learning needs and preferences.

**Resource Availability:** Provides a wealth of digital resources, multimedia content, and interactive tools to enhance learning experiences.

**Innovative Teaching Methods:** Allows educators to explore creative and interactive teaching approaches using technology.

**Real-time Assessment:** Enables instant feedback and assessment through online

quizzes, discussions, and interactive assignments.

**Professional Development:** Supports professionals in updating skills and staying current in their respective fields.

**Remote Collaboration:** Fosters collaboration among students and educators globally, promoting diverse perspectives and collaborative learning.

**Environmental Impact:** Reduces the carbon footprint associated with traditional education by minimizing commuting and paper usage. These applications highlight the transformative potential of online education in addressing the evolving needs of learners and educators.

**Importance of Online Education:** Online education offers flexibility, accessibility, and a diverse range of courses, making learning more inclusive and accommodating various schedules. It promotes lifelong learning, allowing individuals to acquire new skills, enhance career prospects, and adapt to evolving industries. Additionally, online education fosters global connectivity, breaking down geographical barriers and creating opportunities for diverse cultural exchanges in the virtual learning environment.

### **Conclusion:**

The conclusion on online education in the 21st century is nuanced. While it offers increased accessibility, flexibility, and diverse learning resources, challenges like the digital divide and concerns about the quality of online learning persist. Striking a balance between traditional and online education, addressing technological disparities, and continually improving online pedagogy are crucial for its continued evolution.

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# CHANGING NATURE OF FEMALE EMPLOYMENT IN RURAL INDIA: ANALYSIS WITH SURVEY DATA

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## ***Abstract***

*The present study examines the changing pattern of female employment in rural India by principal activity status during 2011-12, 2017-18 & 2022-23 for the age cohort 15-65. The entire distribution is divided between the share of rural females in economic activities and household activities which helps us to determine what percentage of working age females in rural India are engaged in economic activities and what is the share of rural females in domestic activities. Caste and education are considered as the two crucial determinants in the distribution of rural females by activity status. The study reveals that over the years participation in domestic activities declined among rural working age females which is mainly due to their huge involvement in self-employment activities as an own-account worker during 2022-23. The study finally concludes with policy suggestions to conduct more female entrepreneurship programmes by the Governments at local and national level.*

## **1.1 Introduction**

The status of female employment has been a subject of research interest since the post reform period. It is observed that women participation in the labour market declined gradually. The Economic Survey also points out the alarming fact of low female labour force participation in Indian labour market. The participation of women in the labour market depends upon several household and social factors. As women in our society are primarily thought of as caregivers of the family so their movement is very much restricted outside the household. So the welfare of women has always been a priority among the

policymakers of India. Moreover, Sustainable Development Goal (SDG) 5 aims at gender equality and empowerment by ending all forms of discrimination against women in India.

The contribution of women in the labour market is very crucial to being empowered and increasing bargaining power inside and outside the household. Moreover, for an overall development of a nation, the equal development of men and women is required, and the development of women is only possible through their empowerment, especially financial empowerment. In this backdrop, this paper examines the changing pattern of women employment by their distribution in different activity status for the periods 2011-12, 2017-18 and 2022-23 focussing only on rural India. The logic behind consideration of only rural India is that as women in the rural sectors of our country are more vulnerable from all the grounds and they are also deprived of proper education. So from this perspective, this study analyses the pattern of women's employment in the rural sector of India from 2011-12 to 2022-23 using the data collected by the National Sample Survey Organization to observe the transition in employment pattern during this long period of eleven years.

Social status is one of the important factors which determine the type of activity performed by a person, given other factors remain the same. This study wants to focus that whether the persons in vulnerable social group are gainful or not in employment in terms of pay and job related other benefits. There are some social customs which may have some influence in making decision on labour market participation, particularly by the women. Education is the another most important factor determining the type of activity of a person. By following the human capital theory (Becker 1964 and Mincer 1984), we also test the hypothesis that higher level of education enhances the probability of getting good quality job with higher pay.

Human capital increases a worker's productivity although at different rates in different activities, organizations, and situations (Becker 1964). Education is conventionally used as proxy for human capital. Higher level of education raises a person's earning through the productivity enhancing factors. According to Mincer (1958), investment in human capital can take the form of expenditures on education, and job training for an individual's earning capacity.

In this study we examine the role of education in selecting activity type by a person.

The information on education is provided at the personal level in different categories. We utilize this information in our empirical analysis by constructing different dummies for different education levels. Opportunities to get quality education may not be the same across genders. We examine how this kind of discrimination, if any, affects the choice of activity in the labour market.

## **1.2 Literature Review**

Fernandez and Puri (2023) examined that female labour force participation is higher in rural India than urban India and the jobs in rural India was highly skewed towards agriculture, where the women workers receive lower wages. Sahu & Behera (2023) addressed the problem of gender inequality in employment using PLFS data from 2017-18 to 2020-21 through the perspective of Sustainable Development, as achieving gender equality and empowering girls is one of the goals of Sustainable development. Srija and Vijay (2021), using Time Use Survey 2019 and PLFS data (2018-19), found that females in India have to perform a huge load of household and care giving activities instead of being highly literate. Sundari (2020) focussed to examine the relationship between women employment in India and the change in GDP and found that there is neither quantitative nor qualitative improvement in women participation over the periods with structural transformation which implies that economic growth cannot generate sufficient jobs for women. Bishnu et.al (2024), using (2004-05) NSSO and (2018-19) PLFS data mentioned that rise in the household income with a larger increase in male wages than female wages, reduced the need for women from additional supply of family income, thus increasing the drop out rate.

## **1.3 Objective of the study**

The main objective of this study is to examine the changing nature of female employment in rural India between 2011-12 to 2022-23 for the working age cohort 15-65. To observe the changing pattern of female employment during this era, we have considered three periods which are 2011-12, 2017-18 and 2022-23 using NSSO data for the first period and PLFS data for rest of the two periods. The pattern of the female employment has been analysed by their participation in different principal activity status during the mentioned periods. As education and caste are the two primary factors which

determine a position of the worker in the labour market , so this study also analyses the distribution of female employment according to their level of education and also by their social groups for the periods 2011-12 , 2017-18 and 2022-23. The distribution helps us to understand the major concentration of rural working age women towards different economic activities for several periods. This study also examines the share of total rural working age women between economic activities and household activities from which we can infer whether they are primarily engaged in domestic activities or participate in economic activities. By observing the changing pattern we can get inference about current trends of women employment in present rural India and how they differ in employment status by their education level and caste groups. Moreover, the periods of this study is also very significant as the last period considered here that is 2022-23 can be regarded as a period after the COVID -19 pandemic so the distribution pattern in this period can reflect the effect of pandemic on the employment of women after pandemic.

#### **1.4 Data**

This study use NSSO 68<sup>th</sup> round data ( 2011-12) of ‘Employment and Unemployment’ and Periodic Labour Force Survey (PLFS) 2017-18 and 2022-23 data. The basic objective of the employment-unemployment surveys of NSSO is to get estimates of the employment and unemployment characteristics at national and State level. The PLFS is independent of the usual survey on employment and unemployment of NSSO . There are several classifications on employment types in the PLFS schedule.

#### **1.5 Distribution by activity status**

Table 1 represents the changes in activity of rural working age people over 68<sup>th</sup> round (2011-12) and PLFS (2017-18) and (2022-23) among female workers only. Here, we are analysing the change in activities in terms of principal activity status where a women spent maximum of her working time during the reference period of 365 days. There are different categories of activity status as mentioned in the survey schedule like self-employed, wage employed and others. The self-employed persons are of three types: own account worker, employer, and unpaid family work. Wage employment is of two types: employment on regular basis and employment on casual basis. The dataset we have used also considers activities like domestic duties, students and unemployed.

It is observed that during 2011-12 around 30 percent of rural females were engaged in economic activities which declined marginally to 27 percent at 2017-18 but surprisingly it increased up to 43 percent during 2022-23. This drastic increase in the participation of economic activities among rural females was mainly due to huge participation in self-employment activities associated with own-account and unpaid family work. Analysis reveals that between a gap of 5 years own-account activity among rural female workers increased about 8 percent and unpaid family work increased about 6 percent. The increase in female own-account worker during recent years in rural India can be regarded as an effect of the COVID-19 pandemic. As there is a huge job loss in wage employment activities so many of them shifted to self-employment activities by setting up a small business to sustain their livelihoods. The unpaid family activity declined during 2017-18 but it increased again during 2022-23.

In case of wage employment activities, the participation of rural females in both regular and casual wage activities has increased gradually during the study periods. It is observed that the rate of participation in casual wage activities was higher than the regular wage activities among rural females which was quite obvious due to the limited availability of formal jobs in rural India.

Among all the principal activities, the rate of participation of rural females was higher in home based activities. Notably during 2011-12 and 2017-18 the share of rural females in household activities was about 70 percent which declined to 56 percent during 2022-23. This decline in household activities among rural females in recent years is mainly associated with the increased participation of rural females in self-employment activities mainly in own-account work.

**Table 1:** Distribution (in percentage) of rural working age females by activity status during 2011-12 , 2017-18 and 2022-23

Principal Activities	2011-12	2017-18	2022-23
Self-Employment Activities			
Own-account worker	7.00	5.63	13.92
Employer	0.16	0.12	0.24

Unpaid family worker	10.88	9.97	15.76
Wage Employment Activities			
Regular salaried worker	3.7	4.29	5.09
Casual worker	7.29	7.38	8.25
Home Based Work			
Household activities	33.52	50.84	33.18
Household activities with other works	37.46	21.76	23.58

Source- Author's own calculation from NSSO 2011-12 and PLFS 2018-19 & 2022-23

### 1.6 Distribution by the level of education

Level of education determines the entry of a person into the labour market. Education is one of the most important factors influencing female labour force participation. Human capital theories underline the importance of education in employment outcomes. According to Becker (1964) workers' education increases labour productivity at different rates in different activities. Table 2 describes the distribution of rural females according to their level of education by activity status. It is observed that the low literate female workers were mainly engaged in unpaid family work or casual work in the labour market and others who are out of the labour market maximum of them are engaged in household activities which increased in 2017-18 but then it declined during post pandemic periods. The higher educated female workers in the workforce mainly engaged in regular salaried activities though the share declined consistently over the study periods. The most surprising fact is that more than half of the female with education level graduation & above were engaged in performing household& associated activities and even this share rose up to more than 60 percent during 2017-18 but then it declined marginally at the post COVID period mainly due to their increasing participation in own-account activities.

The justification behind a huge participation of educated females in household activities in rural India may be due to fact that it is a general belief that an educated woman generally get married with an educated man who have higher income . Since high income families do not have any higher requirement of any extra income so this encourages the labour force withdrawal of women. On the other hand , since in the rural society girls face

various social restriction to move outside specially married ones , so in may times they face opposition from their households to participate in the labour market. Thus, according to the literatures women’s declining labour force participation with education is related to two factors: (1) Structural effect due to lack of opportunities for educated women; and, (2) cultural effects whereby high socioeconomic status simultaneously encourages higher education and labour force withdrawal.

**Table 2:** Distribution (in percentage) of rural working age females across principal activities by the level of education during 2011-12, 2017-18 & 2022-23

Principal Activities	2011-12	Illiterate			Primary & Middle School			Secondary/ HS			Graduate & above		
		2017-18	2022-23	2011-12	2017-18	2022-23	2011-12	2017-18	2022-23	2011-12	2017-18	2022-23	
Own-account worker	8.45	6.04	14.67	7.73	5.56	15.08	6.17	5.37	11.39	5.29	3.51	8.55	
Employer	0.14	0.15	0.18	0.29	0.11	0.28	0.43	0.08	0.23	0.75	0.15	0.14	
Unpaid family worker	20.25	12.92	20.41	17.71	9.46	15.33	12.38	6.45	11.86	5.39	2.54	6.14	
Regular salaried worker	1.01	1.38	2.01	1.94	2.86	3.36	10.21	8.98	8.37	32.08	27.72	26.64	
Casual worker	14.78	10.14	12.3	6.54	6.35	8.07	1.93	3.22	4.33	0.33	0.66	0.53	
Household activities	24.88	43.57	26.82	37.07	54.63	33.56	41.81	57.07	40.37	38.07	51.72	41.17	
Household activities with other works	31.02	24.78	23.89	28.68	21.02	24.18	27.03	18.82	23.43	18.06	13.67	16.82	

Source- Author’s own calculation from NSSO 2011-12 and PLFS 2018-19 & 2022-23

### 1.7 Distribution by social groups

Caste of a worker is another determining factor in the labour market. Figure 1 shows the distribution of rural female workers across different principal activities by their caste. Analysis reveals that the own-account activity and unpaid family work increased for all social group women workers between the period 2017-18 and 2022-23. It is observed that ST female workers have the maximum share in both own-account and unpaid family activity followed by upper caste female workers for all the considered periods. The regular salaried activities gradually increased over the periods among all social group female workers where the participation of ST female workers were marginally higher than other

group female workers. On other hand, casual wage activities was mainly dominated by SC workers where the share gradually increased over the study periods. Notably there was a high increment of casual wage activities among ST women workers between 2017-18 and 2022-23. Table 3 reveals that the household and other domestic activities was mainly performed by upper caste female workers for all the considered study periods. Notably , the participation of females in performing only household activities was highest during the period 2017-18 among all social group females which declined afterwards .

**Table 3:** Distribution (in percentage) of rural working age females across principal activities by the caste during 2011-12, 2017-18 & 2022-23

Principal Activities	ST			SC			OBC			Other Caste		
	2011-12	2017-18	2022-23	2011-12	2017-18	2022-23	2011-12	2017-18	2022-23	2011-12	2017-18	2022-23
Own-account worker	12.07	7.81	19.21	5.89	4.79	11.56	5.83	5.08	12.69	6.42	5.59	13.96
Employer	0.13	0.11	0.21	0.06	0.03	0.12	0.21	0.16	0.26	0.17	0.14	0.31
Unpaid family worker	18.74	15.62	25.62	6.85	6.27	10.37	11.05	10.04	15.53	8.42	8.77	12.78
Regular salaried worker	4.57	5.68	6.54	3.47	4.25	5.67	3.28	3.79	4.42	3.95	4.13	4.63
Casual worker	8.44	7.39	9.14	12.71	13.34	13.58	7.54	7.39	7.96	2.98	2.79	3.29
Household activities	22.28	40.21	18.74	28.04	47.71	34.22	36.59	52.53	36.2	38.86	58.04	38.43
Household activities with other works	33.74	23.16	20.53	42.96	23.61	24.47	35.49	21.01	22.92	39.2	20.51	26.58

Source- Author's own calculation from NSSO 2011-12 and PLFS 2018-19 & 2022-23

## 1.8 Conclusion and Policy Implications

This paper examined the changing nature of female employment in rural India during 2011-12, 2017-18 & 2022-23 by their participation in principal activities. Apart from this this study also analysed the distribution of working age female workers between economic and household activities during the mentioned periods. As caste and education are considered to be two important determinants which direct the participation in different quality jobs, the distribution of rural females has also been analysed by these two determinants across different principal activities. The study observed that though participation in economic activities declined between 2011-12 & 2017-18 among rural

females, it increased sharply during 2022-23 mainly due to a huge participation in own-account activity and unpaid family activity which are mainly distress relief jobs. This active participation of female workers in self-employment activity during 2022-23 may be viewed as an effect of the COVID-19 pandemic where many of them lost their jobs in formal employment and so started a small business to survive with the family. Due to this huge involvement in self-employment work the share of rural females considerably declined in household activities during 2022-23 which increased sharply during 2017-18. Analysis by education reveals that more highly educated female workers were engaged in regular salaried activities, as expected but over the years their share has declined in regular salaried jobs while they are concentrating more on own-account activity as well as unpaid family activity. Surprisingly a significant portion of the more highly educated females were also engaged in household jobs though this share declined during 2022-23. Analysis by caste reveals that own-account activity increased among all social group female workers during the period 2022-23, but to varying extents. Unpaid family work was mainly performed by ST workers which increased significantly between the study periods whereas casual work has been mainly dominated by SC female workers which increased marginally and the participation in regular salaried activities was marginally higher among ST female workers compared to other categories. It is observed that OBC and upper-caste female workers were mainly engaged in household activities compared with other categories, though their share declined during 2022-23 .

The overall analysis depicts the rise in work participation of rural females between the periods 2017-18 and 2022-23, mainly towards self-employment activities. This is notably a positive approach towards the path of female development though they are mainly distress relief jobs. Still, more active participation of rural females should be encouraged by the various training and entrepreneurship programmes by the government as it helps women to become self-reliant which is very important to establish their position in the society.

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## কালিদাসের নাটকগুলির সমালোচনামূলক তত্ত্বগুলির বিশ্লেষণ

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**সারসংক্ষেপঃ-** ভারতীয় সংস্কৃত সাহিত্যের দৃশ্য-ঐতিহ্যের বাহক, নাটক-ভেদের সঙ্গে সমাজের অটুট সংযোগ রয়েছে। সবসময় সুখী সমাপ্তি থাকার পাশাপাশি এই নাটকগুলো সমসাময়িক যুগের অবস্থাও প্রকাশ করতে সক্ষম। সংস্কৃত নাটক তাদের যুগের সামাজিক শ্রেণী, বিশ্বাস, আনুগত্য, নৈতিক ব্যবস্থা, ঐতিহ্য, সংস্কৃতি, পোশাক-পরিচ্ছদ, উৎসব ও শিল্পকলাকে অত্যন্ত পরিকল্পিতভাবে প্রকাশ করে।

কালিদাসের তিনটি নাটকেই অনেক জয়গায় পূর্ণ সাফল্যের সঙ্গে অভিনীত হয়েছে। তিনি সকল পণ্ডিত ও সাধারণ মানুষকে আনন্দের অমৃত পান করিয়ে সন্তুষ্ট করেছেন। তাঁর নাটকে জীবনের নানা সমস্যাকে সুস্পষ্টভাবে বিবেচনা করে বাস্তব রূপ দেওয়া হয়েছে। জীবনের লক্ষ্য সর্বদাই উচ্চ হতে হবে, সবার মধ্যে বিশ্বভ্রাতৃত্ববোধ জাগ্রত হতে হবে, অন্যের দুঃখ-কষ্ট দেখে দুঃখিত হওয়াটাই মানবতা ইত্যাদি অনেক ভালো ভাবনা তাঁর নাটকে তুলে ধরা হয়েছে। সাহিত্য সমাজের সংস্কৃতির উপাদানগুলিকে প্রতিফলিত করে, সমাজে প্রচলিত বিশ্বাস, উত্স এবং প্রথাগুলিকে চিত্রিত করার পাশাপাশি তাদের মূল্যায়ন করে অর্থাৎ সমসাময়িক যুগে তারা কতটা অনুকূল বা প্রতিকূল তা নির্ধারণ করে সমাজের প্রতি তার দায়িত্ব পালন করে। ‘অভিজ্ঞান’ মানে যার দ্বারা জানা যায় বা অজ্ঞানতাকে জ্ঞানে রূপান্তর করা হয় (কোনও বস্তুর অবস্থার জ্ঞান) এতে কিছু অজানা সত্য, প্রায়শই একটি গুরুত্বপূর্ণ রহস্যের আকস্মিক আবিষ্কারের কারণে গতি পরিবর্তিত হয়। পরিস্থিতি পরিবর্তিত হয় এবং নাটকের পথ পরিবর্তন, যা অনুকূল বা প্রতিকূল, আনন্দদায়ক বা দুঃখজনক হতে পারে। এইভাবে, অভিজ্ঞানশকুন্তলমে, কবি বস্তুকে (আংটি) ব্যক্তি (রাজা) দ্বারা এবং ব্যক্তি দ্বারা ব্যক্তি (রাজা দ্বারা সমস্ত অত্যাচারের রাজা, শকুন্তলা দ্বারা, তপস্বী দ্বারা, রাজা দ্বারা, শকুন্তলার দ্বারা) চিত্রিত করেছেন। , রাজার দ্বারা), এটি একটি আনন্দদায়ক সচেতনতা। এইভাবে বিক্রমোর্বশীয় নাটকে উর্বশীর স্বাভাবিক স্বীকৃতি আয়ুর মাধ্যমে সম্পন্ন হয়। আয়ু এবং উর্বশী উভয়ের পারস্পরিক স্বীকৃতির কারণে, পুত্র তার মাকে পায় এবং মা তার পুত্রকে পায়। অতএব, এটি একটি অনুকূল এবং আনন্দদায়ক স্বীকৃতি হিসাবে বিবেচিত হতে পারে। আবার মালবিকা এবং অগ্নি মিত্রের পরিচয় ফলে যে অভিজ্ঞান প্রাপ্ত হয়। তার পরিচয় প্রাপ্ত হয়। এই স্বীকৃতির পরে, রাজা এবং মালবিকার স্থায়ী মিলনের (স্বামী এবং স্ত্রী হিসাবে) পথ প্রশস্ত হয়। ভারতীয় সাহিত্যের বিশেষত্ব হল বাস্তবতাকে চিত্রিত করার সময়, এটি অবশ্যই শেষ পর্যন্ত একটি আদর্শ প্রতিষ্ঠা করে। সত্যম, শিবম,

সুন্দরম-এর উদ্দেশ্য ভারতীয় সাহিত্যেও গৃহীত হয়েছে।

**বিষয়সূচক শব্দ-** নাটক, অভিজ্ঞানতত্ত্ব, বিচারতত্ত্ব, অভিনয়, মানবতা, অজ্ঞানতা, আনন্দদায়ক, দুঃখজনক

**ভূমিকা-** কালিদাসের নাটকগুলির সমালোচনামূলক তত্ত্বগুলি বিশ্লেষণ করলে এটি স্পষ্ট হয়ে যায় যে তাঁর নাটকগুলিতে দুটি ধরনের উপাদান ব্যবহার করা হয়েছে - অভিজ্ঞানতত্ত্ব এবং বিচারতত্ত্ব।

অভিজ্ঞান শব্দের উৎপত্তি হল অভিজ্ঞা + ল্যুট 'করণাধিকারণ্যোশ্চ' সূত্র থেকে করণের অর্থে ল্যুট প্রত্যয় যোগ করে উত্পন্ন হয়েছে। 'অভিজ্ঞান' মানে যার দ্বারা জানা যায় বা অজ্ঞানতাকে জ্ঞানে রূপান্তর করা হয় (কোনও বস্তুর অবস্থার জ্ঞান) এতে কিছু অজানা সত্য, প্রায়শই একটি গুরুত্বপূর্ণ রহস্যের আকস্মিক আবিষ্কারের কারণে গতি পরিবর্তিত হয়। পরিস্থিতি পরিবর্তিত হয় এবং নাটকের পথ পরিবর্তন, যা অনুকূল বা প্রতিকূল, আনন্দদায়ক বা দুঃখজনক হতে পারে। সাধারণত, সনাক্তকরণ একটি বস্তু এবং ব্যক্তি উভয়েরই হতে পারে, তবে একজন ব্যক্তির সনাক্তকরণ আরও স্বাভাবিক। এই অভিজ্ঞান 4 প্রকারের হতে পারে- স্মৃতির উপর ভিত্তি করে অভিজ্ঞান, প্রাকৃতিক অভিজ্ঞান, লক্ষণের মাধ্যমে অভিজ্ঞান এবং যুক্তির মাধ্যমে অভিজ্ঞান।

**অভিজ্ঞানশাকুন্তলমে অভিজ্ঞা তত্ত্বঃ-** অভিজ্ঞানের ভিত্তিতেই মহান কবি কালিদাস এই বিখ্যাত নাটকটির নাম দিয়েছেন অভিজ্ঞানশকুন্তলম্। অভিজ্ঞান এই রূপকের প্রধান ঘটনা। ষষ্ঠ অঙ্কের শুরুতে, সেনাপতি যখন ধীর কর্তৃক প্রাপ্ত রাজার নামে চিহ্নিত আংটি নিয়ে রাজা দুষ্যন্তের কাছে আসে, তখন রাজা তার আংটি চিনতে পারেন এবং দুষ্যন্ত আংটি দেখার সাথে সাথে অভিশাপ মুক্ত হন। মনে পড়ে যে তার ছিল এই আংটি শকুন্তলাকে দিয়ে ছিলেন। এইভাবে, এই বস্তু (রিং) স্মারক মাধ্যমে সনাক্ত করা হয়। এই স্বীকৃতির সাথে সাথে পরিস্থিতির পরিবর্তন হয় এবং নাটকটি নতুন মোড় নেয়।

এই আংটি দেখার পর রাজা অনুতপ্ত হন এবং সমগ্র রাজ্যে বসন্ত উৎসব নিষিদ্ধ করেন এবং শকুন্তলার থেকে বিচ্ছেদের কারণে অনুতাপের আঁগুনে পুড়তে থাকেন।

রাজা (ধীরে ধ্যানে মগ্ন হয়ে) প্রথমে প্রিয়াকে জাগত করার পরেও ঘুমিয়ে ছিলেন এবং এখন এই (আমার) হতাশ হৃদয় অনুতাপের দুঃখে জেগে উঠেছে। তার সমস্ত বিষয় মনের গোচরে এসেছে। আংটির সাহায্যে রাজা দুষ্যন্ত শকুন্তলার কথা স্মরণ করতে পারলেন।

সেনাপতি বলে যে আমি বুঝতে পারছি ওই (আংটির) মূল্যবান পাথর মহারাজার খুব প্রিয় নয়। (কিন্তু) তার দৃষ্টি রাজাকে প্রিয় ব্যক্তির কথা মনে করিয়ে দিল। স্বভাবগতভাবে গভীর হওয়া সত্ত্বেও ক্ষণিকের জন্য তার চোখ দিয়ে জল গড়িয়ে পড়ল।

সপ্তম অঙ্কে, যখন রাজা এবং শকুন্তলার স্বাভাবিকভাবে পুনর্মিলন হয়, তখন রাজা একই জিনিস প্রকাশ করেন, “শকুন্তলা বললেন যে- হে আর্যপুত্র আংটি পেয়ে আসলে আমাকে তোমার কথা মনে করিয়ে দিয়েছে।”<sup>1</sup> এখানে, যখন রাজা দুষ্যন্ত এবং শকুন্তলার পুনর্মিলন হয়, তখন রাজা এটি প্রকাশ করেন।

উপরোক্ত বক্তব্য থেকে জানা যায় এখানে রাজা ও শকুন্তলা উভয়েরই পারস্পরিক স্বীকৃতি রয়েছে। শকুন্তলাকে রাজা দুষ্যন্ত প্রথম চিনতে পারেন।

অর্থাৎ, রাজা শকুন্তলার দিকে তাকিয়ে বলেন, ওহ, এই সেই শকুন্তলা, যে নোংরা পোশাক পরে, নিয়ম

মেনে চলার কারণে তার মুখ পাতলা, বেণী আছে, এই নিষ্ঠুর আচার-আচরণ এমনটি দেখেছে। আমার স্বামীর জন্য দীর্ঘ বিচ্ছেদ হয়েছে। এই অভিজ্ঞান স্মৃতি এবং প্রাকৃতিক উপর ভিত্তি করে। এর পর শকুন্তলার কাছে রাজার পরিচয় হয়। শকুন্তলা অনুশোচনার কারণে রাজাকে বিকৃত চেহারায় দেখে বললেন যে তিনি আর্য পুত্রের মতো দেখতে নন। কে এই ? এই সময়ে আমার ছেলেকে তার শরীরের স্পর্শে কে কলুষিত করছে ? আবার শকুন্তলা মনে মনে বলে, হে হৃদয়, ধৈর্য ধর, ধৈর্য ধর। ভাগ্য তার বিদেহ ছেড়ে এখন আমার প্রতি করুণা করেছে। আসলে তিনি আর কেউ নন, আর্যপুত্র।

এই অভিজ্ঞান বিতর্কের মাধ্যমে ঘটে। যদিও শকুন্তলা আগে থেকেই রাজাকে চিনতেন। কারণ পঞ্চম অঙ্কের শুরুতে তাঁকে আর্যপুত্র বলে সম্বোধন করতে চেয়েছিলেন। কিন্তু সপ্তম অঙ্কে কবি অত্যন্ত দক্ষতার সঙ্গে রাজা দুয্যন্তকে শকুন্তলাকে চিনতে বললেন।

“রাজা শকুন্তলাকে বলেন, ‘হে প্রিয় ! যদিও আমি তোমার প্রতি নিষ্ঠুর ছিলাম, তার ফল ভালো হয়েছে, কারণ আমি দেখছি তুমি এখন আমাকে চিনতে পেরেছ।’”<sup>2</sup>

সপ্তম অঙ্কেই রাজা দুয্যন্ত সকলের অত্যাচার সম্পর্কে সচেতন হন। কবি অভিজ্ঞানের বিতর্কের মাধ্যমে এবং চিহ্নের (রক্ষাসূত্র) মাধ্যমে এই স্বীকৃতি সম্পন্ন করেছেন যখন রাজা প্রথম সকলের নিপীড়ন দেখেন, তখনই তার মনে স্বীকৃতির জন্ম হয় এবং ধীরে ধীরে এই স্বীকৃতি দৃঢ়তার দিকে এগিয়ে যায়।

অর্থাৎ রাজা বলেন, এই সন্তানের জন্য আমার নিজের ছেলের মতো আমার অন্তরে স্নেহের কী আছে ? নিঃসন্দেহে সন্তান হীনতার কারণে আমাকে এই সন্তানের প্রতি আকৃষ্ট এবং ভালোবাসে আছে।

তপস্বী ও রাজার তর্কের মধ্য দিয়ে রাজা জানতে পারেন এই শিশুটি পুরবংশীর। তার মা অম্বরার সাথে সম্পর্কযুক্ত। তার পিতা তার স্ত্রীকে (সন্তানের মা) পরিত্যাগ করেছেন। এই সমস্ত যুক্তির কারণে রাজার দৃঢ় প্রত্যয় দৃঢ় থেকে শক্তিশালী হয়ে উঠছিল। মৃগময়ুরের সৌন্দর্য বর্ণনা করতে যখন তাপসীর মুখ থেকে ‘শকুন্তলাবণ্যম’ শব্দটি বের হতো, তখন সর্বদমন জিজ্ঞেস করলেন, ‘মম মাতা কুত্র ? তখন রাজা দুয্যন্ত আরও আত্মবিশ্বাসী হয়ে ওঠেন যে ইনি তাঁর পুত্র।

শেষে, যখন তিনি শিশুটির কজ্জি থেকে পড়ে থাকা রক্ষা সূত্রটি তুলে নেন, তখন সন্ন্যাসীরা এটি দেখে অবাক হয়ে যান, কারণ এই রক্ষা সূত্রটি অপরাজিতা ওষুধ দিয়ে জড়ানো ছিল, যা অন্য কোনও ব্যক্তির দ্বারা স্পর্শ করলে সাপে পরিণত হবে এবং কামড় দেবে। , কিন্তু এটি ঘটেনি তাই তিনি কেবল তার পিতা হতে পারেন। এভাবে কবি এখানে আরেকটি স্বীকৃতি সাধন করেছেন- তা হল সন্ন্যাসীদের মাধ্যমে রাজার স্বীকৃতি। তাপসী শকুন্তলার কাছে যায় তাকে এই খুশির খবর জানাতে।

এভাবে অভিজ্ঞানাশকুন্তলম-এ কবি ব্যক্তি (রাজার) দ্বারা বস্তু (আংটি) ব্যক্তি দ্বারা ব্যক্তি (রাজা সর্বদমন ও শকুন্তলনার পরিচয় অভিজ্ঞানের দ্বারা সম্পন্ন হয়) এটি একটি আনন্দদায়ক ও সুখদায়ক সম্প্রীতির পরিচয় পাওয়া যায়।

**বিক্রমোর্বশীয়মে অভিজ্ঞানঃ-** বিক্রমোর্বশীয়মে ব্যক্তি এবং বস্তু উভয়কেই চিহ্নিত করা হয়। প্রথমত, চতুর্থ অঙ্কের শেষে, রাজা পুরুরবা দ্বারা লতারূপ উর্বশীকে অভিজ্ঞান হয়। এই অভিজ্ঞান একটি সভ্গমণীয় মণির দ্বারা চিহ্নিত হয়, তাই এই চিহ্নের দ্বারা অভিজ্ঞান প্রাপ্ত হয়। লতাকে দেখে রাজা বলেন- “ওহ, কী ব্যাপার,

এই লতায় তো ফুল নেই, তবু ওটাকে দেখে আমার কেন খুশি লাগছে ? নাকি এটা ঠিক যে আমার কাছে সুন্দর লাগছে।”<sup>3</sup>

রাজা সেই লতাকে জড়িয়ে ধরে বললেন। আহা, উর্বশীর শরীরকে জড়িয়ে ধরে শরীরটা ঠিক একই রকম আনন্দ পাচ্ছে, (এটি প্রিয়তমা, এটি লতা নয়) আমি এটি বিশ্বাস করতে পারি না। কারণ আমি যে জিনিসটি প্রথম সমর্থন করি তা কিছু সময় পরে দ্বিতীয় হয়ে যায়। অতএব, এই স্পর্শকাতর আনন্দ উপভোগ করার সময়, আমি আমার চোখ খুলব না। (আস্তে আস্তে চোখ খুলে) কি ? তুমি কি সত্যিই উর্বশী ? এইভাবে এই অভিজ্ঞান অনুকূল এবং আনন্দদায়ক। কারণ এর ফলে রাজা ও উর্বশীর মিলন ঘটে। এরপর পঞ্চম অঙ্কে কাঞ্চুকীর দ্বারা আনা তীরটি রাজার অভিজ্ঞান পায়।

এটি বস্তুর সনাত্তকরণ। রাজা জিজ্ঞাসা করেন- আর্ঘ্য লাহ্ম। তুমি কি জানো এটা কার তীর ? এর পরে, তিনি নিজেই তা হাতে নেন, তাতে লেখা অক্ষরগুলি পড়ে বিদুষকের কথা শোনেন এবং বলেন, - “ উর্বশী থেকে জন্ম নেওয়া পুরুষের পুত্র কুমার, যে তার পুত্র বিরোধীদের জীবন নাশ করে দেবেন।” এভাবে বস্তুর সনাত্তকরণ সম্পন্ন হয়। এই স্বীকৃতি কারণ একটি নাটকীয় ঘটনার মাধ্যমে রাজা তার ছেলের কথা জানতে পারেন। তাই এই স্বীকৃতিও অনুকূল ও আনন্দদায়ক বলে বিবেচিত হতে পারে।

বাণের দ্বারা অভিজ্ঞানের পশ্চাত্ত রাজা এবং কুমার আয়ু উভয়েরই পারস্পরিক অভিজ্ঞান রয়েছে। এখানে রাজা আগে থেকেই প্রেমের কাছে পরিচিত। আয়ু যখন তাপসীকে নিয়ে রাজার সামনে হাজির হয়, তখন বিদুষক এবং রাজার মধ্যে তর্ক শুরু হয়।

ইনি সেই শ্রদ্ধেয় ক্ষত্রিয় কুমার, যার নাম অর্ধচন্দ্রের তীরে চিহ্নিত করা হয় ? যা শকুনকে বিদ্ধ করেছিল ? দেখুন, এটি আপনার সাথে খুব মিল দেখাচ্ছে।

এর পরে তাপসী আয়ুকে বলেন “জাত, প্রণাম তে গুরুম”। তাপসীর এই বক্তব্যের সাথে, আয়ু তার বাবাকে প্রণাম করে এবং তাকে চিনতে পারে। তাপসীর আগাম বক্তব্য থেকে রাজাও তার ছেলেকে চিনতে পেরেছেন এবং বলেছেন- এসো ছেলে! আসো! পুত্রের স্পর্শ সারা শরীরে ছড়িয়ে পড়ে (অতএব) তুমি (আমার কাছে এসে) আমাকে সেইভাবে খুশি কর যেমন চাঁদের রশ্মি চন্দ্রকান্ত মণিকে খুশি করে (তরল করে)।

এইভাবে, এটি একটি ব্যক্তির দ্বারা অন্য ব্যক্তির পারস্পরিক অভিজ্ঞান, যা বিতর্কের মাধ্যমে এবং প্রাকৃতিক ঘটনার মাধ্যমে উদ্ভূত হয়, যার কারণে রাজা একটি পুত্র লাভ করে এবং আয়ু তার পিতা পায়। অতএব, এই অভিজ্ঞান ও অনুকূল এবং আনন্দদায়ক হিসাবে বিবেচিত হতে পারে।

শেষ পর্যন্ত উর্বশী এবং আয়ুর পারস্পরিক স্বীকৃতি রয়েছে। এটি ব্যক্তি দ্বারা ব্যক্তির পারস্পরিক স্বীকৃতিও। আয়ুকে রাজার কাছে বসে থাকতে দেখে উর্বশী ভাবে। কে ইনি, যাকে মহারাজা নিজেই আসনে বসিয়েছেন, যার হাতে ধনুক আছে এবং যার দণ্ড রয়েছে মহারাজা নিজেই দেখভাল করছেন ?

আবার মনে পড়ে সে বলে, আহা ! সত্যবতীর দিকে তাকিয়ে বুঝলাম এই আমার ছেলে আয়ু। এখন অনেক বড় হয়ে গেছে। সুতরাং এটি স্মৃতি-জন্য অভিজ্ঞান। এখানে রাজা আয়ুকে বলেন যে বৎস, ইনি তোমার মা যাকে এভাবে উল্লেখ করা হয়েছে-

“ইযং তে জননী প্রাপ্তা ত্বদালোকনতত্পরা।

স্নেহ প্রসবনির্ভিন্নমুদ্রহস্তী স্তনাংশুকম ॥”<sup>4</sup>

অর্থাৎ রাজা উর্বশীর দিকে তাকিয়ে বলেন, বৎস! এই তোমার মা যে তোমার দিকে তাকিয়ে আছে আর যার বাত্‌সল্য প্রেমের কারণে দুধের ফোঁটা ফোঁটা মতো ভালোবাসায় কারণে তার আঁচলকে ভিজেয়ে দিচ্ছে।

এইভাবে (মাতা) উর্বশীর স্বাভাবিক অভিজ্ঞান আয়ুর মাধ্যমে সম্পন্ন হয়। আয়ু এবং উর্বশী উভয়ের পারস্পরিক অভিজ্ঞানের কারণে, পুত্র তার মাকে পায় এবং মা তার পুত্রকে পায়। অতএব, এটি একটি অনুকূল এবং আনন্দদায়ক অভিজ্ঞান হিসাবে বিবেচিত হতে পারে। কিন্তু পরে উর্বশী তার অভিশাপের কথা মনে করে, যার কারণে সে রাজার কাছ থেকে ভবিষ্যতে বিচ্ছেদের ভয়ে দুঃখিত হয়ে পড়ে। অতএব, এই স্বীকৃতি এবং রাজার পারস্পরিক স্বীকৃতি এবং বয়স, উভয়ই প্রতিকূল হতে পারত, কিন্তু নারদের বাণীর কারণে তাদের প্রতিকূলতার অবসান ঘটে। এইভাবে, বিক্রমোর্বশীয়মের নাটকে, ব্যক্তি এবং বস্তু উভয়কেই স্বাভাবিকভাবে চিহ্নিত করা হয়েছে প্রতীকের মাধ্যমে, যুক্তির মাধ্যমে এবং স্মৃতির মাধ্যমে। এই সমস্ত সনাক্তকরণ অনুকূল এবং আনন্দদায়ক।

**মালবিকাগ্নিমিত্রে অভিজ্ঞানঃ-** মালবিকাগ্নিমিত্রম- এর পঞ্চম অঙ্কে মালবিকা ও পরিব্রাজিকা কৌশিকীকে চিহ্নিত করা হয়েছে। প্রথমে মালবিকাকে অভিজ্ঞান করা হয়। আবার মালবিকাকে দুবার অভিজ্ঞান করা হয়। প্রথমটি শিল্পের দ্বারা এবং দ্বিতীয়টি রাজা ও রাণী ধরিণী দ্বারা। মালবিকা স্বভাবতই শিল্পের দ্বারা অভিজ্ঞান। এখানে একের পর এক ঘটতে থাকা ঘটনার ফলস্বরূপ দেখা যায় কবিকে এর জন্য আলাদা প্রচেষ্টা করতে হয় না, তাই এটি আরও শৈল্পিক। কাকতালীয়ভাবে, রাজপরিবারের উপস্থিত শিল্পিরা মালবিকাকে দেখতে পেয়েই বলে উঠল - “আরে, রাজকন্যার জয় হোক, রাজকুমারী হোক।” রাজা ও রাণী ধরিণী কর্তৃক মালবিকার অভিজ্ঞান বিতর্কের মাধ্যমে সম্পন্ন হয়। শিল্পিরা মালবিকাকে চিনতে পেরে অভিবাদন জানালে রাজা জিজ্ঞেস করেন।

তোমরা দুজন কে ? আর এই কে ? ইনি সেই মালবিকা, সেই মাধবসেনের ছোট বোন যাকে আপনি সামরিক উপায়ে বিদর্ভরাজকে পরাজিত করে মুক্ত করেছিলেন। মালবিকার বাস্তবতা জানার পর দেবী ধরিণী বলেন এবং রাজাও তাকে চিনতে পেরে বলেন, “যে দেবীর মর্যাদা পাওয়ার যোগ্য তাকে দাস হয়ে জীবনযাপন করতে হয়। যেমন- দামি সিন্ধের কাপড় স্নানের জন্য ব্যবহার করা হয়। ঠিক তেমনি মালবিকাকে সেই ভাবে ব্যবহার করা হয়েছে।

এইভাবে, মালবিকা শিল্পীদের দ্বারা স্বীকৃত হয়। যখন মালবিকার উপলব্ধি সম্পূর্ণ হয়, তখন পরিব্রাজিকা কৌশিকির উপলব্ধি ঘটে। এটাও দুইবার হয়। প্রথমটি শিল্পীদের দ্বারা এবং দ্বিতীয়টি রাজা ও রাণী ধরিণী দ্বারা। মালবিকার মতো, কৌশিকীকে শিল্পীদের দ্বারা স্বীকৃতি দেওয়াও একটি স্বাভাবিক অভিজ্ঞান, কারণ এটিও নাটকের ঘটনা থেকে স্বাভাবিকভাবেই উদ্ভূত হয়। দুই শিল্পি কৌশিকীর গলা শোনা মাত্রই, তাঁকে চিনতে পেরে দুজনেই তাঁকে ‘ভগবতী নমস্তে’ অভিবাদন জানায়। রাজা ও রাণী ধরিণীর দ্বারা পরিব্রাজিকা কৌশিকির অভিজ্ঞান ও মালবিকার মতোই বিতর্কের মাধ্যমে সম্পন্ন হয়। শিল্পীদের দ্বারা কৌশিকীকে চিনতে পেরে তাকে অভিবাদন জানালে রাজা জিজ্ঞেস করেন। “মাধবসেন আমাদের মন্ত্রীদের থেকে অগ্ৰজ ছিলেন।”<sup>5</sup>

সুতরাং, এই উভয় স্বীকৃতিই একজন ব্যক্তির দ্বারা অন্য ব্যক্তির স্বীকৃতি। যারা এই অভিজ্ঞান করেন (শিল্পি, রাজা এবং রাণী নিজে) তারা ইতিমধ্যেই অভিজ্ঞান এবং কৌশিকী এবং মালবিকাও পারস্পরিক অভিজ্ঞান। এই কারণেই কৌশিকী মালবিকার সম্পূর্ণ পরিচয় দেন এবং যখন শিল্পিরা জিজ্ঞাসা করেন যে তিনি আর্য কৌশিকির মতো শোনাচ্ছেন, তখন মালবিকা বলেন ‘অথ কিম’, উভয় স্বীকৃতিই অনুকূল এবং আনন্দদায়ক। এই স্বীকৃতির পরে, রাজা এবং মালবিকার স্থায়ী মিলনের (স্বামী এবং স্ত্রী হিসাবে) পথ প্রশস্ত হয়।<sup>৬</sup>

### বিচার তত্ত্ব

মহাকবি কালিদাসের নাটকগুলিকে সমালোচনামূলকভাবে অধ্যয়ন করলে এটা স্পষ্ট হয় যে, তাঁর নাটকগুলি তৎকালীন মানুষের মনে প্রচলিত লোককাহিনীকে বর্ণনা করে। তিনি তার নাটকগুলিতে ঘটনা ও চরিত্রের মাধ্যমে একটি ধারণা উপস্থাপন করেছেন। অধ্যয়ন করে জানা যায়, অভিজ্ঞান শকুন্তলমে প্রথম, চতুর্থ ও সপ্তম অঙ্কের স্থান তপোবন। যেখানে পঞ্চম ও ষষ্ঠ অঙ্কের স্থান রাজভবন। কবি তপোবনের পরিবেশকে শুদ্ধ ও পবিত্র বলে বর্ণনা করলেও রাজভবনের পরিবেশকে দুঃখজনক ও হতাশাজনক বলে বর্ণনা করেছেন। তপোবনের অধীনে কথাশ্রমের দৃশ্য, শকুন্তলা ও দুয্যস্তের মিলন, মৃগয়ার অবসর, শকুন্তলা ও দুয্যস্তের গন্ধর্ব্ব বিবাহ, শকুন্তলার স্বামীর বাড়িতে বিদায় এবং অবশেষে মারীচাশ্রমের দৃশ্য, শকুন্তলা ও তার ছেলের সঙ্গে দুয্যস্তের পুনর্মিলন। পরম শান্তির পরিবেশ ইত্যাদি ঘটে থাকে। যেখানে রাজভবনের দৃশ্য রয়েছে হংসপদিকার উপলভ্য যুক্তি ও রাজার বিচ্ছেদের বিলাপ এবং বসন্ত উৎসবের নিষেধাজ্ঞা সম্বলিত গান।

তপোবন সম্বন্ধে কবি অভিজ্ঞান শকুন্তলমে এই কথাটি উল্লেখ করেছেন- “আত্মবিশ্বাসী হয়ে হরিণ নিঃসন্দেহে রথের শব্দ শুনছে।” তবে প্রাসাদের জন্যই বলা হয়েছে যে “শাঙ্গারাভ বলেছেন যে এই প্রাসাদটি আশুনের শিখায় ঘেরা একটি ভবনের মতো পরিচিত।”<sup>৭</sup>

কবি রাষ্ট্রকে নিজের হাতে ধরা অভিপ্রায়ের চিঠির মতো মনে করেন, রাজপ্রাসাদের লোকেরা সর্বদা ভোগ-বিলাসে মগ্ন থাকে, তারা প্রায়ই ঐশ্বর্যের নেশায় মত্ত হয়ে বিকারগস্ত হয়ে পড়ে এবং অন্যকে প্রতারণা করাকে বিজ্ঞান বলে মনে করে।

এখানে কালিদাস রাষ্ট্রকে নিজের হাতে ছাতার মতো ধরে আছেন। রাজপ্রাসাদের লোকেরা সর্বদা ভোগ-বিলাসে মগ্ন থাকে, তারা প্রায়ই ঐশ্বর্যের নেশায় মত্ত হয়ে বিকারগস্ত হয়ে পড়ে এবং অন্যকে প্রতারণা করাকে বিজ্ঞান বলে মনে করে।

অতএব, উপসংহারে, বলা যেতে পারে যে অভিজ্ঞান শকুন্তলমে, এই ধারণাটি উত্থাপন করা হয়েছে যে “একটি সফল পরিবারের ভিত্তি হল বিশুদ্ধ ভালবাসা এবং মূল্যবোধ সহ সন্তানের জন্ম।”<sup>৮</sup> বিশুদ্ধ ভালবাসা হল সেই জিনিস যার সামান্যতম লালসাও নেই এবং যা আমাদের কর্তব্য। তা ধর্ম থেকে আলাদা করে না। সন্তানকে ভালো মূল্যবোধ দিয়ে মানুষ করতে হলে মা-বাবা উভয়েই মূল্যবোধে ভালো থাকতে হবে এবং গর্ভধারণের সময় থেকেই ভবিষ্যৎ সন্তানের মূল্যবোধের প্রতি খেয়াল রাখতে হবে, অন্যথায় একই রকম ভোগাসক্তি পোহাতে হতে পারে। উপায় এ ধরনের দায়িত্ব পালন বর্তমান বিশ্বের জন্য কল্যাণকর এবং প্রেক্ষাপটের জন্য উপযোগী।

ঘটনা ও চরিত্রের আলোচনার মাধ্যমে বিক্রমোর্বশীয়মে জানা যায় যে, কামপ্রেম অশুভ, বিচ্ছেদের

আগুনে তপস্যার দ্বারা শুদ্ধ না হলে তা অপবিত্র থাকে। এই অপবিত্র ও লম্পট প্রেম একজন মানুষকে তার কর্তব্য পালনে বাধা দেয়। এই লম্পট প্রেমের কারণে উর্বশীর কথা স্বর্গে পরমানন্দে চলে যায়। পুরুষোত্তমের পরিবর্তে তিনি বললেন পুরুষবা। এইভাবে, ভারত মুনির নির্দেশনায় (লক্ষ্মী স্বয়ম্বর) নাটকে তিনি লক্ষ্মীর ভূমিকা ঠিকভাবে পালন করতে পারেননি। যে তার দায়িত্ব থেকে বিচ্যুত হয় তাকে শাস্তির সম্মুখীন হতে হয়। তাই উর্বশীও শাস্তি পেয়েছেন। ভারতমুনি তাকে অভিশাপ দিয়েছিলেন ‘ন তে দিব্যম স্থানম ভবিষতি।’ এভাবে তিনি স্বর্গ থেকে পড়ে গেলেন। এ থেকে বোঝা যায় যে, এই লালসা মানুষের জীবনেও বাধা সৃষ্টি করে।

এখানে পুরুষবাও মানুষের দুর্বলতার শিকার। তার লম্পট দৃষ্টির কারণেই পুরুষবা ‘উদয়বতী’ দেখতে পান। ফলস্বরূপ, উর্বশীর থেকে বিচ্ছেদ ঘটে যা নিম্নরূপ উল্লেখ করা হয়েছে-

রাজা বিদ্যাধরের কন্যা উদয়বতীর দিকে তাকিয়ে থাকলেন, যে মন্দাকিনীর তীরে বালির ঢিবি তৈরি করে অনেকক্ষণ খেলছিল, এতে উর্বশী তার উপর ক্রুদ্ধ হন।

ভারতমুনির অভিশাপের কারণে তিনি নারীদের জন্য নিষিদ্ধ কুমার বনে প্রবেশ করেন এবং এর ফলে তিনি লতা রূপে রূপান্তরিত হন। এভাবে তার একটি ভুলের কারণে তাকে স্বর্গ থেকে নিষ্কিপ্ত হতে হয়েছিল এবং আরেকটি ছোট ভুলের কারণে তাকে তার স্বামীর থেকে বিচ্ছেদ সহ্য করতে হয়েছিল।

এভাবে চতুর্থ অঙ্কের বিচ্ছেদের আগুনে দন্ধ হয়ে যখন দুজনের ভালোবাসা খাঁটি সোনায় পরিণত হয়, তখন পরমানন্দ বা বিচ্ছেদের কোনো উপলক্ষ থাকে না।

ঔশিনারীর ‘প্রিয়নু প্রসাধন ব্রত’-এর মাধ্যমেও উর্বশীর প্রেমের সামাজিক স্বীকৃতি দেখানোর চেষ্টা করা হয়েছে। এই সামাজিক স্বীকৃতির পরেই সে পুরুষবার জীবনসঙ্গী হয়ে ওঠে। এর আগে, দ্বিতীয় অভিনয়ে, যখন সে রাজার সাথে দেখা করার চেষ্টা করে এবং একটি প্রেমপত্র লিখে তার অভ্যন্তরীণ অনুভূতি প্রকাশ করে এবং প্রেমের পথে এগিয়ে যায়, তখনই একটি প্রতিবন্ধকতা দেখা দেয় - দেবদূত তাকে নাটকের জন্য ডাকতে আসে। কোনো নারী অন্য বোনের মতো সমাজে সম্মান পেতে পারে না। নারী-পুরুষের সম্পর্কের সামাজিক স্বীকৃতি দেওয়া প্রয়োজন।

পুরুষবার জীবনসঙ্গী হওয়ার পর উর্বশী একটি পুত্র সন্তানের জন্ম দেন। এই পুত্রও ঋষি চ্যবনের দ্বারা শিক্ষিত। উর্বশী কখনই স্বামীর থেকে বিচ্ছেদ চান না। ঔশিনারী তার স্বামীর জন্য সবকিছু ছেড়ে দেয় এবং উর্বশীও স্বর্গ ছেড়ে চলে যায়। সে তার স্বামীকে ছেড়ে স্বর্গে যেতে চায় না। অবশেষে ভগবান তার প্রার্থনা শোনেন এবং ইন্দ্রের কৃপায় তাদের আজীবন মিলন হয়। এইভাবে, বিক্রমোর্বশীয়মে একটি সফল নাটক চিত্রিত হয়েছে।

উপসংহারে- বলা যায় কামপ্রেম অপবিত্র, বিচ্ছেদের আগুনে তপস্যার দ্বারা শুদ্ধ না হওয়া পর্যন্ত তা কলুষিত থাকে। একটি সফল পরিবারের ভিত্তি হলো লালসামুক্ত, বিশুদ্ধ ভালোবাসা এবং মূল্যবোধসম্পন্ন সন্তানের জন্ম। এই শুধুমাত্র পবিত্র ভালোবাসা কখনো আমাদের ধর্ম ও কর্তব্য থেকে বিচ্ছিন্ন করতে পারে না। এটি বর্তমানে এর উপযোগিতা। মালবিকাগ্নিমিত্রম-এও চরিত্রদের কথোপকথন ও ঘটনার মাধ্যমে একটি ধারণা উপস্থাপন করা হয়েছে। এটি কবির প্রথম নাটকীয় রচনা এবং দ্বিতীয় কাব্য রচনা হওয়ায় এতে

পরিপক্কতার অভাব থাকলেও প্রেমের আদর্শ উপস্থাপন করা হয়েছে। তৃতীয় নাটকে কবির আসলে লেখনীতে ফুটে উঠেছে সমাজের আসল চিত্র যা পাঠক গণকে আকর্ষণ করে।

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## THE KACHARI TRIBE: A STUDY OF ANCESTRY AND CULTURE

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**Abstract:** *The Kachari tribe is an indigenous group from northeast India, has a remarkable story of endurance, migration and cultural diversity. They originally called the Brahmaputra valley their home and called themselves “Bodo” or “Bodo-fisa” meaning Children of “Bodo” reflecting their identity. The tribe “Kachari” has a wealthy history that captures the precise route of this tribe and regarded for their nomadic nature. The Kacharis lived a lively life, shifting from region to region with transferring cultivation and temporary houses that indicates simply how adaptable they had been to the exceptional environments. During different historical periods, such as during the Ahom kingdom, the Kacharis were called Timisa, thus marking a new chapter in their history. Marriage alliances, such as that between the daughter of the Raja of Hill Tipperah and the Raja of Maibong, extended the meaning of the word “Kachari” beyond mere place and that shows how closely related these indigenous communities are. Cultural fusion is a key characteristic of the Kacharis that combines their local animistic ideals with the Hindu affects that visible in deities like Bathau or lord Siva.*

**Key words:** Kachari, Bodo, Bodo-Kachari, Kachari tribe, origin, tradition, culture.

**Introduction:** The diverse and fascinating history of the Kachari tribe occupies an important place among the indigenous peoples of northeast India. It spreads to different regions and has been known by different names over time. In Goalpara and North Bengal it is called Mech, in the North Cachar Hills it is called Dimasa. In the Brahmaputra valley they are known as Bodo or Bodo-fisa. Experts advise not to make conclusions about the origin of people who speak similar languages, especially since languages close to each other have many influences. But Bodo is different. There are five different communities that speak the original language and suggest that they may be speaking the same language. Languages change quickly, especially unwritten languages. In ancient

times, the Koches who had a large kingdom used the Bodo language. Literally the Bodo language survived in the Brahmaputra valley despite Hindu and Shan influences pointing to its ancient roots and claiming that many people in the region are Bodo. Looking at the physical features, which show distinct Indian and Chinese influences, helps to understand the continuity of Koch's heritage through cultural interactions and intermarriage with people followed by India in the Brahmaputra and Surma valleys.<sup>1</sup> The diversities in nomenclature reflect the geographical and cultural span of this tribal group. The Kacharis have been described by some scholars as one of the most ancient known aboriginal tribes that who inhabited Assam, certainly could have left a mark on the northeastern corner of the Indian subcontinent. Their identity evolves from these various names, suggestive of deep bonding with the lands they inhabit. In the Brahmaputra Valley, the Kacharis have had the pride of proclaiming themselves as Bodo or Bodo-fisa so that it is their collective identity, which exhibits their being the sons of the Bodo. To the Ahoms, they were known as Timisa, which seems to be a corruption of Dimasa, recalling a time when they had ruled the Dhansiri valley. The term 'Kachari' itself is an interesting linguistic problem. It is probably derived from a Sanskrit word meaning a frontier district, or in Bengali, the 'deep bank of a river.' The history of the origin of the Kachari race is merely a matter of conjecture, as no authenticated historical record has been discovered regarding this people. Their physical characteristics indicate a connection with the Mongolian type and hence a probable origin in Tibet or China. A tradition amongst the Garos, who are closely allied to the Kacharis, speaks of the migration of their forefathers from northern mountains, perhaps from Tibet itself, into the Brahmaputra Valley. Such a tradition, though it needs careful scrutiny, itself suggests an examination into the migration history of the race. The Brahmaputra Valley may have been subjected to several immigrations from the north and northeast, which resulted in the formation of strong kingdoms like Kamarupa. The Chutiya, another offsets of the Kachari race, seems at one time to have held sway in Eastern Assam and may have dominated this part of the early history of the Region. Circumstantial evidences, for instance, the nomenclature of prominent rivers in Assam, which have a similar word as that used by the Kacharis for water, point to their historical influence and may associate them with the naming of significant geographical features of the province. The ruins near Sadiya, a former capital of the Chutiya, further contribute to the archaeological exploration of the Kachari race's historical footprint in Assam. This

variety of names definitely reveals geographical and cultural richness for the Kacharis. They were one of the oldest known early inhabitants of Assam. North India definitely undertook their influence. The identity of the Kacharis has altered with different names that each testifies to their deep connection with the land. In the Brahmaputra valley, they openly called themselves the Bodo or Bodo-fisa meaning “sons of Bodo” thus affirms their common ancestry. Interestingly, the Ahoms called them Timisa that is a name, which perhaps dates back to Dimasa, in reference to when they ruled the Dhansiri valley. The term “Kachari” itself is interesting, it may be derived from a Sanskrit word referring to a border region, or in Bengali, it may mean deep bank of a river. Their origins are still somewhat unclear, with no dependable historical account to rely on, but their physical features suggest that they belong to the Mongolian group, either through Tibet or China. There is even a tradition common among the Garos, very closely related to the Kacharis, speaking of their ancestors having migrated from northern mountains, perhaps from Tibet, into the Brahmaputra Valley. Anyway, this is a story worth more than just a cursory glance since it holds interesting possibilities for discovering the history of Kachari migration. Probably many waves of migration from the north and northeast covered the Brahmaputra valley and gave rise to the powerful kingdoms like Kamarupa. The Chutiya was a branch of the Kacharis that once ruled over eastern Assam, hence suggesting that the Kachari had significant influence on the early history of the region. Even the names of the major rivers of Assam seem to be a parallel sound to the Kachari words for water and thus their lasting influence was there in this region. Ruins near Sadiya, the ancient capital of the Chutiya adds one more dimension to the archaeological study about the historical presence of the Kacharis in Assam.<sup>2</sup> The roots of their name hint at geographical connections and telling of their ties to certain regions or landscapes in their history. The Kacharis gave their name to the district of Cachar, telling something about their influence on local toponym. Their history inseparably links with migrations, adaptation, and dynamic relationship with diverse landscapes they have inhabited right from the plains of Goalpara to the hills of North Cachar. The Kacharis donned different identities, but a thread of culture runs through them. This introduction barely captures a sight of a tribe with such rich heritage waiting to be explored and understood in its totality.

**Objectives:** The goal of this research is to discover the origin of the Kachari tribe, the divergent dialects of the Bodo family, effects of geography and changes in culture.

This paper investigates on names, their significance as place names and how they interact with other neighbouring tribes to give complete view about dynamics identity of Kachari people that will address their past relevance and present issues.

**Methodology:** This is about how the study has been done combining various methods such as history, linguistics and anthropology. For the historical part, information was obtained from archives and journals. Language analysis compares Bodo group languages by focusing on Kachari dialects and the social geography provides data that assist in determining regional influences.

**Discussion:** Kachari Buranji is an ancient manuscript chronicle that was published in 1936 by the Department of Historical and Antiquarian Studies of Assam. The book specifically discusses the Ahom-Kachari relationship during the time from the late 14<sup>th</sup> century to the early 18<sup>th</sup> century. In its preface, it provides a story on how the Cachar Rajas came about and links them with earliest known Kachari kings. Changes in area and jurisdiction of the Kachari kingdom within different periods are revealed including details on their original sites and locations of rule. Due to pressure from their mighty rivals who were also neighbors, a good number of Kacharis moved their capital successively to Dimapur, Maibong and then to Khaspur.<sup>3</sup> The Kachari tribe also known as Bodo, is a major cultural entity that has deep historical and geographical roots in northeastern India. They are recognized as the one of earliest indigenous people of the Brahmaputra Valley dates back to ancient times. Their history follows through different landscapes including Assam, North Bengal and beyond. The name Kachari tribe reflects different aspects of its identity like Mech and Bodo sometimes signifying external perceptions about them while at other times they self-identify with these names. The early settlement in Kachar country mentioned in Limbu creation myth connects them to an enduring symbol within this region since ages. The Kachari tribe has been prominent in areas such as Goalpara, Kamrup, Darrang and the North Cachar Hills. They also have a significant influence over North Bengal encompassing plains, hills and terai regions where their lifestyles and cultures have adapted to different terrains. The language component contributes significantly towards the Kachari tribes' identity since their main language is Bodo or Plains Kachari respectively which define them as a people. The different dialects of this linguistic plurality that encompass such dialects as Dimasa (Hills Kachari), Garo, Rabha, Lalung and Tipura enrich the overall language diversity of the larger Bodo family. The

original meanings of these two words are derived from Hinduism since both Kachari and Sanskrit have borrowed them. Other sub-tribes are often introduced to their main tradition as people are born into a specific occupation. But today though they have lost their importance among most people those who live in tiger folk do not forget about their totems. This respect is paid by traditional Kacharis who are still following conservative norms where they enter into mourning in case one such animal dies close to their village. This event happened in a very short time after which people mourned for less than twenty-four hours. For some time personal assets may be sacrificed during this period without eating anything solid. After this week comes an elaborate cleaning ritual. It is usually carried out by women to cover up the floor and walls of the house using mud and cow dung that has been freshly prepared in most cases. Clothes and brass utensils should be washed properly in running water while earthenware vessels should be thrown away except for those that are new or unused ones. Next, the community's elder member who acts like Deori (minister) will then distribute 'water of peace' (Santi-Jal) ceremoniously to everyone to drink. This water represents, ending sacrifice along with common sacrifice of a fowl or maybe a pig, which conclude the rituals mentioned above. After these rituals are completed peaceful activities with neighbors can start as usual again.<sup>4</sup> Kachari tribe has unique customs and social structure whereas Meches or Bodos are considered the westernmost branch of the larger Kachari tribe. It is through sub tribes like Agnia Mech, Assam Mech, Kachra Mech and Thampai Mech that they organize themselves socially. There are certain rituals, which are observed during marriage and funeral celebrations blending animistic customs with increasing influence of Hindu ones. The Kachari people have very animistic beliefs but they are also inclined to Hinduism. Bathau is revered as the deity who safeguards family interests and honour. The sacred siju tree or the Euphorbia splendens that symbolizes Bathau, is used for divination purposes as well as detection of wrongdoings. Myths and stories handed down from generation to generation make for a rich repository of Kachari folk tales that reflect their worldview and cultural values. In Kachari culture, mythology interacts closely with nature's features and heavenly bodies. Suteupha fought with Kacharis, whose kingdom then stretched on the southern bank of Brahmaputra from Dikhu to Kalang, the Dhansiri valley and what is now North Cachar Subdivision. As a result of the battle, the Kachari king was defeated and all Kachari settlements beyond Dikhu River were left to Ahoms. For about 100 years after that event,

both nations knew where they stood in relation to each other; it was in fact marked by absence of any hostilities until 1490 when there occurred a fight along its banks. Very little is known concerning Kachari business practices until early 17<sup>th</sup> century when Yasanarayan became Kachari king. In this interlude period Kachari kings retained most parts within Nowgong District plus North Cachar Hills gradually were extending their reign into the plains of Cachar. Nevertheless, in the historical records there is no name given for Suteupha's rival among Kachari rulers.<sup>5</sup> From creation myths to demi gods tales and moral experiences, that reveal how tribes viewed their origin, world and ethics. As such, the Kachari tribe is an embodiment of India's cultural diversity found in the North East. A vibrant image of native people is formed by their colourful tradition, language and peculiar practices. These studies about Kachari not only provide a window through which we can see what our ancestors did but also help us examine more closely the links among culture, geography and identity across the north east borderland of India.

The Kachari tribe is one of the oldest tribes of the Eastern India. Their genesis is intimately tied to that of Brahmaputra Valley's historical and mythological structure. The Kacharis cannot be traced back accurately because there are no ancient written records but some aspects of their history can be reconstructed from oral traditions, legends and linguistic studies. For example, it is stated in the Limbu creation legend that one of the two prophets is believed to have settled in Kachari land. There also exist a cluster of languages around border plains of Eastern Bengal, Assam and Kachar as well as lower hills marking boundaries between these regions that are evidently related to each other closely. Therefore, this linguistic group shows strong relationships among different tribes residing in large geographical space with their separate names indicating their close kinship ties. This is crucial because a significant part of Eastern Bengal population is assumed to share linguistic links with these tribes speaking this language based on such evidence. It includes Cooches and Meches in Cooch Behar (Sub-Himalayan Dooars), Goalpara, Kacharis, Mekirs in Assam as well as Kachar, Garo residing in Garo hills and Tipperahs at Hill Tipperah.<sup>6</sup> This region, in Nepalese referred to as the tract at the foot of the hills between the Brahmaputra and Kosi rivers, is identified as an early homeland for the Mech, Kachari and Dhimal tribes. According to this legend, there is a mythological connection existing between the Kacharis and Kachar country, which adds a mythological weight into their origin story. From the linguistic point of view, Kacharis

are classified under Bodo language group. Hindus of Assam know them as Kacharis; Meches by people from Bengal. The Kacharis are therefore a race that lives among small hillocks along with intermingling Hindu individuals in areas that were once their sole indigenous territories along the Himalayan foothills located within Northern Bengal as well as Assam.<sup>7</sup> According to Hodgson, Bodo is the first generic name while Kachari is more often used as a specific term implicating linguistic and ethnic group. The Mech or Meches and Kacharis refer to themselves as 'Bodo' or 'Bara'. Such nomenclature, which is shared in different dialects across the group, implies that they share a common linguistic ancestry; it has built unity among them since ages. These migrations and movements among Kachari tribes have in turn influenced their dispersal patterns over time. Importantly, Kachari means that historically these people were connected with specific zones before a part of them acquired what is now Cachar District. As evidenced by how the name is used over large swathes outside Cachar District, there was once a past when Kacharis dominated many places that were not in this area at all. There are no particular routes taken nor places settled by Kacharis families; however, their spread throughout Assam, North Bengal among other regions neighbouring it can be recognized due to how time has changed culture. Therefore, it is not about one single event rather a complex play of several historical, mythical and linguistic factors that made up Kachari identity throughout centuries. A significant and old indigenous community, migration of the Kachari tribe has been a multi-faceted historical movement characterized by mobility, settlements and adaptations throughout various environments. Although pinpointing specific details has proven difficult because there have been few written records from the past times; however studying languages history or anthropology can help exploit clues regarding Kachari migration.

Kacharis belong to the broader ethno linguistic family including the Meches and Rabhas, though linguistically classified under Bodo group. There is a historical importance associated with the term 'Kachari' which may have derived from Sanskrit or Bengali linked it closely to language identity and land. According to the Limbu legends, one of their ancestors settled in Kachar country. Divided into three subfamilies, the Indo-Chinese linguistic family Mon-Khmer and Tibeto-Burman as its major representations in Assam; while Siamese Chinese, the third sub-family consists of Shan where Ahom is spoken as a dialect. First, the speakers of Mon-Khmer arrived, followed by successive intrusions of

tribes that spoke Tibeto-Burman dialects. These latter groups either assimilated into the culture of earlier survivors or marginalized them in hill ranges. The Tibeto-Burman dialects mainly fall under three groups in Assam, Naga of the east of Naga Hills, Kuki-Chin found in Manipur, Kachar and Lushai Hills, Bodo which covers almost all remaining non-Aryan languages within Brahmaputra Valley, Garo Hills and major ones in North Kachar and Hill Tippera. It also includes Kachari or Mech, Garo Dimasa Tippera Lalung Rabha and Chutiyas. Moreover, there have been more recent invasions from tribes speaking Tai or Shan languages; for example, Ahoms.<sup>8</sup> This geographical area, commonly called, as the region close to the hills located between the Brahmaputra and Kosi rivers is a mythical birthplace that indicates an early association of Kacharis with this geographical space. Over centuries migrations made by Kacharis shaped their dispersal in different regions; thus leaving an everlasting mark on the cultural landscape. The word 'Kachari' was already in use in various areas before a faction of the tribe owned present day Cachar district. This historical nomenclature suggests that there was some kind of continuous movement and settlement pattern where the tribe adjusted itself according to new environments. The migration path of Kachari tribe passed through Assam, North Bengal and surrounding areas. Their historic route shows intricate relationships driven by many factors such as changes in environment, economics events and inter-community relationships within bordering settlements. The pattern of migration among Kacharis was probably motivated, by obtaining right type socio-cultural backgrounds for agriculture and also access to resources while a change occurs politically. The diverse cultural heritage of the Kachari tribe is a result of their migration with variations in customs, traditions and folklore, which found in different places. The Bara people, who living in Kamrup district to the east are referred to as the Kacharis by some who pronounce it as Kosari. The name Kachari is said to have originated many years back when the Raja of Hill Tipperah gave the present day Surma valley, which located in the district of Cachar as a dowry during the marriage of his daughter to the Raja of Maibong in North Cachar. Located in North Cachar are the Dimasa people who are called Kacharis by Assamese.<sup>9</sup> An exclusive ability for the tribe to accommodate itself in many areas while still holding onto its own identity shows how strong and dynamic they are in relation to history which in turn forms what they are today. In other words, the migration of the Kachari tribe is a complex story that combines together linguistic relationships, mythical roots and historical movements. Though some

specifics might not be clear enough, the significant aspect of the Kachari journey is a depiction of their lastingness in that region and cultural importance around northeastern India. The Kachari tribe also has some remarkable likenesses with multiple other tribes from this North East Indian belt creating and connecting through time cultural and historical ties contributing to rich diverseness among all native societies residing there. This has more relevance on all fronts linguistically, culturally or socially since it is this set of similarities that hold Kachari people together related to their immediate neighbours' groups. In linguistic terms, Kacharis are classified under Bodo group, which extends to include various tribes such as Meches, Rabhas and others. Such a similar language implies a common ancestry or a past interaction that has shaped their tongues resulting to analogous vocabularies, grammatical structures and linguistic manners. The tribes call themselves Bodo or Bara for them to be united in their common language background. Culturally, Kacharis have some customs, rituals and traditions similar to those of tribes near them. Some practices regarding marriage, funeral rites and religious beliefs usually possess alike features as an indication of cultural laws common to different tribes. One proof of similar religious practices could be found in the worshipping of shared deities or symbols, like when Sij (Euphorbia) is taken as a sign of Almighty God. The languages spoke by Mech and Rabha closely relate to Kacharis, hence some people say they are more or less alike. Nevertheless no documentation exists yet on the grammatical structures or vocabulary resources for these additional languages that are quite similar. It is observed that if you ask a Rabha person about his tribe, he may tell you he is the part of Rabha-Kachari too. In different areas they are registered as Mech and Rabha on community basis and people determine their connection through dialects used rather than member shapes. Located within the Garo Hills slopes both in lower valleys are considered to be normal settlements inhabited by those Hajong whom allegedly adopted Hinduism in parts.<sup>10</sup>

Historically and geographically, Kacharis have been alongside tribes like Meches, Rabhas and Garos. As a result, social customs, festivals and interaction among people have just interchanged within this particular space of shared existence. Hence, there is a sense of belongingness existing among these tribes. It is actually the close social ties, like the intermarriages and cultural exchanges that bring these communities together, forms a strong and unified group beyond their individual tribal identities. The Kacharis, Meches and Rabhas have fought for their rights under similar conditions in history giving them a

common psychological sense of time, which unites them all. External forces, colonialism and ever-changing political scenes have been experienced by these tribes in similar ways leading to stories that speak about their pride over modifying themselves. However, when making comparisons regarding those similarities it should not be forgotten that each tribe has its own particularity though they exist within the same umbrella. Kacharis despite all their shared features are still different from other tribes because they possess unique cultural identities; also there are specific areas where they differ in terms of historical paths or changes affecting their society at large. This is how people can be bound by some characteristics and at the same time their individual differences can be preserved, which makes the society of North Eastern India very rich in cultural diversity. They are also said to be highly cultural rich with several ceremonies that illustrate their lifestyle. One significant area where marriage rituals take place is called solemn ceremonies that describe the union shared between two individuals' souls including their families' souls too. When both parties exchange betel leaves and areca nuts, this becomes a pivotal moment that shows that they would be going through life together as one undivided whole. Offering a cock and hen to gods like the Bathau or lord Siva is symbolizing the sacredness since it indicates what likely matrimonial ties could be spiritually involved in. Death also integrates elements of animism and gradually evolving Hinduism.<sup>11</sup> The ethnic history of Kachari community in northeastern India is one marked by migration and transformation of culture over time. They came from Brahmaputra Valley identifying themselves as Bodo or Bodo-fisa meaning sons of the Bodo. The term "kachari" means various things including a land that borders on other lands or provinces originating from Sanskrit. Their nomadic lifestyle enabled them to metamorphose from being Kachari, Mech or Dimasa according to where they found themselves at any given moment, all of which are just different names for people who talk the same language because they belong together. This is an indicator of complex relationship between native traditions and invading cultures because it employs syncretism of native animistic beliefs with Hindu influences like Bathau and Shiva included among other spirits in deity enumerations. Over time they came to be known as Timisa tribe since they were found most times around Dhansiri valley while under Ahom dynasty rule. It should also be noted that intermarriages within other local realms such as Koch kings kingdom played a significant role in establishing their diverse identities. The integrative piece of the Kachari tribe's history reveals a fascinating story

of endurance, migration cultural assimilation, and historical progression that covers the northeastern section of the Indian subcontinent. It is clear as we begin to go through the extensive historical narrative that Kacharis have been known by various names like Bodo, Mech and Dimasa. The Kacharis have emerged in many different landscapes adapting to altered surroundings while still holding on to their indigenous identity. They called themselves Bodo or Bodo-fisa once residing in the Brahmaputra Valley which was a term indicating their togetherness as children of Berabodo tribe. However, Kachari has different meanings according to various people; some say it is a Sanskrit word meaning border area. Kachari tribe is shaped up by different historical process that is captured well in this complex web of origins. The Kacharis were nomads who lived a dynamic life by moving their farms from one place to another. This was a way of surviving through varying circumstances thus giving rise to different identities such as Mech, Dimasa and Kachari that represented geographical variations and tribal interactions with other tribes. It can be said that the Kacharis did not have a fixed identity but rather one, which was shifting according to socio-cultural changes they experienced. During the Ahom period they were called Timisa, which stands out as an important stage in their history. It shows their location on the Dhansiri river basin and demonstrates how periods of time connect with each other where indigenous people had vital role in creating regional politics. The various regional kingdoms into which the Kacharis assimilated, like that of the Kos kings, throw open the complex historical forces that forged their identity. Marriage alliances with neighbouring kingdoms, for instance, the daughter of the Raja of Hill Tipperah marrying the Raja of Maibong, made them part and parcel of the history of this place. The Kachari term was extended from North Cachar Dimasa inhabitants to their Bara kinsmen in Assam plains and North East Bengal records how identities went beyond geographical lines. The historical journey of Kachari tribe stands out prominently for its cultural syncretism. This can be seen when examining the fusion between local animistic beliefs and Hinduism where some deities such as Bathau and Shiva were adopted leading to movement between indigenous customs as well as outside cultures. The Meches' sacred Siju tree can be taken as an example representing syncretism since through it one is able to observe both continuity of indigenous practices along with their change over time. Underneath it all, so fade out at dawn five unique people groups that have lived in this particular area for ages; Kacharis, Rabhas and Meches are in the lowlands while Mikirs, Lalungs and Hojais

inhabit Nowgong. It is common sense realizing that our understanding of what constitute individual races does not translate into these tribal names, which might appear alien to them. Indeed vernacular names vary between communities albeit referring to one ethnicity or another. Basically everyone within a certain locality identifies themselves differently as they go about life leaving behind these external imposed identities like Abor, Miri or Dafali closely associated with Bodo tribe comprising such tribes as Kachari, Rabha, Mech among others.<sup>12</sup>

**Conclusion:** The origin of Kachari people is still a bit of a mystery with few concrete records to tell us exactly where they came from though their appearance suggests a connection to the Mongolian race that points the possible roots from Tibet or China. The Garo tribe is closely related to the Kachari tribe. The Garos have story that has been passed down through the various generations. This story says about their ancestors that they came from the northern mountains, which may be from Tibet to the Brahmaputra Valley. While this story is interesting it is important to look at this with some of cautions and it gives us a chance to explore where the Kacharis might have come from. In Brahmaputra Valley, the groups migrated from north and northeast that contributed to establishment of mighty kingdoms such as the Kamarupa. One branch of the Kacharis is Chutiyas who ruled eastern Assam, showing how much impact Kacharis had in the early history of the region. Besides, some major rivers in Assam carry names which are similar to the Kachari word for water indicating that their influence might have gone as far as naming the main monuments. The old remains found near Sadiya, an ancient capital city of the Chutiya dynasty confirms that the Kacharis have always existed among South-Asians since then. Kachari People's history is a personification of their ability to carry on existing under various circumstances that they have been moving with time. There is not a line path but an assimilation of events where different cultural transformations and migrations converge. The dynamics, which represented by these neighboring communities' interaction, are likewise a testimony to the eastern part of Indian subcontinent's historical workings. Thus, Kachari tribal history determined by such intricate intermingling can be summarized briefly as follows. The Kacharis have left a permanent mark on the historical canvas of Assam from the time they were nomads in Brahmaputra Valley through to when they integrated into different regional kingdoms. They have shown how hardy indigenous peoples can be by adapting continuously and synthesizing various cultural

influences among changing environments that were distinctive throughout history. Within the northeastern part of India's cultural fabric, Kachari tribe's past offers us a chance to engage with multiphase aspects within itself ranging from its own identity crisis to cultural syncretism and maintenance of its past.

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A BIBLIOMETRIC ANALYSIS OF THE JOURNAL TITLED  
'INTERNATIONAL JOURNAL OF DATA MINING AND EMERGING  
TECHNOLOGIES'.

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**ABSTRACT**

'International Journal of Data Mining and Emerging Technologies' is published by Diva Enterprises Private Limited, New Delhi. 'International Journal of Data Mining and Emerging Technologies' is a peer-reviewed journal of international reputation that publishes high quality original research papers and reviews. 'International Journal of Data Mining and Emerging Technologies' seeks to provide the latest research and the best practices in the field of 'Data Mining'. is playing an important role in the dissemination of theoretical and practical knowledge in the fields of 'Data Mining' and Emerging Technologies. It is a Half – Yearly journal (May and November). The Journal has both print and on-line versions. The Print ISSN of this journal is 2249 – 3242; and the On-line ISSN of this journal is 2249 - 3220 . This paper is a bibliometric study of the 'International Journal of Data Mining and Emerging Technologies' and this bibliometric study covers the ten [10] volumes of the journal [i.e. from Vol. 1 (2011) to Vol. 10 (2020)]. This research article examines the contributions from different point of views. The tabular analysis finds out the volume-wise distribution of contributions, authorship pattern of contributions, gender-wise distribution of contributions, citation-wise distribution of contributions, types of publications cited, distribution of contributions on different micro-subjects of 'Data Mining' clearly and vividly. This paper gives an in-depth description about the journal by the way of bibliometric analysis in a pinpointed manner. The research article would be helpful for the research scholars, students and teachers in the field of

Computer Science Engineering, Information Technology, and Software Professionals in general, and especially this research paper would be very helpful for the research scholars and teachers in the field of Bibliometrics / Scientometrics / Informetrics etc.

### **KEY WORDS :- BIBLIOMETRICS DATA MINING**

**1. Introduction :-** Bibliometrics is a branch of science discipline which primarily throws light on the quantitative study of library and information science. In the year 1969, the British Librarian Allan Pritchard first coined the term “Bibliometrics”. Bibliometrics may be defined as the ‘quantitative analysis’ of the bibliographic characteristics of the research outcome of any subject discipline. Dr. S. R. Ranganathan, the father of Indian Library Science, coined the term “Librametry”. The meaning of the word “Librametry” is the application of mathematical and statistical techniques in Library and Information Science. Many years later, the specialists in the subject field of ‘Library and Information Science’ coined the term “Informetrics”. They opined that “Informetrics” is the application of mathematical and statistical techniques on ‘Information Science’. Bibliometrics is closely associated with ‘Scientometrics’. ‘Scientometrics’ is the analysis of scientific metrics and indicators. ‘Bibliometrics’ includes the micro-subjects like ‘Citation Analysis’, ‘Authorship Pattern’, ‘Bibliographic Coupling’, ‘Co-Citation Indexing’, ‘Micro-Subject wise Distribution of Articles’ and so many others. Therefore, it may be said that ‘Bibliometrics’ is the terminology which stands for the application of mathematical and statistical techniques to the study of bibliography and its other related aspects. Now, we are living in the “Knowledge Society”. Knowledge is a strategic resource which resides in human brain, corporate culture and also in different forms of knowledge medium like print and non-print documents. Libraries and Information Centres are the store houses of knowledge. Libraries and Information Centres are consisting of books and non-book materials. These are the primary information resources of libraries and information centres. These resources have no value until it is used. These resources of libraries and information centres should be utilized by the potential readers properly. For the effective utilization of information resources, the bibliometric studies are very much helpful for librarians and information professionals. Information Selection, Information Collection, Information Organization, Information Processing through various techniques, Information Retrieval, Information Dissemination etc. are the principal house-keeping operations of Libraries

and Information Centres. All these activities of libraries and information centres can be done easily and quickly through the application of proper bibliometric techniques. As we know that Information is the power, so we should have to keep in our mind that Information is the strategic resource for all. Information handling should be done very cautiously. All the Information related activities can be done smoothly through the application and use of different bibliometric tools and techniques. Acquisition and technical processing work of libraries and information centres can also be done successfully through the application of bibliometric techniques. Library and Information Science is gaining its importance and popularity for its interdisciplinary nature and application of sophisticated techniques.

‘International Journal of Data Mining and Emerging Technologies’ is a peer-reviewed journal of international reputation that publishes high quality original research papers and reviews. ‘International Journal of Data Mining and Emerging Technologies’ is playing an important role in the dissemination of theoretical and practical knowledge in the fields of ‘Data Mining’ and emerging technologies. It is a Half – Yearly journal (May and November). The Journal has both print and on-line versions. The Print ISSN of this journal is 2249 – 3212; and the On-line ISSN of this journal is 2249 - 3220 . This paper is a bibliometric study of the ‘International Journal of Data Mining and Emerging Technologies’ and this bibliometric study covers Ten [10] volumes of the journal [i.e. from Vol. 1 (2011) to Vol. 10 (2020)]. The ‘International Journal of Data Mining and Emerging Technologies’ is playing an important role in the dissemination of theoretical and practical knowledge in the field of Data Mining and emerging technologies. This paper gives an in-depth description about the journal by the way of bibliometric analysis in a vivid manner. The research article would be helpful for the research scholars, students and teachers in the field of Computer Science Engineering, Information Technology and Software Engineering in general, and especially this research article would be very helpful for the research scholars, students and teachers in the field of Bibliometrics / Scientometrics / Informetrics etc.

## **2. Objectives of the study :-**

The following are the objectives of this paper :-

- To make an analysis of the papers published in the ten volumes of the journal [i.e. from Vol. 1 (2011) to Vol. 10 (2020)] in order to collect information on the facts and sub-facts within its purview.

- To know the nature and extent of authorship.
- To know the number of contributions published during the period under study.
- To know the number of contributors according to the Gender (i.e. Gender-wise distribution of contributors).
- To identify the contributions under different micro-subjects of ‘Data Mining’.
- To know the number of citations (i.e. various types of citations).
- To make a thorough study of the ‘International Journal of Data Mining and Emerging Technologies’
- To identify the journal’s nature and extent of contributions.

**3. Scope and Coverage of the Study :-** This paper is a bibliometric study of the ‘International Journal of Data Mining and Emerging Technologies’ and this bibliometric study covers the ten volumes of the journal [i.e. from Vol. 1 (2011) to Vol. 10 (2020)] and there are twenty issues covered by this study as each volume includes two issues. The paper examines the contributions from different point of views. The tabular analysis find out the volume-wise distribution of contributions, authorship pattern of contributions, gender-wise distribution of contributions, citation-wise distribution of contributions, types of publications cited, distribution of contributions on different micro-subjects of ‘Data Mining’ clearly and vividly.

**4. Spectrum of the Journal titled ‘International Journal of Data Mining and Emerging Technologies’ :-** This journal seeks to provide the latest research and the best practices in the field of data mining. This journal provides theoretical and pragmatic viewpoints on data mining and also provides guidance to the professionals who will use this journal to inform their practices. The journal incorporates various advanced data mining techniques and algorithms of different integrated data mining systems and applications. Implementation of advanced data mining techniques will be very helpful for scientists, engineers and physicians as well as researchers and infrastructures which support them. In addition to these, as researchers revealed data-mining is the process of automatic discovery of patterns, transformations, associations and anomalies in massive databases, and is a highly interdisciplinary field representing the confluence of multiple disciplines, such as database systems, data warehousing, machine learning, statistics, algorithms, data visualization, and high performance computing. The following micro-subjects are covered by the journal titled ‘International Journal of Data Mining and Emerging

Technologies' :- Data Mining for Business Intelligence, Emerging Technologies in Data Mining, Data Mining Tools, Bio-Informatics, Data Mining and Warehousing, Information Extraction Methodologies, Genetic Algorithms and Categorization Techniques Used in Data Mining, Data and Information Integration, Micro Array Design and Analysis, Privacy - Preserving Data Mining, Statistical Methods Used in Data Mining, Knowledge Discovery in Databases (KDD), Information Retrieval, Metadata Use and Management, Search Engine Query Processing, Data Models and Access Structures, Semantic Web and Ontology, Advanced User Interfaces for Data Mining, Visual Languages for Data Mining, Engineering and Manufacturing, Enterprise Data Mining and Management, Geographic and Environmental Information Systems, Intrusion Detection, Fraud Prevention and Surveillance.

**5. Methodology of the Study :-** Data regarding each contribution in relation to authorship, authors' institutional affiliation etc. were collected, scanned, examined and recorded on the slips in a systematic manner. Data pertaining to contributions on micro-subjects were also organized on the slips. Data about citations in the contributions were recorded on the separate slips. Data about the documents cited, name of the journal or the name of the book, title of the article or the title of the book, page number, volume number and issue number and other required data about the contributions were recorded accordingly. After collection of data in slips, all the slips were arranged methodically. Another matter of fact is that necessary data were also collected from documentary sources, institutional sources and human sources. Data collected in the above manner were duly analysed and tabulated. On the basis of analysis and tabulation, the findings and conclusions were drawn. Finally, the article is the outcome of this research work.

## **6. Tabular Analysis of Data :-**

### **6.1 Table 1 : Volume-wise Distribution of Contributions**

(Excluding Editorials, Introductory Notes , Reports etc.)

<b>Volume No.</b>	<b>Year</b>	<b>Number of Contributions</b>	<b>Percentage (%)</b>
1	2011	13	10.66
2	2012	10	08.20
3	2013	11	09.01
4	2014	14	11.48

5	2015	15	12.29
6	2016	12	09.84
7	2017	16	13.12
8	2018	17	13.94
9	2019	06	04.91
10	2020	08	06.55
<b>Total</b>	<b>=====</b>	<b>122</b>	<b>100</b>

The above table shows that the maximum numbers of papers are published in this journal in the year 2018[ i.e. 17 ], and minimum numbers of papers are published in the years 2019 [i.e.06 ]. This study covers total 122 numbers of contributions which are published during the year 2011 – 2020.

#### 6.2 Table 2 : Authorship Pattern of Contributions

<b>Number of Authors</b>	<b>Number of Contributions</b>	<b>Percentage (%)</b>
One Author	17	13.94
Two Authors	65	53.28
More Than Two Authors	40	32.78
<b>Total</b>	<b>122</b>	<b>100</b>

After analysing the above table it can be said that maximum number of research articles are published in this journal are jointly by two authors. The authors are very much interested to publish their research articles in this journal are mostly by two authors. It is also clear from this table that the authors are least interested to publish their research papers singly in this journal. The authors are also interested to publish their research papers jointly by more than two authors in this journal.

**6.3 Table 3 : Volume-wise Distribution of Contributions According to Authorship Pattern**

Volume No. and Year	Contribution by One Author	Percentage (%)	Contribution by Two Authors	Percentage (%)	Contribution by More Than Two Authors	Percentage (%)
1(2011)	1	5.88	7	10.77	5	12.50
2(2012)	1	5.88	5	7.70	4	10.00
3(2013)	1	5.88	5	7.70	5	12.50
4(2014)	2	11.77	7	10.77	5	12.50
5(2015)	2	11.77	13	20.00	0	00
6(2016)	1	5.88	5	7.70	6	15.00
7(2017)	4	23.53	9	13.84	3	7.50
8(2018)	0	00	8	12.30	9	22.50
9(2019)	3	17.64	3	4.61	0	00
10(2020)	2	11.77	3	4.61	3	7.50
<b>Total</b>	<b>17</b>	<b>100</b>	<b>65</b>	<b>100</b>	<b>40</b>	<b>100</b>

From the above table it is clear that maximum numbers of research contributions by more than two authors in this journal are in the year 2018 (i.e. 9) and maximum numbers of research articles by two authors (jointly) in this journal are in the year 2015 (i.e. 13). It can also be said from the above table that maximum numbers of research articles by single author in this journal are in the year 2017 (i.e. 4).

**6.4 Table 4 : Distribution of Contributors According to Gender.**

Gender	Number of Contributors	Percentage (%)
Male	218	79.56
Female	64	20.44
<b>Total</b>	<b>282</b>	<b>100</b>

The above table shows that there are totally 79.56% contributors of this journal are male and 20.44% contributors are female during the period under study [i.e. 2011 – 2020]. There are total 218 male contributors and 56 female contributors from volume 1 to volume 10 [total ten volumes under this study].

**6.1 Table 5 : Volume-wise Distribution of Contributors on the Basis of Gender.**

<b>Vol. No. &amp; Year</b>	<b>Male Contributors</b>	<b>Percentage (%)</b>	<b>Female Contributors</b>	<b>Percentage (%)</b>
1(2011)	28	12.85	04	06.25
2(2012)	22	10.09	06	09.37
3(2013)	27	12.39	05	07.82
4(2014)	29	13.30	08	12.50
5(2015)	21	09.63	05	07.82
6(2016)	24	11.00	07	10.93
7(2017)	23	10.55	08	12.50
8(2018)	26	11.93	09	14.06
9(2019)	07	03.21	05	07.82
10(2020)	11	05.05	07	10.93
<b>Total</b>	<b>218</b>	<b>100</b>	<b>64</b>	<b>100</b>

After analysing the above table it can be said that maximum numbers of male contributors are in the year 2014 (volume 4) and minimum numbers of male contributors are in the year 2019 (volume 9). It can also be said from the above table that maximum numbers of female contributors are in the year 2018 (volume 8) and minimum numbers of female contributors are in the year 2011 (volume 1).

**6.6 Table 6 : Distribution of Contributions According to Citations**

<b>Volume No.</b>	<b>Year</b>	<b>No. Of Contributions</b>	<b>No. Of Citations</b>	<b>Average</b>
1	2011	13	144	11.07
2	2012	10	136	13.60
3	2013	11	118	10.72
4	2014	14	188	13.42
5	2015	15	216	14.40
6	2016	12	148	12.33
7	2017	16	167	10.43
8	2018	17	189	11.11
9	2019	06	79	13.16
10	2020	08	87	10.87
<b>Total</b>	<b>=====</b>	<b>122</b>	<b>1472</b>	<b>12.06</b>

From the above table it is clear that the average numbers of citations per contributions are maximum in Volume 5 in the year 2015 [i.e. 14.40] and the average number of citations per contributions are minimum in Volume 7 in the year 2017 in this journal [i.e. 10.43].

It is also clear from the above that Maximum numbers of citations are in Volume 5 in the year 2015 [i.e. 216] , and minimum numbers of citations are in Volume 9 in the year 2019 in this journal [i.e. 79].

**5.7 Table 7 : Types of Publications Cited**

<b>Types of Publications Cited</b>	<b>No. of Citations</b>	<b>Percentage (%)</b>
Books	398	27.03
Journals / Periodicals	498	33.84
Seminar / Conference Proceedings	146	09.92
Reports / Working Papers / Approach Papers	48	03.26
Thesis / Dissertations	108	07.33
Government Documents / Daily Newspapers etc.	62	04.22
Electronic Documents (e-books, e-journals etc.)	212	14.40
<b>Total</b>	<b>1472</b>	<b>100</b>

The above table shows that the Journals and Books are mostly cited by the authors. As we are now living in the age of digital and electronic resources, the scientists, technologists and researchers are also cited the electronic resources very frequently. The other documents like conference papers, thesis & dissertations, working papers, reports, etc. are also cited by the researchers in this journal.

**6.8 Table 8 : Distribution of Contributions According to Different Micro-Subjects under Data Mining and Emerging Technologies**

Micro-Subjects	Number of Contributions	Percentage (%)
Data Mining Algorithms	11	9.01
Data Mining Applications	8	6.55
Data Mining Methods	9	7.38
Data Mining for Business Intelligence	7	5.74
Emerging Technologies in Data Mining	9	7.38
Data Mining Tools	4	3.28
Bio-Informatics	2	1.63
Data Warehousing	6	4.92
Information Extraction Methodologies	4	3.28
Genetic Algorithms & Categorization Techniques for Data Mining	7	5.74
Data & Information Integration	8	6.55
Microarray Design and Analysis	4	3.28
Privacy Preserving Data Mining	2	1.63
Statistical Methods for Data Mining	4	3.28
Multidimensional Data	8	6.55
Knowledge Discovery in Databases (KDD)	4	3.28
Information Retrieval	2	1.63
Metadata Use & Management	2	1.63
Search Engine Query Processing	4	3.28
Data Models and Access Structures	3	2.45
Semantic Web and Ontology	2	1.63
Advanced User Interfaces for Data Mining	3	2.45
Visual Languages for Data Mining	2	1.63
Data and Result Visualization	3	2.45
Enterprise Data Mining and Management	1	0.81
Intrusion Detection	2	1.63
Fraud Prevention and Surveillance	1	0.81
<b>Total</b>	<b>122</b>	<b>100</b>

After analysing the above table it can be said that the maximum numbers of contributions published in this journal during this period under study is on 'Data Mining Algorithms'. It can also be said from this table that 'Data Mining Applications', 'Data

Mining Methods', 'Data Mining for Business Intelligence', 'Emerging Technologies in Data Mining', 'Data Warehousing', 'Multidimensional Data', and 'Genetic Algorithms & Categorization Techniques for Data Mining' are also attracted by the researchers regarding their fields of research. It is also clear from this table that 'Data Mining Tools', 'Information Extraction Methodologies', 'Microarray Design and Analysis', 'Statistical Methods for Data Mining', 'Knowledge Discovery in Databases' (KDD), 'Search Engine Query Processing', 'Data Models and Access Structures', 'Advanced User Interfaces for Data Mining', 'Visual Languages for Data Mining', 'Data and Result Visualization' are the micro-subjects are also covered by the Discipline of 'Data Mining and Emerging Technologies'. Many research articles are also published on these micro-subjects.

**7. Findings and Conclusion :-** After completion of this study, it can be said that there are total 122 numbers of contributions under this study during the period covered [i.e. 2011 – 2020]. Out of this 122 research papers, there are 40 research papers are contributed by more than two authors, 65 research articles are contributed by two authors and only 17 contributions are contributed by single author. It is clear from this study that maximum number of contributions are in the year 2018 [ i.e. 17]. It can be said that maximum numbers of research contributions by more than two authors in this journal are in the year 2018 [ i.e. 9], and maximum numbers of research articles by two authors (jointly) in this journal are in the year 2015 [ i.e. 13]. It is also clear that maximum numbers of research articles by single author in this journal are in the year 2017 [i.e. 4]. There are total 218 male contributors and 64 female contributors in the ten volumes which are covered by this study. This study shows that the average numbers of citations per contributions are maximum in the year 2015 [i.e. 14.40] and the average number of citations per contributions are minimum in the year 2017 in this periodical [i.e. 10.43]. It is also clear from the above study that maximum numbers of citations are in the year 2015 [i.e. 216] , and minimum numbers of citations are in the year 2019 in this journal [i.e. 79]. It is also an important point to be noted that all the research articles published in this journal are carrying citations adequately. It can be said from this research work that the Books and Journals are mostly cited by the authors of this periodical. As we are now living in the electronic era, the hybrid libraries and hybrid information centres are playing an important role in the overall society regarding the information processing, information retrieval and information dissemination. The authors are consulting the

electronic resources for the purpose of their study and research and those electronic resources are cited by the researchers very frequently. The other documents like thesis, dissertations, working papers, Government Reports, conference papers etc. are also cited by the researchers. After completion of this study, it may be said that 'Data Mining Algorithms' is the main thrust area of this journal. Maximum research papers are published in this journal are on 'Data Mining Applications', 'Data Mining Methods', and 'Data Mining for Business Intelligence'. The topics like 'Emerging Technologies in Data Mining', 'Data Warehousing', 'Multidimensional Data', and 'Genetic Algorithms & Categorization Techniques for Data Mining' are also attracted by the researchers. The other micro-subjects under 'Data Mining and Emerging Technologies' are also attracted by the researchers in the concerned subject field. It is also clear from this study that 'Data Mining Tools', 'Information Extraction Methodologies', 'Microarray Design and Analysis', 'Statistical Methods for Data Mining', 'Knowledge Discovery in Databases' (KDD), 'Search Engine Query Processing', 'Data Models and Access Structures', 'Advanced User Interfaces for Data Mining', 'Visual Languages for Data Mining', and 'Data and Result Visualization' are the micro-subjects come under the broad subject discipline of 'Data Mining and Emerging Technologies'. The researchers are very much inclined to publish their research papers in the above-mentioned subject fields also. This journal is an internationally renowned, prospective, futuristic and potential journal and it has already been gained its popularity among the scientists, technologists, and research scholars. We are hopeful about the qualitative articles of this journal.

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## ROLE OF MEDIA IN POLITICAL AWARENESS: AN OBSERVATION

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Human civilization has been changed through a continuous process. It has changed the language and culture of human beings. Science and technology are the outcome of modern civilization.<sup>1</sup> Printing system is also the invention of modern civilization. Mass-communication is established quietly and developed before invention and establishment of printing system. The establishment of mass communication comes as a process of natural tendencies of human groups. In the primitive stage mass-communication was also developed among the primitive human beings.<sup>2</sup> But modern civilization offers modern science and technology through which mass-communication is highly developed and widely spread than earlier<sup>3</sup>

Mass-communication is the practice and product of providing information and leisure entertainment to a large often unknown and increasingly fragmenting audiences.<sup>4</sup> Mass-media is the vehicle of mass-communication. In the age of globalization, the influence of mass-media is enormously increased and developed. The term globalization is not a precise one, and it is used in different ways in the literature. In the most general sense, it refers to the growing interconnectedness of the different parts of the world, a process which gives rise to complex forms of interaction and interdependency.<sup>5</sup> Mass-communication is the technology assistant transmission of messages to mass audiences.<sup>6</sup> Now media are most powerful instrument through which information is transmitted to recipient. Media are only interesting because they are integral to culture and society.<sup>7</sup>

In this connection, we may remember that the media rank-order, news issues which the public text to be significant as a result of this highlighting. It does not claim to predict how the audiences will response to specific content that there will be wide consensus that the issues underscore are indeed important.<sup>8</sup>

Communication is linked with such terms as sharing, participation, association and

the possession of common faith.<sup>9</sup> Heavy television exposure, as a part of media blends attitudes in the direction of the mainstream cultural values and blends them in line with the somewhat conservative political agenda of media owners and power structure in general.<sup>10</sup> Since many forms of mediated communication involve some degree of fixation of symbolic content in a material sub-structure, they endow this content with temporal/permanent which is generally lacking in the communicating exchanges of face to face interaction.<sup>11</sup> To the extent that the transmission of tradition become dependent on mediated forms of communication, it also becomes, detached from the individuals with whom one interacts in day to day, i.e., it becomes de-personalised.<sup>12</sup> The de-personalization of tradition is not, however, a uniform and ambiguous process and we can see that with development of electronic media and specially television, the conditions are created for renewal for the links between the authority of tradition and the individuals who transmit it.<sup>13</sup> The primary aim of mass-media is to catch and hold, visual and aural attention.<sup>14</sup> A good deal of effort in media production is devoted to devices for gaining and keeping attention by catching the eye, arousing emotion, stimulating interest.<sup>15</sup> Media messages are always open and polysemic and are interpreted according to context and the cultures of receivers.<sup>16</sup> In brief, media are commonly regarded as effective instrument of power with potential capacity of extent influence in various ways.<sup>17</sup>

Communication is the way in which attitudes and images are built up in minds of political decision-makers, to the role and relative weight of mass-media compared with passed memories, stereo types and other media, and to areas of attention, perception and orientation, values, evaluation, goal-seeking and decision-making.<sup>18</sup> On the other hand, mass-communication is defined as i) an act or processes of de-transmission of information, ideas, emotions, skills by the use of symbol-words, pictures, graphs, gestures and facial expression,<sup>19</sup> ii) media through which flow information and persuasion, iii) the linkages between individuals and groups, and iv) the mechanism through which human relation exists and developed.<sup>20</sup>

Sets of hypothesis are associated with each definition, but there are no identifiable coherent logical theories.<sup>21</sup> Lasswell has described communication thus: “who says what; in which channel to whom; with what effect”.<sup>22</sup> In this connection, we should remember that, “the medium is not the message, not what is transmitted by the medium”.<sup>23</sup> McLuhan divides communication media into ‘hot’ and ‘cool’ media. A cool medium is one which

requires the receiver to involve himself by filling in for missing data i.e. televisions, a hot medium such as radio, allow the receiver to remain detached.<sup>24</sup> It is fact that, from the very beginning of the human civilization society has been changed through a process. Media has spread a vital role in the process of change. Man has gained tremendous development and reached in the highest stage of progress by new invention. In the 21<sup>st</sup> century in invent of media like radio and television and the later part the invent of computer, website and internet etc. revealed a new dimension to the human civilization and these have confined the world in the small boundary of man.<sup>25</sup> The role of media is now inevitable part of human life.

There are mainly two types of media: a) electronic media and b) printing media. Radio, television, computer, website, internet, mobile etc. are electronic media while printing media include news paper, journal, magazine, periodical etc. Electronic media are generally controlled by the government. On the other hand, news papers and other journals are not generally controlled by the government. Degree of control depends on the nature of government.<sup>26</sup>

There are several communication structure like i) informal face to face contacts ii) traditional-social structure, such as family, religious groups etc., iii) political out puts structures such as legislatures, political input structures such as political party, pressure groups and mass-media.<sup>27</sup>

The emergence of mass-media in a society provides the political elites with a tremendous potential for arousing the interest and influencing the attitudes of these citizens. By the same token the free circulation of information through a mass-media structure creates great potential for popular action on the basis of wide spread and accurate knowledge about political events. The independent mass-media offer the average citizen opportunities to express his grievances and to call upon both the leaders and his peers to join him in seeking change.<sup>28</sup> So media is the indispensable channel for gaining political knowledge.

All media either electronic or printing are channel for entertainment. Media act not only for entertainment but also for gaining knowledge. Radio and televisions furnish different types of information as well as various programmes of entertainment. News paper, political magazine and periodicals etc. supply political information. The media have a vital role in enhancing of political thinking and political awareness of the people.<sup>29</sup>

Political awareness depends on stability and change of political system.<sup>30</sup> There are

different channels through people of which mass-media are important active factor. People place their political attitude on the basis of political information what they receive from media. Hence, media is the communication for information. Communication is the transmission of meaning through use of symbols. It is the process by which a person or group tries to make another person or group aware of its feeling about a particular matter.<sup>31</sup> The nature and role of political communication are understood through separate consideration of its constituted elements. The media of political communication are usually divided into two categories: i) mass-media in which message is aimed at a large number of receivers and involves no face to face contact between communicators and receivers, and ii) face to face media, which carry messages to only a few receivers at time, with direct contact between communicators and receivers.<sup>32</sup>

It is observed that some media how they influence on public opinion in political matter and how they receivers get political information for gaining political knowledge by which they are politically aware. The accuracy of the picture of the political world provided by the media is quite important in terms of the content of public opinion.<sup>33</sup>

News papers are important media for gaining political knowledge. Most news papers, in addition to news print substantial numbers of 'features', comics, recipes, fashion notes, bridge columns and so on. Most news papers are also printed material avoided and intended to influence the political opinion of the leaders, mainly in form of unsent editorial and signed political columns. But we should not conclude that news papers have no significant influence on public opinion. Most people obtained their notions of what is going in politics mainly from what they read in the news column of their news papers and these notions fix the basic direction of their opinions.<sup>34</sup> So the effect of news papers on public opinion is less powerful when it comes indirectly through news stories rather than directly editorials.

Radio and televisions are also the important media for political information to receivers. These media nevertheless play significant roles in the formation of political opinion. It is revealed by several studies that people trust accuracy and impartiality of news presentation on radio and television are more than they trust what they in their news papers.<sup>35</sup> Mention may be made in this connection, although there are many Bengali TV channels in West Bengal what they provide political information are somewhat party based, yet some impartial information are also furnished. The rural people get political

information through TV channels.

These two electronic media are important sources of popular ideas about national as well as world affairs and as such have a powerful impact upon the information of public opinion. In all democratic states motion pictures are produced mainly by private firms, although government agencies occasionally issue 'documentary films'.<sup>36</sup> It is well known to all that movies produced in the democracies are intended to entertain audiences and to make money for their producers, rather than to sale particular political point of view. Direct and obvious propaganda in movies is relatively rare. But it does not mean that it has no political role in public opinion.<sup>37</sup> It is observe by study, the reality perceptions of many movies goers are strongly affected by what they see and these perceptions in term powerfully influence political attitude.<sup>38</sup>

In this connection, some minor media like magazines, pamphlets, bill boards, posters in trains and buses, all magazine in different important places, theatre, drama play and so on may sited. The influence of the minor media on politics is probably greater than the size of their audience suggests. These media influence tremendously on 'opinion leaders'.<sup>39</sup>

Groups are divided on two categories- primary group and secondary group. The above mention media are related to secondary group. On the other hand, primary group includes face to face relations. Persons belong to a number of primary group compose of people with who he regularly has direct contact. Every member of a primary group is subject to various pressures to conform his opinions to those of its associates.<sup>40</sup> For one thing he is likely to read the same news paper, watch the same television programme and see the same movies- as do his fellows, and his reality perceptions thus tend to be the same as theirs. Whenever he expresses his opinion contrary to those of its associates, some them may try 'to set him straight' and he may learn that peace of clinching to his views is cessations of the friendly relations with other members of the groups, a preach most people are unwillingly to pay. Face to face communication thus exerts a powerful influence upon the political reality, motions, values and preferences.<sup>41</sup>

Despite technological improvements in the mass-media especially television there is, today no diminution in attention to progress for personalized appeals 'to get out the votes'. Personal contact in political campaign today receives a prominent emphasize in thinking and planning of party strategy.<sup>42</sup> Now a day's most media, particularly, television has great impact on the public opinion an it is an active element for arousing political

awareness.<sup>43</sup> Thus communication media in the past three or four decades have gained tremendous significance in influencing the attitudinal pattern of individual thought of the world. With news papers, films and radio, television and presently with satellite, internet, website, mobile and other sophisticated delivery system, modern communication have been thrust into almost every corner of the world.<sup>44</sup>

The development of mass-media as the key in society marches from a state traditionalism to that of modernity, it may reasonably be expected that a rise in media exposure would be accompanied by a corresponding impact on attitudinal pattern of the respondents.<sup>45</sup> To sum up, press, news paper including daily, weekly, semi weekly magazines and journals of various kinds and government publications is an important media for public opinion and on the other hand, television is the immediate media for formulation of public opinion. Motion pictures today are extending great influence upon public opinion.

Political awareness depends on stability and change political system.<sup>46</sup> There are so many agencies through which political awareness is developed. Mass-media are active and important agencies in modern age. Rational people develop their political attitude towards political system and political matter on the basis of different information, statistics and opinion. Political awareness is related to political structure and class structure. Mass-media emphasizedly play the role in industrial based area and city life than the agricultural based area and rural life. The percentage of education is high in urban life while the rate of education is low in rural life than that of city life.

During the British regime in India, media like news paper, pamphlet, magazine, radio and 'Vande Mataram' played a role to arouse the awareness of the mass of India against the tyranny of British rule. The peasants of India were also influenced by media, peasants' organizations and pressure groups. The impressive, if rather short lived broadening of the national movement in India which was the major achievement of the Swadeshi era in Bengal never have been attend without the use of new technique of the mass contact and development of noble forms of organizations.<sup>47</sup> The old style of political agitation had concentrated mainly on presenting through speeches, news papers, pamphlets and petitions cogent arguments stating the nationalist views on the particular grievances of the day.<sup>48</sup> There were a large number of political associations; communication media help the considerable achievement of the age in providing nationalism with a mass base.<sup>49</sup>

India is a largest democratic state which is an agriculture-based country. The large numbers of people live in villages. The education and political culture are not so high. So political awareness and political participation of village people are low than the urban educated people. On the other hand, the Indian villages are, in general, economically lopsided. The villagers except a few are poor and most of the people are below the poverty line and they have to spend much time for their livelihood. The poor villagers are not able to purchase modern media like television, internet, website system etc. A successful media system in a democratic society depends ultimately upon the choice of receiver in the selection of media.<sup>50</sup> Radio is the cheap media for poor villagers. The mass-media including news paper, television, radio, magazines and books constitute the communication structures.

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## ANTI FARM LAW PROTEST IN INDIA, 2020-21

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### **Abstract**

The Farm movement 2020-2021 has made its mark in the recent political history of India. The new farm laws intended to create 'one nation-one market', break market protection and increase commercial involvement of the big business companies. The farmers organized themselves against the laws as they felt it would endanger their livelihood as the laws were pro-corporate. The anti-farm law protest had spectacular success as it could forge unprecedented alliance cutting across class, caste, religion and gender. This article discusses how this movement has revived the farmer's identity and protested against authoritarian tendencies of the ruling government.

On November 19, 2021, Narendra Modi declared that the farm laws would be repealed and along with that the long-drawn struggle of the most historic farmers movement in India came to an end. The success of India's longest running movement can be contributed to the successful coordination by the farmer's union, volunteer groups etc irrespective of their class and caste identity and varied political views. This movement proved to be peaceful and persistent against the brutal methods employed by the government, such as deployment of paramilitary forces equipped with water cannons, tear gas shells etc. Barricades were set up with barbed wires and trenches were dug near the border of the capital to resist the protestors. The protestors consciously rejected any kind of political affiliation so that no political leaders could gain leverage through their movement.

Agricultural reforms have direct impact on the farmers. Thus it swiftly catches the attention of mass politics especially in countries like India where the rural sector is vast. The farmers had organized themselves to fight against the three most controversial farm laws namely- The Farmer's Produce Trade and Commerce (Promotion and Facilitation )

Act 2020, The Essential Commodities (Amendment) Act and the Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Service Act 2020. The farmer unions were of the opinion that these laws would expose the farmers to the vulnerabilities of free market and endanger their livelihoods. This is a very significant movement in the history of Indian politics and contemporary social movements. It is a reflection on how civil society organizes in self-defense to protect its community itself against the expansion of the state apparatus and market economy. During 1947 the Jawaharlal Nehru Government, taking inspiration from Gandhi's philosophy of self reliance called for gradual shrinking of the rationing commitments and to rely more on internal procurement rather than imports. Unfortunately the experiment lasted only for nine months. During that time India was a food deficit country. Today India has entered the age of permanent surpluses but even today policies of decontrol seems hard to execute.

The Indian Constitution makers have inserted sufficient safeguards in the constitution to ensure that passing of ordinances do not become a regular practice in the lawmaking procedure. But time and again ordinances have been passed with or without the parliamentary approval. The passing of farm laws have been an example of one such ordinance. There was nothing in the ordinance that could justify any emergent situation that required immediate addressing, nor did the Government bother to offer any explanation. There was no food emergency in India that would have justified the Government's decision to pass an ordinance. Perhaps the government utilized the issue of health emergency due to Covid, to pass the laws hastily. Ordinances are simply used as an anti-democratic tool. This definitely in turn aggravate the citizen's loss of faith in the state's democratic institutions.

### **The Controversial Acts**

The government promoted a convincing narrative about the importance of big private corporate capital's entry into the agricultural sector to further the betterment of the farmers. The Farmer's Produced, Trade and Commerce (Promotion and Facilitation) Act 2020, wanted to introduce free trade through removal of restrictions on processes, agents and physically acquiring agricultural produce. There would be no restrains such as licenses or stock limits etc and online transactions. This Act would weaken the public distribution system, which provides the indigent families food grains at a much lower cost

than the open market prices. The Farmers (Empowerment and Protection ) Agreement of Price Assurance and Farm Services Act 2020 wanted to advocate ‘contract farming’ through changes in the present, legal and institutional framework. The farmers can get into agreement with a buyers to cultivate a specific crop that is to be purchased at a predetermined rate. This law also does not provide any kind of price security to the farmers. (Jha 2022)The Essential Commodities (Amendment ) Act 2020 shortened the list of ‘essential’ commodities by removing a number of important items such as cereals, pulses, sugar etc. Regulations on prices of essential food items would be removed, leading to rise in prices. Subsequently constraints on their trade stocking were also removed. As a whole these acts gave free hand to the market forces relating to a plethora of activities related to Indian agriculture. The Government would have very little role in preventing hoarding of essential commodities and agricultural produce thus it would be highly difficult for the Government to control inflation of essential goods. The Farmer’s Produce Trade and Commerce Act 2020, along with the Essential Commodities (Amendment) Act gave leverage to the private traders with increase in hoarding and price manipulation. The farmers also blamed the Government for not ensuring minimum support price (MSP) for the agricultural produce. Clearly the winners would be the private traders, processors and exporters who have the power to control the market forces. Fluctuating prices of essential commodities would hugely effect small farmers and food buyers. As a whole the laws proposed a major reorientation of the existing regulatory mechanism of Indian agriculture. (Jodhka 2021) And the farmers and farmer’s unions feared that they might ultimately loose their land, the source of their existence and livelihood.

Agricultural transition is necessary for all practical purposes but the government failed to have a good theory of transition. Ashutosh Varshney suggests that the Government should have adopted methods like income support and incentives for farmers as they make the transition to higher value-added farming. Without income support withdrawal of MSP for wheat and rice is too punitive. (Varshney 2020) The Government through these laws chooses to expose the farmers to the severity of the market rather than the industrialists. Legal and administrative support for the farmers is an absolute necessity, otherwise in case of contract farming the small farmers would be left at the mercy of the industrialists who definitely have better economic, administrative and legal knowledge. The neo-liberal economic environment is controlled by the private players, leaving the

peasantry at the mercy of the market forces would be detrimental to their interests. So it is important to strengthen the public marketing infrastructure and reduce the farm costs. Along with the Government's support of MSP the farmers need to be guided to make crop choices in order to ensure crop diversification. There is no denying of the fact that the Government should play the key role in improving farmer and rural welfare.

### **Blow to the Federal Structure**

It is important to note how the Farm Laws tried to change the power structure of the India federal system. By passing a law on agriculture, which is designated as a state subject in the Constitution, the Centre tried to violate the constitutional legislative sphere of the state. Privatization acts as a key to transfer powers from the state to the Centre. When the Centre passes laws on subjects that are mentioned under the State List in the Constitution, it would definitely come under public inspection. If the new laws came into action the state's revenues would have declined ultimately depriving them of fiscal autonomy. Since agriculture is related to land and supply of food, it becomes an important area for the states to hold on to their autonomy. Preserving agriculture as a state subject in Indian federal system and fighting against the entry of agrobusiness capitalism would be very critical in India's political arena in the coming years. The Farmer's Produce Trade and Commerce Act 2020 states that no market fee, cess or levy can be imposed by the State's Agriculture Produce Market Committee (APMC) act or by any law. Section 16 of this act states that the Central government will issue directives to the states as and when required for the successful implementation of the Laws and the state governments would have to comply to such directives. Clauses across the laws categorically prevent the states from violating any central directives. The present BJP government at the center concentrates on a unified national market and centralized inclination within India's federal structure so as to bring about business friendly development. The increased centralization was viewed as a threat by the states and they felt their regional identities and aspirations would be jeopardized by the laws.

### **Background of the Movement**

If we look back at India's agricultural scenario we can observe that the condition of the Indian farmers had worsened over the years due to trade liberalization and globalization

policies such as deregulation of inputs, imports and prices since 1990s. This led the farmers to fall into the trap of vicious cycle of debt. The agricultural sector in India is facing largescale crisis. The report of the Situation Assessment Survey (SSS) clearly brought out the grim conditions of the farmer households. Neoliberal policies led to shrinking of usable agricultural land along with this unbalanced distribution of land have pushed the Indian farmers either to become landless or just having small or marginal holdings. The neo-liberal reforms also exposed the farmers to yield risk as well as price risk. It pushed them against the wall leading to a stunning sweep of suicide across the country. The Bharatiya Kisan Union (BKU) in UP is led by Rakesh Tikait mainly represents the Jat dominated sugar producing areas in West UP. The framework of agricultural markets and state procurement in west UP is not as well organized as in Punjab or Haryana. The farmers here have to carry their wheat produce to Haryana to assert the minimum support price. Sugar that is produced in area procured by the Government at a remunerative price which leaves the farmers exposed to the fluctuations of sugar prices in the market which brought sufferings for the farmers. Therefore the fight for the abolition of the farm laws came from the basic demand to expand the MSP regime.

### **Effects of Green Revolution**

Green Revolution was intrinsically the furtherance of capital-intensive industrial agriculture. It mainly emphasized on subsidized fertilizers, irrigation and cultivation of varieties of rice and wheat which relied heavily on high usage of fertilizers. Since it was high priced it was introduced in only few districts of Punjab and some other states. As production peaked, prices fell and the farmers were assured state procurement through mandis. But in course of time, state support was curtailed and farmers became debt ridden. India surely reaped the benefits of Green Revolution in terms of aggregate output as well as farmer incomes. But at the same time the use of high-yielding seeds, chemical fertilizers and pesticides, along with heavy use of water were the negative side of it. So on the one hand Green Revolution made India a food surplus country, on the other it led to depletion of the underground water level and degradation of soil fertility and fall in crop yields in the long run. So farmers are forced to invest more money in chemical fertilizers and thus heavily depend on the local money lenders. Green revolution secured cheap cereals in exchange for injustice and ecological sustainability. (Aga 2021).

### **Farmer's Unity Culminating to the Protest Movement**

Against the backdrop of the Land Acquisition Bill and various other neo-liberal reforms introduced by the Modi Government, a number of farmer organizations emerged such as Bhumi Adhikar Andolan (BAA) and the All India Kisan Sangharsh Coordination Committee (AIKSCC). The All India Kisan Coordination Committee was formed in late 2017 as an umbrella organization in order to mobilize the farmers in their struggle for remunerative prices and relief from debt. So the farmers had been organizing themselves as their hardships kept on aggravating. Ultimately when the Union government decided to push ahead with the farm laws the farmers came out with all their strength and vigor.

The unity among the various peasant organisations leading to a mass protest movement did not happen overnight. The Union Government hostility passed the ordinances without much parliamentary deliberations. Soon analyzing the repercussions of the laws The Bharatiya Kisan Union in Punjab started their demonstrations and protest movement. Several rounds of talks took place between the farmer's organizations and the government which eventually led to a deadlock. The opposition to the laws were most intense in Punjab and Haryana which later spread to the Jat population of Western Uttar Pradesh. In an effort to unite the farmers from other states The Samyukta Kisan Moracha (SKM) was formed as a joint platform of Punjab farmer's organization, All India Kisan Sangharsh Coordination Committee (AIKSS) and Bharatiya Kisan Union (BKU). Under the leadership of SKM a nation wide protest movement was stirred with the Dilli Chalo movement on November 26, 2020. (Gupta 2021) The national capital became the focal point of the farm law protests. The protesters with tractors and trolleys were stopped at the Delhi border. Protest sites were set up at Singhu Border, Tikri Border and Ghazipur Border, interstate highways as they enter Delhi. With every passing day it became evident that the farmers have emerged as a united resolute force. Tents and makeshift shelters were erected at the protest sites and protesters prepared themselves to brave the harsh weather and state's coercive apparatus. Support was gained from various parts of the country even though the movement was spearheaded by the Jats or Sikhs of Punjab. The Sikh cultural religious traditions which was used during the protest had a somewhat secular appeal. The protest sites became democratic communities. (Jonathan Pattenden 2021) Protestors slept side by side in the tents and multiple langars or community kitchens were set up which

provided food not only to the protestor but also the local rural and poor people. The local villagers supplied fresh vegetables from their lands. Soon the movement had a cascading effect as the student's union and labor's union joined hands with the protesters. A number of NGOs provide services like medical camps, clothing and other daily requirements. The BKU tried to mobilize its village-level cadre and organization, composing farmers cutting across caste and religious differences. Thus the farmers were united irrespective of their class, religion and geographical divide of rural and urban. This very technique was adopted by late Mahendra Singh Tikait. (Kumar 2022) Following RakeshVaishnav and Ors vs Union of India and Ors, the Supreme Court put a stay order on the laws and formed a three member committee. But the farmers refused to fall into the ploy of another committee and demanded to negotiate directly with the government. The farmers were well aware of the political tactics deployed by the Government to stifle the protest. The farmers held on to their protest sites till the end, braving the inclement weather and coercive forces used by the Government to crush the movement. Even though the present government advocates cooperative federalism, we very often notice centralization of power under the Modi government. Time and again we perceive the Government taking unilateral decisions and aggressively intervening in the affairs of the states. (Jaffrelot 2021)

The protestors' decisions to march to Delhi also points to the fact that real power lies with the Prime Minister's Office. 26<sup>th</sup> January 2021 is an important milestone in the movement. Violence and disruptions took place on the Republic Day which to an extent tarnished the nonviolent image of the movement. On the one hand the incident discredited the movement leaders but it also made way for the rise new leadership. Rather than loosing ground from the next day onwards the fabric of the movement changed. Community ties and identities became stronger and the leaders successfully exploited the community sentiments. Farmers of Punjab organized Mahapanchayats, which were not customary in the state, but they were organized only to imbibe a sense of solidarity among themselves. The Farmers' movement consolidated rather incompatible forces and organisations to protect the peasantry. In Haryana, the movement witnessed an unexpected participation of the Khaps in assisting the protest. The Khaps had previously shunned away from raising economic political issues. Khap panchayats, the traditionally orthodox establishments, became agents of change and mass mobilization. Unlike the earlier movements of 1970s

and 1980s the farm laws protest managed to garner a much more wider support base with regional and class diversity. The Kisan identity gained prominence in contrast to their religious or ethnic identities. There was no waning of the farmer's enthusiasm as they united to fight against the commodification of agricultural production and trade. The Tikri border had a large presence of small and marginal farmers from Punjab and Haryana. The farmers from the Mewat region also joined the protest which has a significant number of Muslim population. Farmer groups from Odisha, West Bengal, Jammu and Kashmir and Kerala also joined in. The farm law protests opens up scope for a new politics for progressive change, even though its doubtful whether the solidarity would be long lasting. (Nilsen 2022) Explicitly projecting their Kisan identity this movement shows that over the years the farmers were disappointed with the rural-agrarian developments. The movement skillfully merged diverse strands of ideas including Marxism, Gandhism, Ambedkarism etc to create an inclusive spirit of protest.

The previous farmers' movement gave leverage to the rich landowners. Many of the farmers' unions like Shetkari Sanghatana in Maharashtra, the Karnataka Rajya Raitha Sangha mainly fought for free trade in agriculture and against subsidized food distribution system. These movements were also caste biased, in contrast the anti farm law protests managed to mobilize larger sections of society against the threat of corporate control.

### **Counter Action by the Government**

The farm protest had shown unforeseen solidarity across caste, class and gender backgrounds. This definitely made the authority apprehensive. In order to dismantle the farmers' protest the Government used laws that sanction imprisonment without trial for an extended period of time without bail. Use of such punitive measures have become very common to quash dissenting voices. The Government tried to throttle the movement by brutal police force, unlawful detention and censorship. The mainstream media tried to spread that the farmers were being instigated by the opposition party. A number of demonstrators were arrested and put behind bars. Water canons and tear gas was used to stop the protestors from entering the capital, but farmers remained resolute and continued with the movement. The speeches delivered by the farmers and villagers for organizing the protests reflected their extent of their consciousness and knowledge regarding the controversial farm laws. A group of young activists started a newspaper, Trolley Times

to provide a platform for the protesting farmers against the vilification campaigns by the mainstream media and also provide insights into the farmer's concerns. They also set up small libraries for lending books and organized special lectures, discussion sessions and programs to spread consciousness and generate enthusiasm among the agitating farmers. This definitely helped to create a counter narrative against the Centre's propaganda about the benefits of the laws. Efforts to control the social media and brand the movement as Khalistani, religious nationalism or anti national only reflected the desperation of the ruling power.

### **Unifying Role of Religion**

This movement successfully transcended any particular religious belief or political ideology. The Sikh spirit of community service especially setting up langars or community kitchens at the protest sites fostered a communitarian spirit as more and more people volunteered in this practice. Caste barriers were broken down at the protest sites where were treated equally and with respect. Toilets were being cleaned and streets mopped by upper caste Jats which was definitely an unfamiliar sight. The protestors organized Nagar Kirtan on the birth anniversary of Guru Govind Singh. A museum on wheel at the Singhi border displayed pictures of the Sikh glorious past invoking a sense of pride among a youth. All these gave courage, strength and determination to the protesting farmers as they continued their protest braving the harsh climatic conditions. The Samyukta Kisan Morcha organized Guru Ravidas Jayanti at all protest sites which was attended by all farmers irrespective of their caste identity. Guru Ravidas, a prominent figure in Sikhism, his egalitarian versus are part of the Guru Granth Sahib, promoting an interreligious worldview and shared idioms in sacred practices.

### **Role of Women in the Movement**

If we observe the agrarian landscape of Punjab and northwest India we notice an aggressive patriarchal structure. Women are mainly engaged in household chores and have least visibility in the public space. They are in a disadvantageous position in terms of food security and nutrition, which they felt would be aggravated if the farm laws came into force. In case of landownership and inheritance practice also wide gender biasness is noticed. Wives and daughters are never given land ownership rights. From the 1970s

onwards women have made their presence felt through various nonviolent struggles such as Chipko Andolan, Sardar Sarovar Dam Satyagraha etc. they have raised their voices fighting for issues like livelihood and displacement due to development projects. The widows of the farmers who committed suicide due to farm debt have carries the liabilities even without clear ownership of the lands. These widows have begun rallying around Kisan Mazdoor Khudkhusi Peedith Parivar Committee as the Government seems oblivious of their circumstances. SKM's main aspiration was to involve larger sections of to the farm community in the movement, which also called for participation of women. It would be wrong to say that women had easy access to the movement in a largely patriarchal setting. In the initial stages of the movement women were not allowed to sit in the stage along with the male counterparts and amenities were not suitable for women. Later when the female activists voices against this discrimination they ultimately gained some representation in border management communities and played a very significant role. Women broke the shackles of the patriarchal structures and took to the streets, actively engaging in the mobilization process, delivering speeches and raising concern regarding their lack of recognition as farmers. Women especially from small farmer and laboring families participated in the movement. SKM Rohtak and Women organization along with Tikri Mahila Kisan Samiti mobilized local women to the protest site. Women played a significant role at the toll plaza, the highway protest site. They had a voice in the decision making committees along with the men from the farmer union and organizations. (Jagmati Sangwan, Women's Participation in Protests against the Three Farm Laws in India: Perspectives from the Ground 2022) Rural India is marked by structural inequalities of class, caste and gender. Women protestors had to put up a sustained fight against discriminatory practices to make their presence felt and voices heard. The farmer movement is definitely unique due to the overwhelming presence of the women organizations and the Khaps. The participation of women was especially impressive in Jind district which is dominated by khap panchayats. (Siwach 2021) The rail roko agitation in Haryana was streered by the women, which was unforeseen in a state where the social structure is highly patriarchal. During the movement women activists played active role along with the Khap leaders who is the past never allowed women's participation in the political space. So patriarchal division of labor was also not present at the protest sites.

As a whole in this movement women played a multifaceted role. They led marches, protest gatherings, delivered speeches, wrote articles, managed langars, mobilized rations (Jagmati Sangwan, Women's Participation in Protest against The Three Farm Laws in India: Perspectives from the Ground 2022) etc. the participation of women in the movement helped them to voice against an authoritarian regime which tried to jeopardize their livelihood and food security.

### **Conclusion**

The farmer's protest is a landmark in Indian politics for a number of reasons. It has opened up new insights for the future of India's democracy and a path for future protest movements. The rollback of the three farm laws again brings to the fore, the crisis of India's democracy-we find the primacy of a unilateral announcement over the debating voices in Parliament. The movement also proves that if such unilateralism continues, ordinary citizens would rise to keep up the spirit of democracy. The major emphasis of the movement was that by passing the three farm laws the Government was favoring the corporate houses. Trust deficit between protesting farmers and the government is enormous. (Varshney 2020) The absolute resolve with which the farmers continued their protest relentlessly reflects that their movement was not just based on mere perception that in the long run the farmer's interests would be undermined as the market would be driven by private interests. It is evident that the farmer's are ready to forge unprecedented alliances to organize joint mass action in order to fight against the neo-liberal state and corporate led agenda. The protest was not just about the farms and the laws. It also stood for reinstating the right to protest and uphold the democratic values. The movement strived to remain nonviolent and peaceful and could incorporate various sections such as women, religious minorities and indigenous groups. The site for the protest- the national highway, also played a crucial role as it successfully grabbed the media attention. This movement can be viewed as a resistance to authoritarianism. The strategies adopted by the farmers to continue the movement for a long period of time in a more or less nonviolent fashion would definitely serve as guidebook for future struggles. In the days to come the present Government needs to emphasize more on opportunities for democratic dialogue and negotiations and policies should be potentially transformative, informed and pragmatic. Any coercive methods would definitely have a backlash.

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# DIGITAL INFRASTRUCTURE FOR KNOWLEDGE SHARING (DIKSHA): PRESENT STATUS OF OPEN EDUCATIONAL RESOURCES (OER) AVAILABLE IN THE PLATFORM

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**Abstract:** The present study explores the resources available in DIKSHA platform which is the '*one nation; one digital platform*' for school education in India. Varieties of open educational resources (OER) in various formats are available for the students, teachers, parents and institutions for all states and Union Territories (UTs). Data have been collected from this portal. The analyses show that digital contents in English (1,42,823) and Hindi languages (1,00,089) languages are available more in this portal and a large number of videos (35.07%) and documents (33.09%) files are there. Uttar Pradesh has the highest learning minutes in this portal

**Keywords:** DIKSHA, OER, open educational resources, e-context, digital documents, online education, knowledge sharing

## **1. Introduction**

The accessibility of information technology and its rapid advancement have enhanced educational system in India in a number of ways. Though the one of the fundamental rights to every people is the access information and knowledge, but the limitations are there to access a reading material that introduces a barrier to enhance educational system. Development of OER solves this barrier in all spheres of education health including industry. OER is based on the simple yet effective principle of making educational resources freely and legally accessible online for the public to remix, share, improve and distribute (William and Flora Hewlett Foundation, 2013, Nov 13).

Any type of educational content, from tiny photos to large books or online courses, can be considered OER. Open educational resources (OER) repositories offer a variety

of educational courses, degree programs, course materials, textbooks, articles, videos, assessments, software applications, and other forms of educational materials (Neely et al. 2016). These days, a growing number of organizations and people exchange these digital resources online without interference from monetary, legal, or technological constraints. OER offers teachers the chance to improve their instructional strategies while making education more accessible to all learners (Kurelovic, 2016). Education has suffered globally as a result of the Covid-19 pandemic, particularly in India. There are so many initiatives on OER in India such as National Digital Library of India (NDLI), Digital Infrastructure for Knowledge Sharing (DIKSHA), Shodhganga and so on. To assist the Indian education system, however, a number of policies have been put in place at the individual, institutional, and even governmental levels.

## **2. DIKSHA - an overview**

DIKSHA (Digital Infrastructure for Knowledge Sharing) initiative of the National Council of Educational Research and Training (Ministry of Education, Government of India), a national level platform for school education has been launched under PM-e-Vidya of India. The main objective of this platform is to provide digital learning resource across the country. It was launched 5<sup>th</sup> September 2017 by Honourable Vice President of India – Shri M. Venkaiah Naidu. Presently DIKSHA has been adopted by almost all the States and Union Territories (UTs). This portal provides free access of digital resources to the students, teachers, and parents (<https://diksha.gov.in/>). DIKSHA has seen more than 1.72 crore registered users and more than 2.10 lakh daily users as on August 25, 2024. The portal shows that 552.15 crore learning sessions and 6,407.59 Crore learning minute till the data. The platform offers 6,782 energized text books and 3.58 lakh e-Contents as OER in more than 30 Indian languages and on more than 300 subjects.

## **3. Objectives**

The main objectives of this study are as follows:

- To know the various digital resources available on DIKSHA platform
- To find the language wise OER for strengthening online education across the country
- To identify the resources in different subjects
- To find the usage pattern of OER by the states and UTs.

#### **4. Review of Literature**

Open Education Resources (OER) emerged as a result of the free software movement, according to Caswell et al. (2008). In the field of education, OERs are a comparatively new development with the goal of liberalizing access to knowledge and increase the standards of educational resources (William and Flora Hewlett Foundation, 2013, Nov 13). Open licensing, namely “new legal means to create and distribute open tools and content through licensing schemes such as Creative Commons,” has been recognized by the OECD (2007) as another legal issue guiding various areas of open education. OER must be part of the public domain or be distributed under an open license, such as the Creative Commons License (CCL), which allows anyone to use, alter, and redistribute them for free or with very few restrictions (OECD 2007; UNESCO, 2011).

Many studies on OER and open licensing have been completed at national and international level (Singh, 2024). Olivier & Baroud (2023) found OER initiatives in South Africa in their edited book “Open educational resources and open pedagogy in Lebanon and South Africa”. Cai et al. (2023) investigated China, Jung (2022) studied Japan and Korea. Nath (2022) studied the various initiatives on OER taken in India and abroad. The traditional model of teaching and learning will shift as a result of the accessible and widespread availability of excellent educational resources, raising the standard of instruction. The Indian government has initiated a number of cutting-edge projects and programs pertaining to the creation and distribution of educational materials, including SHAKSHAT, NMEICT, NPTEL, OSCAR, and E-grid (Dutta, 2016). But various issues and problems of OER have been facing by the Social Scientists of Select Higher Educational Institutions in India (Kumar, Baishya & Deka, 2021). In order to use OER effectively for increasing educational opportunity and quality in the Indian context, a systemic and sustainable way is to identify difficulties and making solutions that address infrastructural preparedness (Vijay Kumar, (2009). Singh (2024) has addressed many barriers regarding OER in India faced the users in his study. In order to make OER more accessible to students, instructors, parents, and institutions, a study on the current state of OER available on the DIKSHA portal is required.

#### **5. Methodologies and data collections**

Online survey method has been followed for this study. Live data on various educational

resources are available in DIKSHA portal (<https://diksha.gov.in/data/>). The dashboard of this portal consists of four visualization areas namely 'User Metrics', 'Usage Metrics', 'Content Metrics' and 'Course Metrics'. Every section of the areas has been scanned and then data have been collected. This study has captured data on August 25-26, 2024 from this portal. As the present study has been conducted on OER, only the data under 'Usage Metrics' and 'Content Metrics' have been considered.

## 6 Analysis and interpretations

### 6.1 Content type of OER

In DIKSHA platform digital resources are available in different medium and format like audio video, document and others formats. The following analysis shows number of documents in different content types.

**Table no.1:** OER in different content types

Sl.no.	Content type	Number of OER	%
1	Audio	18	0.01
2	Document	1,18,651	33.09
3	Interactive Content	72,637	20.26
4	Video	1,25,766	35.07
5	YouTube video	41,520	11.58
Total		3,58,592	100

A chart using the above table has been shown below:

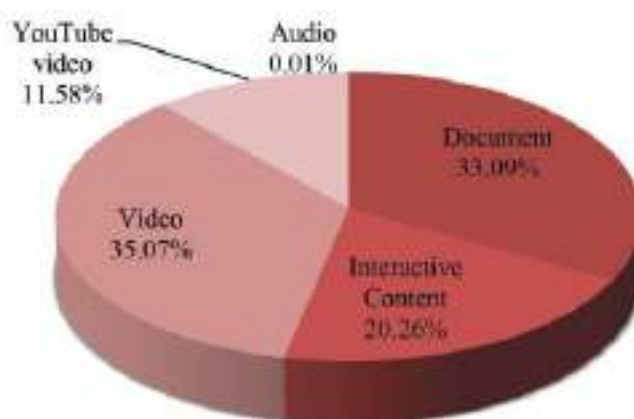


Chart no1: Different content types

The above clears that a large number of videos (35.07%) and documents (33.09%) e.g. pdf are available in DIKSHA portal. A good number of interactive contents (20.26%) are also available in that portal. A least number of YouTube videos (11.58%) are there. Almost negligible amount of audio materials (only 18) are available in the portal.

### 6.2 Energized Textbooks and e-Contents

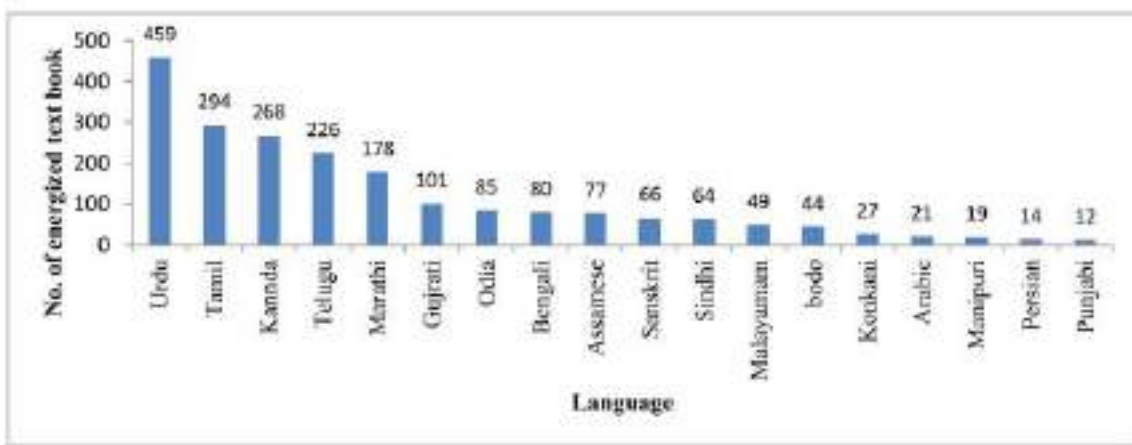
The DIKSHA platform contains a lot of energized text books and e-contents for their users. Those learning materials have been framed in different Indian languages. This section discuss about language wise reading and learning materials available in this portal.

**Table no. 2:** Statement showing language wise Textbooks and e-Contents

Sl. no.	Language	Text book	E-Content
1	Arabic	21	314
2	Assamese	77	4,465
3	Bengali	80	2206
4	Bodo	44	1393
5	English	3,005	1,42,823
6	Gujrati	101	19829
7	Hindi	2,130	1,00,089
8	Kannda	268	20,326
9	Konkani	27	1584
10	Malayamam	49	1625
11	Manipuri	19	342
12	Marathi	178	17,514
13	Mizo	11	718
14	Odia	85	9,958
15	Persian	14	216
16	Punjabi	12	3,950
17	Sanskrit	66	2,996
18	Sindhi	64	325
19	Tamil	294	11,546
20	Telugu	226	16,271
21	Urdu	459	13,187
<b>Total</b>		<b>7,230</b>	<b>3,71,677</b>

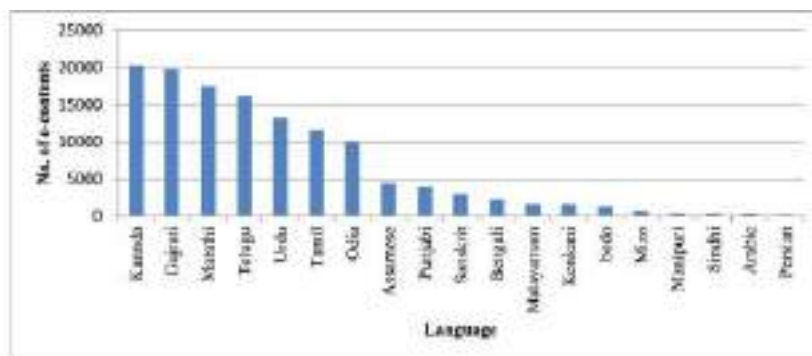
The above table shows that total number of energized textbooks and e-contents are 7,230

and 3,71,677 respectively available in 21 languages. The above table excludes some e-content materials in other languages e.g. e-contents available on Arbi, Dogri, Garo, Kashmiri, Khasi, Koch Rajbongshi, Santali, Tulu etc. for comparative analysis as there is no text book available in those languages in this portal. A large number of text book are available in English (1,42,823) and Hindi languages (1,00,089). The following two charts exclude these textbooks available in those languages for details comparisons of textbooks.



**Chart no.2:** Decreasing order of energized text book in different languages

The above chart shows that a large number of energized text books are available in Urdu (459), Tamil (294), Kanada (268), Telugu (226) and in Gujrati (101). Availability of energized text books in Odia, Bengali, Assamese, Sanskrit and Sindhi languages are considerably is considerably low than other languages. The found few books in Persian (14) and Punjabi (12) languages.



**Chart no.3:** Decreasing order of e-contents in different languages

The above chart shows that e-contents in Kannda (20326) and Gujrati languages (19,829) are very high in number. More than 5,000 e-contents are available in each of Marathi, Telugu, Urdu, Tamil and Orid languages. A least number of e-contents are there in Assamese, Punjabi, Sanskrit, Bengali, and in Malyamam.

### 6.3 Subject wise Energized Textbooks (ETB)

There are 301 subject wise energized textbooks are available in this portal. Below are the subjects that have the greatest availability (more than 100) of engaging textbooks.

Table no.3: Subject wise number of energized text books (selected only)

Sl. no.	Subject	No. of ETB
1	Mathematics	1,030
2	English	639
3	Hindi	553
4	Science	457
5	Geography	389
6	History	313
7	Political Science	288
8	Economics	215
9	Social Science	196
10	Physics	159
11	Chemistry	157
12	Accountancy	152
13	Environmental Studies	141
14	Sociology	128
15	Urdu	127
16	Biology	117
17	Evs	117
18	Sanskrit	108

The above table shows that more ETB are available in Mathematics (1,030), English (639), Hindi (553), and on Science (457) subjects. A good numbers of text books on Geography, History, Political Science and Economics subjects are also available in this portal.

### 6.4 Learning minutes by the States and UTs

The DIKSHA portal shows the learning minutes by the states and the UTs. The

following table shows the data on total learning minutes.

Table no. 4: Decreasing order of learning minutes by the states and UTs

<b>Sl.no.</b>	<b>States &amp; UTs</b>	<b>Learning minutes in total</b>
34	Uttar Pradesh	1380,13,10,696
20	Madhya Pradesh	771,04,12,834
5	Bihar	598,32,41,224
16	Karnataka	523,81,05,703
29	Rajasthan	411,79,40,156
11	Gujarat	328,80,82,632
21	Maharashtra	313,30,30,966
15	Jharkhand	286,96,37,488
26	Odisha	269,17,35,626
2	Andhra Pradesh	245,32,59,086
7	Chhattisgarh	192,36,94,774
12	Haryana	154,07,51,033
14	Jammu And Kashmir	147,84,56,621
31	Tamil Nadu	93,79,91,853
9	Delhi	82,17,78,987
32	Telangana	75,30,62,391
4	Assam	73,53,92,130
28	Punjab	73,49,55,074
35	Uttarakhand	44,22,78,919
13	Himachal Pradesh	36,94,83,072
17	Kerala	24,14,80,747
23	Meghalaya	22,32,59,730
36	West Bengal	18,31,22,260
22	Manipur	18,13,44,820
10	Goa	14,33,83,876
33	Tripura	11,97,56,352
6	Chandigarh	10,49,60,705
25	Nagaland	9,50,59,097
3	Arunachal Pradesh	9,18,95,038
1	Andaman and Nicobar Islands	8,88,01,837
18	Ladakh	8,83,47,995

Sl.no.	States & UTs	Learning minutes in total
30	Sikkim	7,82,11,353
24	Mizoram	4,89,98,647
27	Puducherry	4,75,99,344
8	Dadra and Nagar Haveli and Daman & Diu	3,31,69,112
19	Lakshadweep	78,13,598

In the above the table containing DIKSHA portal usage by the States and UTs, it is found that Uttar Pradesh, Madhya Pradesh, Bihar, Karnataka, Rajasthan, Gujarat, Maharashtra, Jharkhand, Odisha and Andhra Pradesh are the leading states in this regard. Regarding UTs, it is observed that residents of Chandigarh, the Andaman and Nicobar Islands, and Ladakh use the DIKSHA portal more frequently.

## 7 Discussions

To increase the use of OER by the learners, teachers and other stake holders the Ministry of Human Resource Development (MHRD) has taken many initiatives. DIKSHA is one of them. The resources available in this portal are provided in free to the school children in various school students. These resources are not only useful to the learners but to the teachers also. The above analysis clarifies that only some states and UTs are very proactive to use the platform and to contribute to the portal. It is good sign that the development of e-contents by the contributors from different states and UTs are gradually increasing. The dashboard of the portal shows the decreasing rate in many cases by all the states and UTs after the Covid-19 pandemic. But stability is noticed there after this period. The usage pattern by the states shows that only 50% of the states including UTs crossed 150 Crores learning minutes in the portal. Therefore, the study recommends the followings for fruitful and eventual implementation of the portal.

- Awareness about the portal is required to all levels of primary, secondary and upper secondary level through conducting various programmes, workshops, seminars etc.
- Capacity building programmes for learners and teachers for adopting digital technology in their classrooms.
- Physical infrastructures like ICT classrooms, digital devices, high-speed internet facilities etc. are essential.

- Special packages must be provided for hard to reach areas and remote villages in various states.
- Various online courses for the teachers are to be provided so that these courses can help teachers to increase their leadership skill, concepts and application (Sharma, 2021).

## 8. Conclusion

The DIKSHA platform has a substantial number of open educational resources (OER) that is becoming more and more accessible to learners and other stakeholders every day. There are many different kinds of educational resources available, including lesson plans, micro-courses, supported content materials like videos that aid in concept clarification and explanation for teachers, practice materials for students, assessment materials to aid in learning evaluation for teachers and students and so on (Sharma, 2021). To make the fruitful use of this huge amount of OER, the government will need to make numerous technological adjustments throughout the nation to ensure the implementing of digital education.

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# MANAGING INDIGENOUS KNOWLEDGE: DESCRIBING THE ROLE OF PUBLIC LIBRARIES IN HOOGHLY DISTRICT, WEST BENGAL

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**Abstract:** The study focuses the role of public libraries for capturing, managing and sharing indigenous knowledge. Indigenous knowledge in district of Hooghly is an integral part of the daily life. It influences directly or indirectly on various socio-economic and cultural activities of the people of this district. Many social organisations, especially the public libraries play significant roles in this regard. This is a quantitative study with data from interviews and telephonic conversations with 15 librarians of public libraries in Hooghly District. The results highlight methods of capturing and managing indigenous knowledge by those libraries. It also explores various issues regarding dissemination and awareness of indigenous knowledge. Few recommendations have also been made for all the stakeholders in this regard.

**Keywords:** Indigenous knowledge, public library, indigenous knowledge system, heritage, archive, Hooghly, West Bengal

## **1. Introduction:**

Over time, many cultural experiences and typical understanding have been carried out generation to generation and preserve them by the indigenous peoples in various communities around the world (Bruchac, 2014). These understandings are helpful for strongly social bonding, economic activities, and educational system. This is simply called indigenous knowledge (IK). It is also called “traditional knowledge”, “local knowledge”, “traditional ecological knowledge” or “ethno-ecology” etc. IK is considered as the social capital of the poor people (Senanayake, 2006). It is their main asset to invest in the struggle for survival and for developmental activities. Though the survival activities in the community of indigenous people are vital to them which include produce food, provide

for shelter and to achieve control of their own lives (World Bank, 1998). Indigenous knowledge (IK) includes the practices by the people in a community, expressions, beliefs, insights, understandings and experiences gained for surviving in an Indigenous group. The IK is generated in a particular territory by interacting among indigenous people. Most of the IK contains important scientific data as this knowledge is best viewed as a practical engagement – tested, augmented, and refined through generations of land-based practices (Grey, 2014). The IK is generally transferred from one generation to another generation formally and informally among kin groups through social encounters, oral traditions, ritual practices, and other activities which includes oral narratives that recount human histories; cosmological observations, techniques for planting and harvesting; hunting and gathering skills; specialized understandings of local ecosystems; and the manufacture of specialized tools and technologies and so on (Bruchac, 2014).

## **2. Objectives:**

Main objectives of the study are

- To identify various IK at the local level;
- To find out the methods of awareness taken by the library about IK;
- To state the collections of documents on IK in public libraries;
- To uncover the status of infrastructure directly or indirectly required for

preserving IK;

- To find out the role of public libraries regarding IK

## **3. Review of Literature:**

Public libraries have significant role (Abdul Kargbo, 2005) in promoting indigenous knowledge for developing various aspects of the countries. Muswazi (2001) studied for indigenous knowledge management in Swaziland. In the knowledge management era, information professionals have great opportunities and challenges for managing and preserving indigenous knowledge (Ngulube, 2002; Sithole, 2007; Lwoga, Ngulube & Stilwell, 2011). Not only have the information professionals, the whole information service sectors had also responsibilities and protocols in this regard (Nakata, Byrne, Nakata & Gardiner, 2005). Anderson (2005) studied for the crisis of access, control and future utilities of indigenous knowledge. In most of the countries, indigenous knowledge is sadly diminishing at an alarming rate and therefore, an urgent need to collect it before

much of it is completely lost (Kargbo, 2006; Lindh & Haider, 2010). For collecting and preserving local information resources many initiatives have been taken by various institutions (Isah, Bashorun & Omopupa, 2011). Desa Informasi (Information Village), an initiative has been taken by Petra Christian University through the implementation of an institutional repository (IR) system (Tjeka, 2006). Stevens (2008) showed different ways of knowing indigenous knowledge and stated tools and strategies for managing this knowledge. The role of social media technologies to create, preserve, and disseminate indigenous knowledge among communities is most significant (Owiny, Mehta & Marezki, 2014). Therefore the role of ICTs is most significant for sustainable Indigenous Knowledge Systems (Myeza & Kaya, 2016; Azubuiké & Aji, 2021). Role of public libraries for managing local indigenous knowledge is most important (Owolabi, Ovwasa, Ajayi & Odewale, 2022).

#### **4 . Methodology:**

This is a prototype qualitative study and the data have been collected from the public libraries in the District of Hooghly, West Bengal. Purposive sampling has been followed for data collection and a total of 9 public libraries have been selected. The selected libraries include one district library, one town library and seven public libraries at remote villages in Hooghly District. An open ended questionnaire has been placed to the librarians or to the in-charge of the libraries physically and some of the cases data have been collected by telephonic interview with them. They have been asked about various aspects of the local IK, types of IK, methods of awareness, collection and preservation of IK by the libraries, infrastructural conditions of the libraries etc.

##### **4.1 Data Collections**

A total of 9 public libraries have been selected purposefully which include district central library, town libraries and public libraries in rural areas.

1. Hooghly District Central Library
2. Chandannagar Pustakagar
3. Uttara para Jaikrishna Public Library
4. Serampore Public Library
5. Tarakeswar Yuba Sangha Town Library
6. Talpur Kishore Pathagar

7. Ramnagar Banimandir Pathagar
8. Bandhab Nabarun Pathagar
9. Rashidpur Union Library

**Table 1: Statement showing queries to the librarians and their responses**

Sl. no.	Queries on IK	Yes	No	May be
1	Awareness programme about IK	2	7	0
2	Identifying IK by the libraries	2	7	0
3	Understanding importance of IK	9	0	1
4	IK in library collections	3	4	2
5	Financial problems	9	1	0
6	Technical problems	7	2	0
7	Minimum IT infrastructure in libraries	2	4	3
8	Influence of Covid-19 on IT infrastructure	2	7	0

## 5 Discussion of findings

It highlights the findings based on the objectives of the study, under the following headings and sub-heading:

### 5.1 Identifying IK at local levels

- a) *Bramha Puja* (for awareness of fire at Champadanga, Tarakeswar Block)
- b) *Olaibibi* (for awareness and prevention of communicable diseases at Ranbugpur)
- c) *Dhyana Utsab* (for agricultural information exchange among communities at Pursurah)
- d) *Dighir Mela* (for mutual exchange/sale of old furniture and other various items at Arambagh)
- e) *Jandar Mela (Alur Dam Mela)* (food, new crops, economic activities etc at Rajbalhat, Hooghly)

### 5.2 Methods of awareness about IK

- a) Most of the librarians (7 out of 9) said that they do not follow any methods regarding identifying and awareness of local IK. But other two libraries arrange programmes or cultural activities by which indirectly they aware about local IK.

- b) Positive responses have been received from all the librarians that IK is important for all aspects of development of a community.

### **5.3 Collections of documents on IK**

- a) Most of the librarians (6 out of 9) said that they have not any collected item in any form regarding IK. Rest of the librarians said that they keep such IK mainly in printed form.
- b) Most of the librarians try to collect local IK but due to financial and technical problems they fail to take any initiatives.

### **5.4 Status of infrastructure**

- a) Only Uttarpara Jaikrishna Public Library and Hooghly District Central Library have infrastructures like computer, internet connection, scanners etc. for the users and as well as for managing IK.
- b) Another two librarians said that their IT infrastructures have been damaged due to Covid-19 Pandemic and till now these are not restored. Rests of the libraries have no infrastructures regarding this.

## **6. Conclusion:**

Managing IK is an important input for sustainable development of this district. IK management comes with challenges and costs; public libraries are not in well positioned when it comes to issues relating to collection development, preservation and dissemination of information. Public libraries should be proactive to aware and educate stakeholders on the value, contribution and importance of IK for community development. These can be done through seminars, conferences and public education.

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# ARTIFICIAL INTELLIGENCE: ITS ADOPTION AND APPLICATIONS IN ACADEMIC LIBRARIES IN INDIA

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## **Abstract:**

Artificial intelligence (AI) has entered into various sectors, such as education, agriculture, healthcare, economics, and library management. Its incorporation in library management aims to enhance resource allocation for more favourable results. This paper focuses on the adoption and application of artificial intelligence within the academic library system. The paper describes the concept of artificial intelligence while tracing its origin and components. The study is to investigate the possible uses of AI within India's academic library system. It further discusses with the advantage of adopting artificial intelligence in academic libraries which includes user-friendly, infinite functions, ability to take complex work among others; and the challenges faced by library management towards the adoption of artificial intelligence which include financial uncertainty, job loss, technological disadvantages among others. The paper recommends that government and library management must come together to predict the way forward for academic libraries in terms of meeting up with the latest standard of the use of AI in libraries. Furthermore, it is recommended that library staff should be exposed to training and retraining in the use of artificial intelligence in delivering of library services. Moreover, the integration of AI should be firmly established as a standard practice across all library units. The institutions' budgetary allocations should take AI costs into consideration. The Indian library system's academic libraries could make it simpler to find materials if AI is used.

**Keywords:** Artificial Intelligence (AI), Academic Libraries, Library Services, Components of AI, Library System, etc.

**Introduction:**

Libraries are regarded as knowledge and information repositories, serving as crucial hubs for academic and community enrichment. In this IT and digital age, libraries are not exempt from the transformative power of technology, and one such transformation that is making significant inroads is the integration of Artificial Intelligence (AI). AI involves computer-controlled robots that possess the capacity for intelligent thinking akin to humans. These robots are electronically operated with the aid of computers, replicating human mental faculties. AI records and assesses all user activities, enhancing human convenience and progress in various life domains, a result of advancements in science and technology. Due to the massive strain on librarians to offer library customers with high quality services as a result of the information explosion in our current culture. In the library setting, the adoption of AI can improve library services and provides access to accurate information that can drive growth and development in this information age. Artificial intelligence technologies are now being used in libraries to achieve the organic integration of readers and libraries. With this, readers interact on the same platform, track and acquire the personalized needs and information of users so that users can access information accurately, and humanized services, at a reduced cost to rationally utilize library resources. Tella (2020) stressed that libraries in the developed countries have accepted and use AI technologies virtually in all spheres of life whereas those in developing countries are still struggling to find their feet. AI has made its way into libraries in the form of a chat window that responds to simple informative queries, handles directed online queries at the library web-site, issues past-due warnings, and directs visitors to pertinent resources in the library. On the library floor, collaborative robots called AI work alongside people to do difficult or boring jobs. AI implementation in libraries will have an impact on the connection of information technology, actively encourage information utilization, and make it easier for users to search for information and quickly find what they need. In Indian education system, academic librarians view artificial intelligence as a fresh source of inspiration for the creation of intelligent libraries.

Librarians have begun incorporating artificial technologies into library systems to align with contemporary national and global trends in the field of librarianship. Within Indian educational organizations, there is an obvious lack of documentation on the incorporation of intelligent technologies in academic libraries.

Libraries are the nerve centre of an educational institution and a place where information is provided to serve all patrons irrespective of their ages, political and ethical background, religion, sex, etc. The transition of information materials from book collections to audiotape collections, video collections, database, digitization of information materials, library automation, and now the adoption of artificial intelligence in library operations (Vijayakumar & Vijan, 2011). This implies that one of the motives of adopting AI technologies in academic libraries is to satisfy user needs

#### **Literature Review:**

Norman Jacknis (2017) expressed in his blog that though librarians have acquired many skills to organize the information and making it accessible anywhere, libraries can ensure the application of the tools for the new generation of knowledge, which surpasses Google search has been developed for academic purposes.

Hsieh and Hall's (1989) study offers a thorough examination of expert systems and artificial intelligence (AI) in the context of library and information science. The study thoroughly examines the literature on artificial intelligence (AI) drawn from "Library Literature" and "Library and Information Science Abstracts," delving into the field's definition and historical evolution.

According to Asemi et al.'s (2021) review of research on AI technologies for libraries, intelligent systems were primarily created to recognize and replace books on the shelf. They also recommended enhancing the interaction between librarians and robots. In addition, they divided the relevant research into four categories: resources, users, services, and technology. To put it briefly, libraries can create intelligent systems based on human-computer interactions that are seamless, graphical, and easy to use with the aid of emerging AI technologies.

Shruthi and Chandru (2021) provided an account of the applications of AI in the libraries

under study. AI can translate spoken words into spoken questions, convert audio to text, create audiobooks, and enable automatic translation from written to spoken word. It can be applied to indexing to automatically offer relevant preferred terms, assign pertinent subdivisions, and draw conclusions.

### **Concepts of AI:**

The origin of Artificial Intelligence (AI) can be traced to John McCarthy's research in 1955.

Merriam-Webster English Dictionary (2018) stated that artificial intelligence is “a part of computer science that deals with giving ability to the machines to look as if they have natural human intelligence.”

Liu (2016) defined AI as intelligent robots or intelligent systems that imitate AI seeks to duplicate the operations of human intelligence while continuing the study of intelligence in human beings. A branch of computer science known as artificial intelligence focuses on how computers learn (ML), Through a variety of methods, such as identification of characters, assessment of images, 3D perception, and eye function modeling, artificial intelligence processes information and interprets the environment. Furthermore, it encompasses voice recognition, speech generation, the comprehension and utilization of NLP, and a growing emphasis on expert systems.

Tredinnick (2017) described AI as a cluster of technologies, and various computing science approaches to make flexible rational decisions that align with unpredictable environmental conditions. However, this tread can be linked to process automation, the Internet of things, data processing, tangible robotic, conversational interactions and decision support.

### Components of AI:

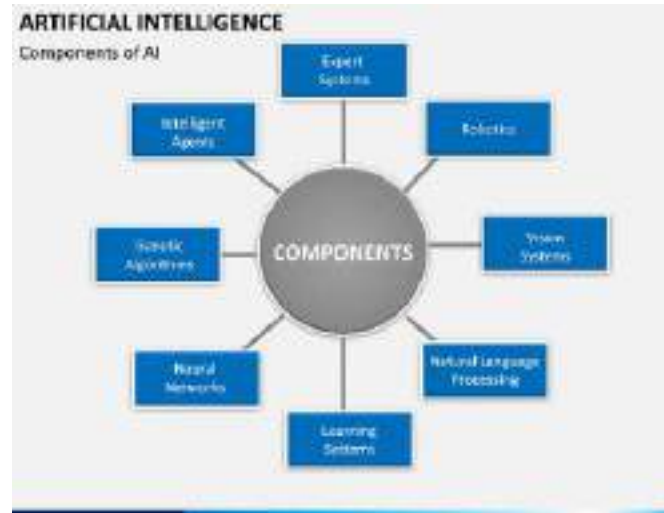


Image Source: [www.sketchbubble.com](http://www.sketchbubble.com)

Figure: Diagram of Artificial Intelligence Components

Artificial Intelligences (AI) sub-areas, namely expert systems, natural language processing, pattern recognition and robotics, aim to simulate human intelligence with computers. Some recent computing techniques and areas for artificial intelligence development discussed below:

**Expert System:** The Expert System is a computerized knowledge system that serves as a gateway or interface for providing access to the database and obtaining relevant information. It ranges from simple regulatory systems with flat data to very large-scale, integrated development that takes many years to develop. An expert system is a computer program that offers expert advice, decisions or solutions to a particular situation. Knowledge base, inference engine and user interface are the various components of the expert systems.

**NLP:** Natural Language stands as the latest advancement in the realm of programming language. A natural language client interface for artificial intelligence has been developed by researchers by implementing a restricted vocabulary and grammar. With the utilization of NLP, computers are capable of understanding the primary linguistic concepts embedded in both questions and their corresponding answers. The different aspects of natural

language processing include things like speech detection, artificially translated linguistic approaches, voice synthesizing, and information retrieval.

**Pattern Recognition:** Pattern recognition is a crucial field in the development of intelligent systems and has far-reaching applications in diverse industries, from healthcare and finance to security and entertainment. It plays a crucial role in the development of technology that can understand and interpret complex data, ultimately improving decision-making and automation. Pattern recognition tasks can be categorized as supervised or unsupervised. In supervised learning, the algorithm is trained on labeled data, while in unsupervised learning, the algorithm identifies patterns without labeled examples.

**Robotics:** Robotics is commonly recognized as a branch of artificial intelligence. It concentrates on the development of movement and perception skills. Robots are electronic devices created for performing automated tasks, either directly under the control of a person or by using artificial intelligence and pre-programmed instructions.

**Machine learning:** Arthur Samuel, an American pioneer in computer gaming and artificial intelligence, invented the term ‘machine learning’ in 1959 and defined it as “it gives computer the ability to learn without explicit programming”. Depending on the nature of the “signal” or “responses” to the learning system, machine-learning applications divided into the three primary categories, i.e., (a) Supervised learning (b) Unsupervised learning (c) Reinforcement learning (d) Semi-supervised learning.

**HAMLET:** The system is HAMLET (How about Machine Learning Enhanced Theses) currently a developer at the Berkman Klein Center for Internet and Society at Harvard. HAMLET uses the doc2vec algorithm. This is an algorithm for estimating the similarity in meaning between different documents, based on a widely used algorithm word2vec, which estimates the similarity between words. It explores the results online at the URL in the gray box. HAMLET has three prototype interfaces: a recommendation engine, an uploaded file oracle, and a literature review buddy. [Kumar & Yadav, 2023]

Libraries have the opportunity to adapt and refocus their attention with the aid of AI applications, as the methods for information retrieval are continually evolving. Libraries are strategically positioning themselves to leverage cognitive computing and, more specifically, artificial intelligence applications due to their considerable potential in enhancing the quality of library services.

### **Applications of AI in Academic Libraries:**

AI technologies are playing a vital role in transforming traditional library services into more efficient, user-centered, and data-driven environments.

#### **1. Optimization of Collection Development**

- a) **Predictive Analytics for Collection Development:** AI-powered predictive analytics analyze user borrowing patterns and emerging trends to inform collection development decisions. Libraries can allocate resources more efficiently and ensure that their collections remain relevant.
- b) **Automating Cataloging and Metadata Enrichment:** AI can automate cataloging tasks, reducing the time and effort required to process new acquisitions. Machine learning models can analyze content and generate metadata, making resources more discoverable.
- c) **Preservation and Digitization Efforts:** Libraries often house rare and fragile materials. AI plays a role in digitizing and preserving these materials. Technologies like OCR (Optical Character Recognition) can convert printed text into digital formats, and AI can assist in the restoration of deteriorating documents.
- d) **Managing Digital Rights and Licenses:** AI can assist in managing digital rights and licenses for library collections, ensuring compliance with copyright and licensing agreements. This is especially important as libraries increasingly offer digital resources.

#### **2. Enhancement of Information Retrieval**

- a) **AI-driven Search Engines and Recommendation Systems:** AI has revolutionized the way users discover library resources. Advanced search algorithms and recommendation systems help users find relevant materials more efficiently. These systems analyze user behavior, preferences, and historical data to provide tailored suggestions, improving the overall user experience.
- b) **Machine Learning for Content Discovery:** Machine learning algorithms can analyze vast collections of data, identifying patterns and trends that might go unnoticed by human librarians. This helps libraries curate and recommend resources more effectively, particularly in specialized or niche subject areas.
- c) **Natural Language Processing for Improved User Queries:** Natural Language

Processing (NLP) enables libraries to understand and respond to user queries in a more human-like manner. Chatbots and virtual assistants equipped with NLP capabilities can engage in conversational interactions, making it easier for users to find the information they need.

- d) **Personalized User Experiences:** AI allows libraries to offer highly personalized user experiences. By analyzing user behavior and preferences, libraries can customize content recommendations, notifications, and interfaces, ensuring that each user's interaction with the library is tailored to their needs and interests.

### **3. Transforming User Engagement**

- a) **AI-driven Reference Services:** AI can augment reference services by providing instant answers to common queries and assisting librarians in research tasks. This allows librarians to focus on more complex inquiries while ensuring that routine questions are addressed promptly.
- b) **Virtual Assistants and Chatbots:** Virtual assistants and chatbots have become integral to library services. They provide real-time assistance to users, answering questions, helping with research, and guiding patrons through library resources. These AI-powered assistants are available 24/7, improving accessibility and user engagement.
- c) **Virtual and Augmented Reality in Library Experiences:** Virtual Reality (VR) and Augmented Reality (AR) technologies create immersive library experiences. Users can explore virtual library spaces, attend virtual events, and engage with digital resources in novel ways. AR enhances physical library spaces by providing additional information or interactive elements when users view books or objects through AR-enabled devices.
- d) **Tailored Content Recommendations:** AI-driven content recommendations extend beyond books and articles. Libraries can use AI to suggest relevant events, workshops, and community activities, promoting engagement with the library beyond traditional research and borrowing.

### **4. Promoting Accessibility and Inclusivity**

- a) **AI-Powered Accessibility Tools:** AI technologies enhance accessibility for users

with disabilities. Text-to-speech and speech-to-text conversion, image recognition, and adaptive interfaces improve the accessibility of digital content for all patrons.

- b) **Supporting Diverse Learning Needs:** AI-driven adaptive learning platforms help cater to diverse learning styles and abilities. Libraries can offer personalized learning experiences, whether it's through interactive tutorials, gamified content, or adaptive assessments.
- c) **Multilingual Support Through AI Translation:** Language barriers are minimized through AI-powered translation services. Patrons can access materials in their preferred language, expanding the reach and impact of library collections.
- d) **Enhancing Resources for Users with Disabilities:** AI-driven tools can transform how libraries serve patrons with disabilities. For example, AI can provide alt-text for images, convert text to braille, and make audiovisual content accessible through captioning and sign language recognition.

#### 5. **Ethical Considerations**

- a) **Data Privacy and User Consent:** Collecting and analyzing user data for AI applications must be done with careful consideration of privacy laws and user consent. Libraries need to be transparent about data collection practices and ensure that user information is protected.
- b) **Addressing Ethical Challenges in AI Adoption:** Libraries must have policies and guidelines in place to navigate ethical challenges. This includes addressing issues related to intellectual property, open access, and the responsible use of AI in library services.
- c) **Bias and Fairness in AI Algorithms:** AI algorithms can perpetuate biases present in training data. Libraries must actively work to mitigate bias in AI systems to ensure that recommendations and services are fair and unbiased.
- d) **Transparency and Accountability in AI Systems:** AI systems should be transparent, with clear explanations of how they make recommendations or decisions. Libraries should also establish mechanisms for accountability and redress in case of errors or disputes. [Vijayakumar & Sheshadri, 2019]

#### **Advantages of adopting AI for academic library services:**

With the help of AI, library services can be done in more effective and efficient ways

for improved user satisfaction. Therefore, library users can access timely and accurate information quickly and promptly. A user friendly AI technology will help users search for information with ease, help retrieve information across various collections, and help with users' queries. AI technology can also be used to assign metadata and to assist in the non-textual search.

Mogali (2015) also identified some advantages of AI:

- a) Can take on stressful and complex work that humans may struggle /cannot do
- b) Complete task faster than a human being can
- c) To discover unexplored things i.e. outer space;
- d) Less errors and defects;
- e) Can assist in accessing research jobs in any part of the world with ease
- f) Function is infinite

#### **Challenges of Adopting AI in academic libraries:**

Despite all AI potentials in academic libraries in India are yet to adopt and implement AI. Perhaps, this might be due to low level of awareness and adoption of AI's relevance in libraries, as research connecting artificial intelligence (AI) to librarianship remains relatively low. While the use of AI has been increasing exponentially in other fields, this has not been the case in library and information science. The challenges, faced by libraries today, pose a tangible risk to the traditional role of libraries. Libraries are now struggling with operational. International Labor Organization (2018) also stressed that with the current trend in technological change based on the adoption of artificial intelligence in different organizations that include libraries, AI adoption has created widespread fear of job losses and a high rise in inequality. The other challenges are as follows:

- a) Lack of technical know-how to use and operate artificial intelligence systems among the library staff.
- b) Lack of adequate funding to develop or procure artificial intelligence systems in libraries. Since the budgets for hardware and software are frequently tight, there's always constrain to the type of system the library can purchase or develop.
- c) High system development and maintenance cost of artificial intelligence systems in libraries.
- d) Inherent complexities of expert/artificial intelligence systems' development.

- e) Intelligent systems lack that common base of human knowledge, severely constraining the types of functions that they can perform.
- f) Erratic power supply to power artificial intelligence systems in libraries especially in developing countries. [Hussain, 2023]

**Conclusion:**

The adoption of AI technology in academic libraries in India is viewed as a fresh impetus for the development of smart libraries. Also, the adoption affords libraries the opportunity to render

improved and dynamic services to library patrons. AI is being used to guide and support library activities, and at the same time user-friendly, particularly in information search are among the benefits derived from the adoption AI in libraries. However, despite the benefits associated with the adoption of AI in libraries, some challenges such as financial uncertainty, emerging skill gaps, job loss, lack of adequate infrastructure and erratic power supply still hinder the smooth adoption of AI in many academic libraries in India.

**Recommendations**

Some of the recommendations are suggested:

- Government and library management must come together to proffer the way forward for academic libraries in terms of meeting up with the latest standard of the use of AI in libraries.
- Library staff should be exposed to training and retraining in the use of artificial intelligence for delivering of library services.
- There must be proper policy formulation and implementation for adoption of AI in academic libraries of India.
- Libraries of higher education institutions should intensify efforts in adopting artificial intelligence for high level satisfaction of users.
- AI has to be introduced at all levels of national education curriculum so that graduates from these institutions may work in every industry and apply their knowledge of AI to the advancement of the country.
- Government and concerned agencies should provide adequate artificial intelligent hardware and software to aid in the delivery of libraries' services to users.

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# আরবী চর্চায় মুর্শিদাবাদ জেলা: একটি সমীক্ষা

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## ভূমিকা

আরবী ভাষা আফ্রিকা ও এশিয়ার এক বিশাল জনগোষ্ঠীর কথ্য ভাষা। ভাষাটি সেমেটিক ভাষাগোষ্ঠীর অন্তর্গত এবং জাতিসংঘের একটি দাপ্তরিক ভাষা। ত্রয়োদশ শতাব্দীর শুরু থেকে নিয়ে আজ অর্ধ ভারতে বিভিন্ন পদ্ধতিতে আরবী ভাষায় চর্চা হয়ে আসছে। আরবী এদেশের মানুষের মাতৃভাষা নয়। তাই তাদের দ্বারা আরবীয়দের ন্যায় উন্নত মানের সাহিত্য সৃষ্টির প্রত্যাশা করা যায়না। ধর্মীয় শিক্ষা অর্জনের লক্ষ্যে এদেশের মানুষ আরবী ভাষার চর্চা করে থাকে। কারণ আরবী ভাষায় দক্ষতা অর্জনই ইসলামী সাহিত্যের মৌলিক গ্রন্থাবলী অধ্যয়ন করা সম্ভবপর হয়। ফলে ভারতে অসংখ্য মাদ্রাসা স্থাপিত হয়েছে। স্কুল, কলেজ ও বিশ্ববিদ্যালয় সমূহে আরবী ও ইসলামিক স্টাডিজ বিভাগ চালু হয়েছে। ফলে এখন ভারতে আরবী ভাষার চর্চা হচ্ছে ব্যপক ভাবে।

## আরবী ভাষার পটভূমি ও তাৎপর্য

বর্তমানে আরবী একটি আন্তর্জাতিক ভাষা। বিশ্বের অনেক দেশে আরবী ভাষাকে কথ্য ভাষা বা দ্বিতীয় বিদেশী কথ্য ভাষা হিসাবে ব্যবহার হচ্ছে। প্রাক ঐতিহাসিক যুগ থেকে ভারতের সঙ্গে আরবদের বাণিজ্যিক সম্পর্ক স্থাপিত হয়েছিল।<sup>1</sup> অষ্টম শতাব্দীতে অবিভক্ত ভারতবর্ষে আরবী ভাষা এসেছে। কারো কারো মতে উমাইয়া শাসনামলে, ব্যবসা-বাণিজ্য, ইসলাম প্রচার ও রাজ্য বিজয়ের লক্ষ্যে ভারতবর্ষে আরবদের আগমন ঘটেছিল।

বর্তমানে ভারতে আরবী একটি প্রাণবন্ত এবং জীবন্ত ভাষা হয়ে উঠেছে। বর্তমান বিশ্বে প্রচলিত ভাষাগুলির মধ্যে আরবী ভাষার স্থান ষষ্ঠ নম্বরে। পৃথিবী ব্যাপি প্রায় ৪৫০ মিলিয়ন মানুষ এই ভাষায় কথা বলে।<sup>2</sup> পুরো পৃথিবীতে বর্তমানে ২২ টি দেশের সরকারী ভাষা হল আরবী। অন্যান্য দেশগুলিতেও আরবী ভাষার ব্যবহার দিনদিন বাড়ছে।

জাতিসংঘ, আফ্রিকান ইউনিয়ন, ওআইসি ও আরব লীগ সহ অসংখ্য আন্তর্জাতিক সংস্থার অফিসিয়াল

<sup>1</sup> আবদুল মান্নান তালিব, *বাংলাদেশে ইসলাম*, (ঢাকা, আধুনিক প্রকাশনী, ১৯৮০), পৃ. ৫৩

<sup>2</sup> Pallathadka, H., Pallathadka, L. K., & Devi, T. K. (2022). *Importance of Hindi Language and Its Significance in Nation-Building*. *Integrated Journal for Research in Arts and Humanities*, 2(6), p 92.

ভাষা হল আরবী। জাতিসংঘের প্রতিষ্ঠালগ্ন থেকে দাপ্তরিক ভাষা ছিল পাঁচটি। পরে ১৯৭৩ সালে জাতিসংঘের দাপ্তরিক ভাষা হিসাবে আরবীকে অন্তর্ভুক্ত করা হয়। সর্বশেষে আরবী ভাষার গুরুত্ব অনুধাবন করে ২০১২ সালের অক্টোবর মাসে ইউনেস্কো নির্বাহী পরিষদের বৈঠকের ১৯০তম অধিবেশনে ১৮ ডিসেম্বরকে আন্তর্জাতিক আরবী ভাষা দিবস হিসাবে ঘোষণা করে। এরপর থেকেই সেই দিনটি “আন্তর্জাতিক আরবী ভাষা” দিবস হিসাবে পালিত হচ্ছে।

ভারতের অনেক স্কুল, কলেজ এবং বিশ্ববিদ্যালয়ে আরবী ভাষাকে পড়ানো হচ্ছে। নাদওয়ার প্রখ্যাত আলেমগণ আরবী ভাষাকে প্রাণবন্ত ক্রিয়াকলাপ এবং দক্ষতার সাথে বের করে আনার জন্য যত্নবান ছিলেন বলেই ভারতে আরবী ভাষা একটি জীবন্ত ভাষার রূপ নেয়। বর্তমান সময়ে এই আলেমগণ আরবী ভাষাকে সমৃদ্ধ ও বিকাশের জন্য প্রচেষ্টা চালিয়ে যাচ্ছেন। বিংশ শতাব্দীতে আরবী ভাষাকে কেন্দ্র করে ভারতে প্রচুর সংখ্যক লেখক এবং সাহিত্যিক তাদের মহান রচনা বলীর মাধ্যমে বিশ্বব্যাপী খ্যাতি অর্জন করেছেন। ভারতের আধুনিক স্কুল, কলেজ এবং বিশ্ববিদ্যালয়ে যে সমস্ত লেখক ও পণ্ডিত ব্যক্তিত্বরা পড়ান তাঁরা মূলত অনুবাদ সাহিত্যের উপর বেশি গুরুত্বারোপ করেন। এটা স্পষ্ট যে, সংস্কৃত, ইংরেজি এবং উর্দু থেকে আরবীতে বিপুল সংখ্যক গুরুত্বপূর্ণ অনুবাদের কাজ সম্পন্ন হয়েছে। এই সাহিত্য ভারতের অধিকাংশ মাদ্রাসায় শিক্ষার্থীদের পড়ানো হচ্ছে। এটি উল্লেখযোগ্য ভাবে লক্ষণীয় ভারতে যে সমস্ত জায়গায় আরবী ভাষা শিক্ষার প্রচলন নেই, সেই সব আঞ্চলেও আল-কুরআন অন্যতম গুরুত্বপূর্ণ উপাদান যা আরবী ভাষার উন্নয়নে সহায়তা করছে।<sup>3</sup> ভারতের বেশ কতকগুলি বিশ্ববিদ্যালয়ে আরবী পঠন-পাঠনও শুরু হয়েছে। শিক্ষার বিভিন্ন উচ্চ স্তরের যেমন এম.এ, এম.ফিল, পিএইচ.ডি. এবং বিভিন্ন সার্টিফিকেট কোর্সে আরবী শেখানো হচ্ছে। যেমন জওহরলাল নেহরু বিশ্ববিদ্যালয় (দিল্লি), জামিয়া মিল্লিয়া ইসলামিয়া (দিল্লি), দিল্লি বিশ্ববিদ্যালয় (দিল্লি), আলিগড় মুসলিম বিশ্ববিদ্যালয় (উত্তর প্রদেশ), ওসমানিয়া বিশ্ববিদ্যালয় (হায়দ্রাবাদ), কালিকট বিশ্ববিদ্যালয় (কেরালা), বেনারস হিন্দু বিশ্ববিদ্যালয় (উত্তর প্রদেশ), মাদ্রাজ বিশ্ববিদ্যালয় (চেন্নাই), মৌলানা আজাদ জাতীয় উর্দু বিশ্ববিদ্যালয় (হায়দ্রাবাদ), বরকতুল্লাহ বিশ্ববিদ্যালয় (ভোপাল), কলিকাতা বিশ্ববিদ্যালয় (কলকাতা), আলিয়া বিশ্ববিদ্যালয় (কলকাতা), বর্ধমান বিশ্ববিদ্যালয় (বর্ধমান) গৌড়বঙ্গ বিশ্ববিদ্যালয় (মালদা), মুর্শিদাবাদ বিশ্ববিদ্যালয় (মুর্শিদাবাদ), কাল্যানী বিশ্ববিদ্যালয় (নদিয়া), বিশ্ব ভারতী বিশ্ববিদ্যালয় (শান্তি নিকেতন) ইত্যাদি।

আরবী ভাষা শেখার ফলে বিভিন্ন শিল্প (ভ্রমণ শিল্প, তৈল শিল্প, অনুবাদ, শিক্ষাদান প্রভৃতি) ক্ষেত্রে প্রচুর কর্মসংস্থানের সম্ভাবনা এবং পথ উন্মুক্ত হচ্ছে। তবে ভারতের অধিক সংখ্যক মানুষ আরবী ভাষায় কথা বলতে না পারায় আরবী শেখা কঠিন হয়ে পড়েছে।<sup>4</sup>

### পশ্চিমবঙ্গে আরবী শিক্ষা

3 Rifat, M. R., Jannat, M., Al-Ameen, M. N., Haque, S. T., Kabir, M. A., & Ahmed, S. I. (2021, June). *Purdah, amanah, and gheebat: Understanding privacy in bangladeshi “pious” muslim communities*. In ACM SIGCAS Conference on Computing and Sustainable Societies p. 199.

4 KHAN,S.H. (2019) WORLD WIDE JOURNALS [HTTPS://WWW.WORLDWIDEJOURNALS.COM/PARIPEX/RECENT\\_ISSUES/PDF/2013/MAY/ARABIC-LANGUAGE-TEACHING-IN-INDIA-ITS-PLACE-AND-SCOPE-IN-THE-PRESENT-INDIAN-HIGHER-EDUCATION\\_MAY\\_2013\\_8603994319\\_5702408.PDF](https://www.worldwidejournals.com/paripeX/RECENT_ISSUES/PDF/2013/MAY/ARABIC-LANGUAGE-TEACHING-IN-INDIA-ITS-PLACE-AND-SCOPE-IN-THE-PRESENT-INDIAN-HIGHER-EDUCATION_MAY_2013_8603994319_5702408.PDF)] DATE: 8.2.2023

পশ্চিমবঙ্গে বর্তমানে দু-ধরণের প্রতিষ্ঠানে আরবী পঠন-পাঠন হয়। একটি বেসরকারি মাদ্রাসা বা নিয়ামিয়া মাদ্রাসা শিক্ষা ব্যবস্থা ও অন্যটি সরকারি মাদ্রাসা শিক্ষা ব্যবস্থা।

### বেসরকারি মাদ্রাসা বা নিয়ামিয়া মাদ্রাসা শিক্ষা ব্যবস্থা

ধর্মীয় দৃষ্টিকোণ থেকে আরবীর গুরুত্ব রয়েছে। সালাত, সিয়াম, যাকাত, হজ্জ ইত্যাদি জানা ও পালন করা মানব জাতির উপর অবশ্য করণীয়। এগুলির জানার মাধ্যম হল আল-কুরআন ও হাদিস। আর এগুলির ভাষা হল আরবী। এছাড়াও ফিকাহ, আকাইদ<sup>৫</sup> ও অন্যান্য ইসলামি সাহিত্য বেশিরভাগই এই ভাষায় রচিত। তাই ধর্মের তাগিদে মুসলমানরা আরবী ভাষা শিখতে, লিখতে, চর্চা করতে মাদ্রাসা প্রতিষ্ঠা করেন। এগুলিকে “দারসে নিয়ামিয়া মাদ্রাসা” বলা হয়। ১৯৯৪ সালে দারুল উলুম দেওবন্দ এই উদ্দেশ্যে “রাবেতা মাদারিসে ইসলামিয়া আরাবিয়া” প্রতিষ্ঠা করে। উক্ত বোর্ড রাজ্য শিক্ষার্থীদের বার্ষিক পরীক্ষার ব্যবস্থা করে থেকে। আর এই মাদ্রাসাগুলি মানুষের সাহায্য ও সহযোগিতায় পরিচালিত হয়। এই সব ধর্মীয় প্রতিষ্ঠানে আরবী সাহিত্য এবং আল-কুরআন ও হাদিস অধ্যয়ন কে বেশি গুরুত্ব দেওয়া হয়। পশ্চিমবঙ্গের কিছু বিখ্যাত দারসে নিয়ামিয়া মাদ্রাসা রয়েছে যেমন জামিয়া মাদিনাতুল উলুম (মেমারি), জামিয়া ইসলামুল মুসলিমীন (মালদা), জামিয়া মাজহারুল উলুম (বাটনা, মালদা), জামিয়া দারুল হাদিস (লোহাপুর, বীরভূম), ফুরফুরা ফাতেহিয়া খারেজিয়া মাদ্রাসা (হুগলী) ইত্যাদি উল্লেখযোগ্য।

### সরকারি মাদ্রাসা শিক্ষা ব্যবস্থা

এই ধরণের মাদ্রাসাগুলি পশ্চিমবঙ্গ মাদ্রাসা শিক্ষা পর্ষদের তত্ত্বাবধানে সরকারের সহায়তায় পরিচালিত হয়। পশ্চিমবঙ্গ হল প্রথম রাজ্য যে মাদ্রাসাগুলিকে বোর্ড দ্বারা স্বীকৃত। ১৯৯৪ সালে পশ্চিমবঙ্গ রাজ্য আইনসভায় (পশ্চিমবঙ্গ বোর্ড অব মাদ্রাসা শিক্ষা আইন, ১৯৯৪) পাশ করে বোর্ডকে একটি সংবিধিবদ্ধ স্বায়ত্তশাসিত সংস্থায় রূপান্তর করে। এই বোর্ডের অধিনে পশ্চিমবঙ্গের সকল সরকারি যেমন জুনিয়র হাই মাদ্রাসা, হাই মাদ্রাসা ও সিনিয়র মাদ্রাসাগুলি পরিচালিত হয়। এই মাদ্রাসাগুলিতে আরবী শিক্ষা ছাড়াও অন্যান্য বিষয় যেমন বিজ্ঞান, পাটিগণিত, বাংলা, ইংরাজি ইত্যাদি পঠন-পাঠন হয়। তাছাড়াও এমন সরকারি স্কুল রয়েছে যেখানে বিভিন্ন শ্রেণিতে ইলেকট্রিক হিসাবে আরবীর পঠন-পাঠন হয়।

### মুর্শিদাবাদ জেলার ভৌগোলিক অবস্থান

মুর্শিদাবাদ ভারতবর্ষের পশ্চিমবঙ্গ রাজ্যের একটি জেলা। মুর্শিদাবাদ এক সময় বাংলা, বিহার এবং উড়িষ্যার রাজধানী ছিল। যার প্রতিষ্ঠাতা ছিল মুর্শিদকুলি খাঁ। শহরটি অবস্থানের অক্ষাংশ ও দ্রাঘিমাংশ হল ২৪.১৮° উত্তর ৮৮.২৭° পূর্ব।<sup>৬</sup>

### মুর্শিদাবাদ জেলায় সরকারি মাদ্রাসায় আরবী চর্চা

৫ ইসলামের মৌলিক ধর্মীয় বিশ্বাস সংক্রান্ত শাস্ত্র।

৬ <https://Id.nltr.org/murshidabad.php> date: 03.05.2024

মুর্শিদাবাদ জেলার সরকারি মাদ্রাসাসমূহ যেগুলিতে আরবী ভাষা চর্চা হয়। যেমন আমিরাবাদ হাই মাদ্রাসা (মরিচা, মুর্শিদাবাদ, স্থাপিত-১৯৭০), আব্দুল মান্নান জুনিয়র হাই মাদ্রাসা (কালুখালি, মুর্শিদাবাদ, স্থাপিত-২০০৯), আছড়া হাই মাদ্রাসা (নবগ্রাম, মুর্শিদাবাদ, স্থাপিত-১৯৯৫), আলিমুন মেমোরিয়াল জুনিয়র হাই মাদ্রাসা (হনমন্তনগর, মুর্শিদাবাদ) আযাড়িয়াদহ হাই মাদ্রাসা (লালগোলা, মুর্শিদাবাদ, স্থাপিত-২০০৯), অরঙ্গাবাদ হাই মাদ্রাসা (দাহারপার, মুর্শিদাবাদ, স্থাপিত-১৯৬৮), বি.এস.এম.এম. হাই মাদ্রাসা (ডোমকল, মুর্শিদাবাদ, স্থাপিত-১৯৭৫), বি.এস.এম.এম. জুনিয়র হাই মাদ্রাসা (ডোমকল, মুর্শিদাবাদ, স্থাপিত-২০১০), বেলডাঙ্গা দারুল হাদিস সিনিয়র মাদ্রাসা, বেলডাঙ্গা, মুর্শিদাবাদ, স্থাপিত-১৯৪২), ভাবতা আজিজিয়া হাই মাদ্রাসা, (ভাবতা, বেলডাঙ্গা, মুর্শিদাবাদ, স্থাপিত-১৯২৭), ভরতপুর সিনিয়র মাদ্রাসা (ভরতপুর, মুর্শিদাবাদ, স্থাপিত-১৯৭৯), ভাতশালা হাই মাদ্রাসা (বসন্তপুর মুর্শিদাবাদ, স্থাপিত-১৯৯৫), ভবানীপুর বারকাতীয়া সিনিয়র মাদ্রাসা (ভরতপুর, মুর্শিদাবাদ, স্থাপিত-১৯৭৯), বিলবাড়ি হাই মাদ্রাসা (নবগ্রাম, মুর্শিদাবাদ, স্থাপিত-১৯৮৩), চরলবনগোলা হাই মাদ্রাসা (হনুমন্ত নগর, মুর্শিদাবাদ, স্থাপিত-১৯৪৮), ছয়ঘরী বালিকা হাই মাদ্রাসা (ছয়ঘরী, স্থাপিত-১৯৭৫), চাটরা খোদাবক্স হাই মাদ্রাসা, (চাটরা, স্থাপিত-১৯৭৫), ছয়ঘরী বালিকা জুনিয়র হাই মাদ্রাসা, (ছয়ঘরী, স্থাপিত-২০০৯), ছয়ঘরী কে আই সিনিয়র মাদ্রাসা (ছয়ঘরী, স্থাপিত-১৯৭১), ছাইতনী হাই মাদ্রাসা (লালগোলা, স্থাপিত-১৯৬৯), ডি বি এস হাই মাদ্রাসা (দোগাছি, স্থাপিত-১৯৭১), ডি বি এস জুনিয়র হাই মাদ্রাসা (দোগাছি, স্থাপিত-২০০৯), দোলুয়া জুনিয়র হাই মাদ্রাসা (দোলুয়া, বেলডাঙ্গা, স্থাপিত-২০১০), দেবকুণ্ডু হাই মাদ্রাসা (দেবকুণ্ডু, বেলডাঙ্গা, স্থাপিত-১৯৪৪), দেবকুণ্ডু সেখ আব্দুল রাজ্জাক মেমোরিয়াল হাই মাদ্রাসা (দেবকুণ্ডু, বেলডাঙ্গা, স্থাপিত-২০০৯), ইত্যাদি।

#### মুর্শিদাবাদ জেলায় বেসরকারি মাদ্রাসা বা নিয়ামিয়া মাদ্রাসায় আরবী চর্চা

মুর্শিদাবাদ জেলার বেসরকারি মাদ্রাসা বা নিয়ামিয়া মাদ্রাসাসমূহ যেগুলিতে আরবী ভাষা চর্চা হয়। যেমন সরকারি মাদ্রাসা দারুল উলুম (বেলডাঙ্গা, মুর্শিদাবাদ, স্থাপিত-১৯৫৯), বেলডাঙ্গা জলিলিয়া ইসলামিয়া দারুল হুদা মাদ্রাসা (বেলডাঙ্গা, মুর্শিদাবাদ, স্থাপিত-১৯৫৯), বড়ুয়া জামিয়া আয়েশা সিদ্দিকা মাদ্রাসা লিল বানাত (বেলডাঙ্গা, মুর্শিদাবাদ), মাদ্রাসা তাজবীদুল কুরআন কাশীপুর (রেজিনগর, মুর্শিদাবাদ, স্থাপিত-১৯৬৪), মাদ্রাসা জামিয়া আরাবিয়া বাহারুল উলুম (ডোমকল, মুর্শিদাবাদ, স্থাপিত-১৯৭২), চন্দ্রহাট ইলিবাসিয়া দারুল ইসলাম মাদ্রাসা (চন্দ্রহাট, মুর্শিদাবাদ, স্থাপিত-১৯৫৯), আনুলবেডিয়া মাদ্রাসা সালাফিয়া দারুল ইসলাম (রেজিনগর, মুর্শিদাবাদ, স্থাপিত-১৯৮৩), মাদ্রাসা ইসলামিয়া মার্কাজুল উলুম (ভগবানগোলা, মুর্শিদাবাদ, স্থাপিত-১৯৮১), মাদ্রাসা দারুল উলুম এহইয়াউস সুন্নাহ (সলেহডাঙ্গা, মুর্শিদাবাদ, স্থাপিত-১৯৪৬), মাদ্রাসা ইসলামিয়া দারুল কুরআন (রানিনগর, মুর্শিদাবাদ, স্থাপিত-১৯৯৬), দৌলতাবাদ শিহাবিয়া দারুল উলুম মাদ্রাসা (দৌলতাবাদ, মুর্শিদাবাদ, স্থাপিত-২০১৩), মাদ্রাসা তাহেরিয়া (নবগ্রাম, মুর্শিদাবাদ, স্থাপিত-২০০০), বহরমপুর মাদ্রাসা দারুল সালাম (বহরমপুর, মুর্শিদাবাদ, স্থাপিত-২০১৭), মাদ্রাসা ইসলামিয়া আরাবিয়া মাজাহিরুল উলুম (বড়ুয়া, মুর্শিদাবাদ, স্থাপিত-১৯৬৭), মাদ্রাসা হাফিজিয়া

নাসরুল উলুম (ইসলামপুর, মুর্শিদাবাদ, স্থাপিত-১৯৮৫), বিকরা মাদ্রাসা দারুল কুরআন (রেজিনগর, মুর্শিদাবাদ, স্থাপিত-২০০২) মাদ্রাসা মাহমুদিয়া দারুল কুরআন (পাঁচগ্রাম, মুর্শিদাবাদ, স্থাপিত-২০১১) মাদ্রাসা ইসলামিয়া সাউতুল কুরআন (সাগরদিঘী, মুর্শিদাবাদ, স্থাপিত-২০০৪) ইত্যাদি।

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**VFX Industry in India:  
an Emerging Economic Landscape**

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**Abstract**

As the controversy of the Indian economy climbing the momentous peak of \$4 trillion GDP on the 19<sup>th</sup> of November, 2023 still rages, what however cannot be denied is the palpable fact that it is inching close towards touching the milestone behind the other leading global economies like that of USA, China, Japan and Germany. Propelling the Indian economic landscape towards newer horizons are the emerging Indian industries of today's technological-driven era like the animation and VFX industry, whose total valuation last year stood at a mind-boggling Rupees 107 billion with the VFX industry alone being valued at Rupees 50 billion. With a projected growth of the Indian VFX industry of 18%, a large VFX workforce, robust demand and with global VFX industry itself valued at a stunning figure of USD 2564.3 million in 2021 – it can generally be assumed that the Indian VFX industry is poised towards greater heights in recent times. This paper, prepared on a descriptive methodology, studies the role of the animation and VFX Industry in India, its contribution towards India's giant strides on global arena and the future in an increasingly emerging economic landscape that is at once interesting as well as a harbinger of greater glory to come in the coming days.

**Keywords:** VFX, animation, M&E.

### 1. Introduction

The Indian visual effects (VFX) industry has experienced remarkable growth in recent years, positioning itself as a formidable player in the global entertainment market. This transformation has been driven by a combination of factors, including the country's vast pool of skilled technical talent and its cost-competitive advantage in producing high-quality VFX work. As a result, major Hollywood studios and international production companies have increasingly turned to Indian VFX houses for complex projects, ranging from blockbuster films to high-end television series.

This shift has not only bolstered India's economy but has also led to significant technological advancements within the country's VFX sector. Indian VFX studios have invested heavily in cutting-edge software and hardware, enabling them to tackle increasingly complex and demanding projects that were once the exclusive domain of Western studios.

The rise of India's VFX industry has been nothing short of meteoric, with the country now handling approximately 10% of the global VFX market share. This growth has been fueled by a perfect storm of factors, including a large, English-speaking workforce with strong technical skills, a robust IT infrastructure, and government initiatives supporting the digital media sector. Indian VFX studios have rapidly evolved from handling basic rotoscoping and clean-up work to creating complex, photorealistic visual effects for some of the world's biggest film and television productions. This transformation has not only put India on the map as a VFX powerhouse but has also created a thriving ecosystem of talent, fostering innovation and pushing the boundaries of what's possible in digital visual storytelling.

This rapid growth has also led to the development of specialized VFX education programs and training institutes across India, further solidifying the country's position as a hub for VFX talent. As a result, Indian VFX studios are now not only executing complex projects but also contributing to the development of innovative VFX techniques and technologies, positioning India as a leader in the global VFX industry.

The increasing reliance on VFX in global entertainment has led to a surge in demand for high-quality, cost-effective visual effects solutions. This trend has positioned India as a prime destination for international productions seeking to leverage the country's

technical expertise and competitive pricing, further solidifying its status as a global VFX hub.

The visual effects industry has become an integral part of modern filmmaking and television production, with VFX playing a pivotal role in creating immersive worlds, fantastical creatures, and jaw-dropping action sequences. As audiences' expectations for visual spectacle continue to rise, studios are allocating larger portions of their budgets to VFX, driving the demand for skilled artists and cutting-edge technology. This shift has opened up opportunities for countries like India, which can offer a compelling combination of technical prowess and cost-effectiveness. The convergence of Hollywood's insatiable appetite for VFX and India's burgeoning talent pool has created a symbiotic relationship that is reshaping the global entertainment landscape.

This symbiosis has led to a significant transfer of knowledge and expertise, with Indian VFX artists gaining exposure to cutting-edge techniques and workflows used in high-budget international productions. Simultaneously, Western studios have benefited from India's innovative approaches to problem-solving and cost-effective production methods, resulting in a cross-pollination of ideas that has elevated the global VFX industry as a whole.

This emergence has been further accelerated by the COVID-19 pandemic, which has led to increased demand for digital content and remote collaboration capabilities in the entertainment industry. As a result, Indian VFX studios have adapted rapidly, developing innovative workflows and technologies that enable seamless remote production and post-production processes, further solidifying their position in the global market. With wave after wave of the COVID pandemic and its various variants striking inner and more inner into the heart of the vast Indian hinterland with her rural economy and her vast multitudes, what cannot be denied is its adverse effect on Indian business stemming from its accompanying lockdown and restrictions on movement of Indian workforce.<sup>1</sup> According to the CMIE, during the first wave itself 63 lakh people lost their jobs, even though the figure can camouflage the actual havoc perpetrated by the COVID pandemic.<sup>2</sup> With the second wave of COVID 19 being even more destructive, the '*State of Working India 2021: One Year of COVID-19*' Report had asserted that during 2021 around 23 crore Indians were pressed into poverty.<sup>3</sup> The impact of devastation and destruction, of debts and closedowns – as a consequence of the COVID-19 pandemic is still being felt

on Indian business underbelly today. <sup>4</sup> This economic catastrophe hitherto unseen and unfelt since the days of the Great Depression, has only fuelled economic recession and downturns. <sup>5</sup> However, this chaos and turbulent times had also provided opportunities to some sectors to learn, evolve and grow, <sup>6</sup> with the VFX industry being a prime example, both in India and also globally. <sup>7</sup> Even with the lockdown blues kicking in, it was seen that remote working was positive and efficient for the VFX Industry, <sup>8</sup> with several VFX companies in India like Prime Focus Limited, Red Chilies, Tata elxsi – to name a few, coming to the fore. Today, with a CAGR percentage of 20 to 25, the future of animation and VFX industry in India looks very bright, as it is soon expected to reach valuation of Rupees 190 billion within a couple of years. <sup>9</sup>

The rise of India's VFX industry has also led to increased collaboration between Indian and international studios, fostering knowledge exchange and technological innovation. This cross-pollination of expertise has resulted in the development of novel VFX techniques and workflows, further enhancing India's competitive edge in the global market.

India's ascent as a major player in the VFX industry has been marked by a series of strategic investments and partnerships. Leading Indian VFX studios have established state-of-the-art facilities equipped with advanced hardware and software, enabling them to handle complex projects that rival those produced by their Western counterparts. This technological leap has been complemented by a growing pool of highly skilled artists and technicians who have honed their craft through a combination of formal education and hands-on experience with international productions. The Indian government's support for the digital media sector, including tax incentives and the establishment of specialized economic zones, has further bolstered the industry's growth and attractiveness to global clients.

The country's VFX prowess has extended beyond traditional film and television, with Indian studios now contributing to cutting-edge projects in emerging fields such as virtual reality, augmented reality, and immersive experiences. This diversification has not only expanded the industry's revenue streams but also positioned Indian VFX companies at the forefront of technological innovation. As a result, India has become a hub for experimentation and development of new VFX techniques, attracting talent and investment from around the world and cementing its status as a global VFX powerhouse.

## 2. Objective and Methodology

This technological prowess has extended beyond traditional media, with Indian VFX studios now contributing to cutting-edge projects in virtual and augmented reality, as well as immersive experiences for theme parks and museums. The integration of artificial intelligence and machine learning algorithms into VFX workflows has further enhanced India's competitive edge, allowing for more efficient and innovative approaches to complex visual effects challenges.

This technological convergence has also led to the development of specialized VFX clusters in India, such as the one in Hyderabad, which fosters collaboration between academia, industry, and government to drive innovation. These clusters have become hubs for knowledge exchange and skill development, attracting global talent and investment while nurturing local expertise in advanced VFX techniques.

The evolution of India's film industry has played a crucial role in shaping the country's VFX sector, with the transition from traditional filmmaking techniques to digital technologies creating new opportunities for visual effects artists. This shift has been particularly evident in Bollywood, where the increasing use of VFX has transformed storytelling capabilities and production values, allowing Indian filmmakers to compete on a global scale.

The rise of VFX in Bollywood has not only transformed domestic productions but has also attracted international collaborations, with Indian studios partnering on high-profile Hollywood projects. This cross-pollination of talent and techniques has led to a fusion of Eastern and Western storytelling styles, resulting in visually stunning films that appeal to global audiences.

The transition from practical effects to digital VFX in India's film industry was catalyzed by the rapid advancement of computer graphics technology and the increasing affordability of digital tools. This shift not only revolutionized the visual aesthetics of Indian cinema but also created new job opportunities and specialized roles within the VFX pipeline, leading to the establishment of dedicated VFX studios and training programs across the country. In this backdrop, the prime objectives of this paper are –

- (a) to explore how the Indian VFX industry has been growing over the years, including foreign investment and the boost it has been enjoying, even during COVID.
- (b) to identify its economic potential, regarding growth and employability.

(c) to identify the future prospect of this industry and how it can help India in achieving a position in the global arena.

This paper is primarily prepared on a descriptive methodology, based on latest reports, articles and books available. Though limited within the periphery of a single article and other constraints, nevertheless this article sets out to be at once interesting and thought-providing and explores the stellar role of VFX industry in the emerging Indian economic scenario which is of vital importance for researchers, national planners and world economy.

### **3. Literature Review**

There are several interesting and pertinent articles on the VFX industry scenario, but not in a comprehensive, integrated and nutshell, as this paper sets out to be. Few of the relevant literature related with this article are given below.

Karmakar & Singhal (2020) had studied the functioning the Indian VFX industry, both globally and nationally, which pointed towards a positive future for the industry.<sup>12</sup> Kumar & Vats (2016) had explored the opportunities and threats to the Indian VFX Industry and had focused on the digital future of the country based on the changing consumption pattern. Kumar & Vats (2016) had conducted another study on the various changes in the animation and visual effects in Indian films and the requirement for good quality VFX studios for the flourish of television, advertisements and films. Aravind & Saravanan (2021) through a structured interview-based research had delved into the different challenges faced by the VFX industry workforce in the hub of Indian VFX industry in the southern part of India. Hosseini (2022) had explored the extent of the far-reaching work of VFX artistes in making contemporary modern cinemas as realistic as possible to achieve something beyond the traditional special effects' technique of the film narrative. Mahale & Mahale (2021) had investigated the computer-generated imagery used in Indian films and the role of VFX techniques in that process that contribute to the changing trends in the Indian film industry. Angana Dutta (2022) in her path-breaking thesis had analysed the 21<sup>st</sup> century Indian films that have used VFX technology profligately, like chromo-keying, motion capturing, CGI to enhance the visual aspects Indian films. Hill & Athique (2013) had pointed out to the corporatization of the Indian film landscape where multiplexes have started having the bigger market pie, which have opened up opportunities for integration of new modes of operations and information technology (IT)

inflow along with larger organised capital influx. Goldstein Research (2021) had revealed in their Report the cutting-edge features and aspects that VFX industry is providing the Indian film industry will provide the latter with competitive advantage and expansion to newer markets abroad, thereby ushering holistic economic development. Mora (2018) had drawn linkages with the varied VFX tools used before with the current one being used and has shown how the cinematographic and artistic side of cinema has been influenced by VFX tools.

#### 4. **Reasons for Growth of VFX Industry in India**

There are several reasons for which VFX industry has been growing rapidly in India. These are discussed below.

a. **Demand in the Global Market:** Because of innovativeness, good usage of technology, Indian studios have been getting good work orders globally. Apart from Indian movie-makers, several movie-makers from other countries are outsourcing VFX orders to the Indian studios, including Hollywood.

b. **Cost Effectiveness:** Since VFX itself is a cost-effective phenomenon, it generates demand by allowing more filmmakers to use it. Secondly, Indian technicians are available at a much lower cost compared to several western economies, perhaps with more creativity. These two factors have worked simultaneously for the growth of the industry.

c. **Use of updated innovative technology:** For the sake of generating market demand and staying in front in the global competitive markets, Indian VFX industry has been continuously making investment in upgraded technology and software – all such investments have been generating the fruits.

d. **Increasing Domestic Demand:** Besides international opportunities, Indian market for VFX uses have been growing at an extraordinary pace because of its cost-effectiveness. Uses by movies, agencies for marketing, small screen, streaming platforms – all these have generated the massive growth which is only going to increase in near future.

#### e. **Skilled workforce and education initiatives**

The Indian government has implemented various initiatives to support the growth of the VFX industry, including the establishment of specialized training centers and incubators across the country. These efforts have been complemented by private sector investments in state-of-the-art VFX facilities in major cities, creating a robust ecosystem

for innovation and skill development.<sup>10</sup>

**f. Government support and policies**

The government's support extends beyond training initiatives to include financial incentives and tax breaks for VFX companies, particularly those operating in Special Economic Zones (SEZs). These policies have attracted foreign direct investment and encouraged the establishment of international VFX studios in India, further integrating the country into the global VFX ecosystem.<sup>11</sup>

**5. Economic Impact**

The economic impact of India's VFX industry extends beyond direct revenue generation, influencing adjacent sectors such as tourism and education. A study reveals that the growth of VFX studios in major Indian cities has led to increased international business travel and educational tourism, as foreign professionals and students seek to engage with India's burgeoning VFX ecosystem. This influx of international talent and investment has further accelerated the industry's growth, creating a virtuous cycle of economic development and technological advancement.

**Contribution to GDP and employment**

The VFX industry's contribution to India's GDP has been substantial, with estimates suggesting it accounts for approximately 0.5% of the country's total GDP as of 2023. This sector has also emerged as a significant employer, providing direct jobs to over 100,000 skilled professionals across various specializations, from 3D modeling to compositing and animation.

The economic impact of India's VFX industry extends beyond direct job creation, fostering a robust ecosystem of ancillary services and industries. This multiplier effect has led to the growth of specialized equipment manufacturers, software developers, and training institutions, further amplifying the sector's contribution to the national economy. Moreover, the industry's success has attracted significant foreign direct investment, with global media conglomerates establishing production facilities and partnerships across major Indian cities.

**Foreign investment and collaborations**

The influx of foreign investment has led to the establishment of several high-profile collaborations between Indian VFX studios and international production houses. These partnerships have facilitated knowledge transfer and technological exchange, enabling

Indian artists to work on cutting-edge projects while exposing international teams to innovative cost-effective production methods. As a result, India has become an integral part of the global VFX supply chain, with major Hollywood studios increasingly relying on Indian talent for complex visual effects work across various stages of production.

### **Export of VFX services**

The export of VFX services from India has grown exponentially, with the country now accounting for a significant portion of the global VFX market. According to recent data, India's VFX exports reached \$1.9 billion in 2022, representing a compound annual growth rate of 18% over the past five years.

This growth in VFX exports has been accompanied by a diversification of services offered by Indian studios, ranging from pre-visualization to final compositing and everything in between. The industry has also seen a shift towards higher-value work, with Indian artists increasingly taking on complex character animation, digital environments, and cutting-edge visual effects that were once the exclusive domain of Western studios.

## **6. VFX Industry: India and Global**

*'Visual Effects (VFX) and Animation represent two of the most rapidly growing industries in India. As digital media continues to rise in prominence, these two fields have become increasingly important for creating engaging content. The demand for VFX and animation has grown significantly over the years and will continue to do so in the future.'*<sup>22</sup>

With newer and newer streaming platforms launching forth globally, like the Disney+, HBO Max, Paramount+, Peacock that came up in the crucial COVID pandemic period (2019-21) when almost all other business more or less suffered, the global demand for VFX and animation driven content sky-rocketed mainly riding pillion on the streaming companies reaching every nook and corner of the globe.<sup>23</sup> Different reports doing the rounds point to an overwhelmingly healthy future of the VFX Industry worldwide.

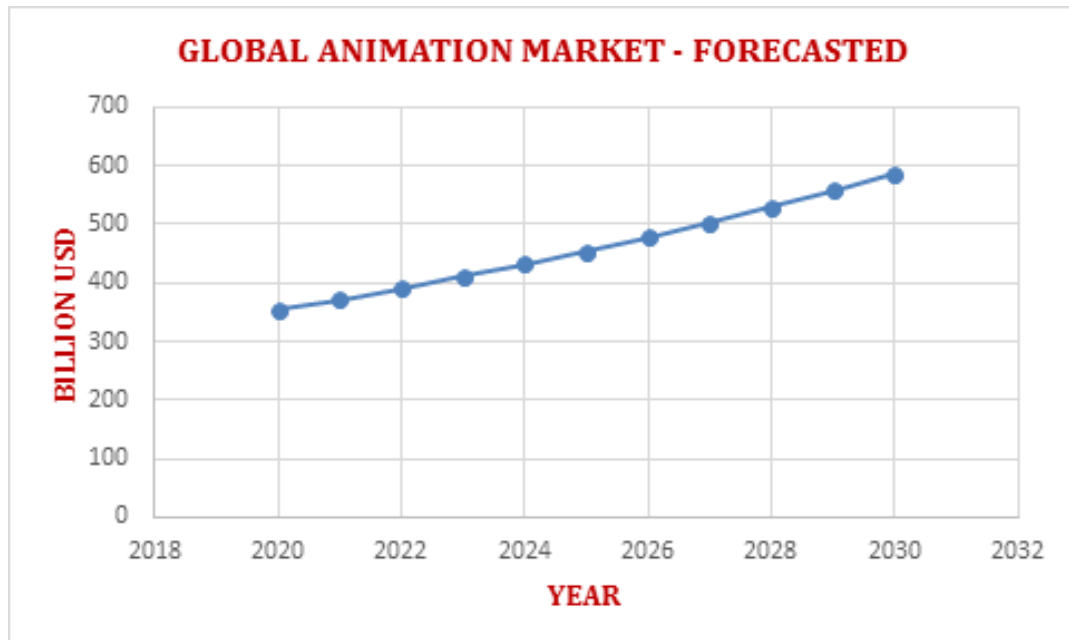
For example, the Data Bridge Market Research Market Analysis Study of 2021, which encompassed the regions of Europe, North and South America, Middle East and Africa as well as the Asia Pacific forecasted a rising trend of Global Visual Effects (VFX) Software

Market to a whopping amount of USD 4,550,558.58 thousand by the year 2030, at an astounding Compound Annual Growth Rate (CAGR) of 13.3% during the forecast period of 2023 to 2030 (2022 being the base year).<sup>24</sup> This Report has been depicted in the Figure-1.



Source: <https://www.databridgemarketresearch.com/reports/global-vfx-software-market>

Another Market Report by Statista, which had valued the global Animation Market at USD 354.7 billion in 2020 has forecasted the global Animation Market to reach USD 587.1 by 2030.<sup>25</sup> This has been depicted in Figure - 2. It shows an ever-rising market with no break in between.



The waves of dynamic change in the VFX industry globally have also touched the Indian economic landscape and the Indian VFX industry has also adapted to the emerging economic landscape. Amidst the surging demand of VFX content, domestic spending has increased manifold and together with technological advancements and the Indian government's encouragement and the setting up of the Animation, Visual Effects, Gaming and Comics (AVGC) Promotion Task force and the National Centre of Excellence in Animation, Gaming and VFX has started India well on the journey into becoming an AVGC hub on the global platform.

#### **7. Role and Contribution of VFX Industry in India**

*'India's animation and VFX industry was valued at around 107 billion Indian rupees in 2022, despite the lapse in market value in the previous year owed to the pandemic's adverse effects. Of the total market size, the VFX segment contributed the highest revenue amounting to about 50 billion Indian rupees.'*<sup>26</sup>

According to the Market Size of Animation and VFX Industry in India 2011-2025 Report of Statista, it was revealed that in the post-COVID period, as the Indian economy slowly started emerging from the ghosts of the pandemic, the entire Indian VFX and

animation industry in 2022 was pegged at an astonishing value of INR 107 billion, with Indian VFX part alone being worth INR 50 billion. Based on a projected CAGR varying between 20 to 25 percent, the entire Indian VFX and animation industry in 2025 is poised to climb to a projected worth of INR 190 billion, Figure 3 reflects the rise of the Indian Animation and VFX Industry from 2011 to 2022 to a projected 2025 value of INR 190 billion.

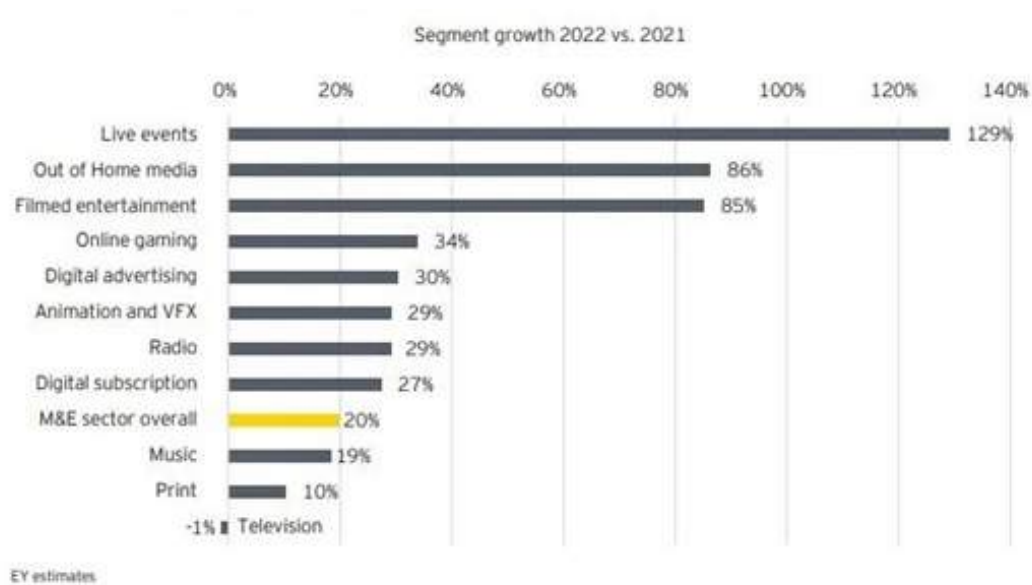
**Figure 3: Market Size of India's Animation and VFX Industry - 2011 to 2025 (projected)**



As the then-Chairperson of the Federation of Indian Chambers of Commerce and Industry (FICCI) Media and Entertainment Committee, Jyoti Deshpande had so aptly described India as the leader of the Digital Forward way on the global platform, it is the very heterogeneous texture of the Indian media and entertainment (M&E) based on the cultural mosaic of the Indian society and a very diverse consumer base that has propelled the Indian M&E sector grew by 20% to achieve its highest ever revenue of INR 2.1 trillion in 2022. <sup>27</sup> Infact, according to the annual media and entertainment (M&E) report by FICCI and consulting firm Ernst and Young (EY) - in 2023 the Indian M&M industry

is expected to grow at a rate of 11.5% to touch INR 2.34 lakh crore, that is USD 29.2 billion and in 2025 the Indian M&M industry is projected to touch INR 2.83 lakh crore, that is USD 35.4 billion, riding on a projected CAGR of 10 %. The FICCI EY report released in 2024, show that in 2023 the industry earned a revenue of Rs. 54 billion which recorded a 10% growth than the revenue of Rs. 50 billion generated in 2022 and the projection shows that by 2026 this value will reach RS. 83 billion.

**Figure 4: Segmental Performance of M&E Sector in 2022**



Source: FICCI Report on M&E 2023

As seen from Figure 4, the animation and VFX segment of the Indian M&E industry grew by a whopping 29% and the Indian animation and VFX segment for the first time ever touched the milestone of INR 100 billion mark. All these augurs well for the future as the role and contribution of VFX industry in India has been positive.

*'Akin to other countries in the Asia-Pacific region, India is characterized by a growing economy and an increasingly wealthier population. Growing prosperity and increasing connectivity have contributed to the growth of the country's media and entertainment industry. With the pandemic catalyzing the path to digital evolution that favors online experiences, the digital media industry in India has gained striking momentum.'*<sup>28</sup>

## 8. Future of Indian VFX Industry: Challenges and Constraints

*‘While the VFX industry continues to grow and evolve, it faces many challenges that can lead to business closures. These challenges include fierce competition, lack of job security, high cost of technology, tight project timelines, and the impact of the COVID-19 pandemic. Businesses in the VFX industry must adapt to these challenges to ensure their longevity in this highly competitive field.’*<sup>29</sup>

With Prime Focus leading the way and with others like Red Chillies, Moving Picture Company, Reliance Mediaworks, Prana Studios, Tata Elxsi and others, there are about 69 VFX studios in India with the workforce ranging between 4,293 to 15,647 depending upon the volume of work.<sup>30</sup> However, for a labour-surplus county like that of India and for a technology-driven industry like VFX, the very nature of the cheap workforce available and the cost constraints for updating technology on a continuous basis – it often happens that animators and VFX artistes are often paid less and modern VFX studios are far few and less in number as there are severe cost and technological constraints for setting up new VFX studios in India, The very crux of the Indian VFX industry are its workforce, Though blessed with the right demographic profile, yet India has not been fully able to harness the demographic dividend as VFX artistes in India have no work security, are underpaid, have limited access to proper training, lack proper skills, no adequate recognition, long working hours, exploiting environment, poor infrastructure, loss of Intellectual Property Rights (IPRs) and host of other dilemmas. Most notably, the workforce in the Indian VFX Industry need to have certain skill like animation, character modeling, sketching, illustration, live motion capture, rigging and communication skills – all of which require for the workforce regular training and skill upgradation, which is always not available to them. Moreover, there is always the latent fear that the prevailing technology may become obsolete and so there is always a need for more and more sophisticated VFX studios to be set up in the country. Also, for ‘Digital India; the Indian VFX industry is having problems in convergence of media as the content that was prepared for traditional media is again and again revised and re-rendered for the proper digital simulation. There is a dearth of funds in Indian VFX industry as more quality work needs more funds to be allocated and utilized in producing high-end quality work that will win accolades on the global platform. To compete with established global VFX hubs, Indian studios are investing heavily in proprietary software development and specialized training programs.

These initiatives aim to create unique value propositions that differentiate Indian VFX services in the global market, such as innovative pipeline solutions for real-time rendering and virtual production techniques. Additionally, the industry is leveraging India's cultural diversity and rich storytelling traditions to infuse VFX projects with distinctive creative elements, appealing to a global audience seeking fresh perspectives in visual storytelling.

#### **9. Future Prospects: Potential for India to become a global VFX leader**

The future of India's VFX industry is poised for exponential growth, with projections indicating a compound annual growth rate of 17.2% from 2021 to 2026 (Jha et al., 2023). This growth trajectory is expected to be driven by increasing demand for high-quality visual effects in both domestic and international productions, as well as the continued development of India's technological infrastructure and talent pool.

One of the most significant emerging trends in VFX is the integration of real-time rendering technologies, which are revolutionizing the production pipeline by allowing for immediate visualization of complex effects. This advancement is particularly impactful in virtual production setups, where it enables directors and cinematographers to make creative decisions on-set, reducing post-production time and costs while enhancing creative control.

The integration of artificial intelligence and machine learning in VFX workflows has led to significant advancements in real-time rendering technologies, enabling immediate visualization of complex effects during production. This technological leap has revolutionized virtual production setups, allowing directors and cinematographers to make on-set creative decisions, thereby reducing post-production time and costs while enhancing creative control (Chakraborty, 2021).

India's potential to become a global VFX leader is further bolstered by its growing expertise in emerging technologies such as virtual reality (VR) and augmented reality (AR). The country's VFX studios are increasingly collaborating with tech giants to develop immersive experiences for entertainment, education, and industrial applications, positioning India at the forefront of the next wave of visual storytelling innovation.

#### **10. Conclusion**

*'With the proliferation of the internet and its accompanying groundbreaking technologies, a shift towards more personalized, convenient digital experiences took place. These developments created further space for the growth of animation and VFX*

industry in India, which enlarged by about 29 percent in 2022. Animation and VFX hold a significant market share of the media industry in India, and it was estimated to have robust growth at a compound annual growth rate of 35 percent between 2022 and 2023.'

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For any industry, its workforce is the lifeline, it is same for the Indian VFX industry, Indian VFX artistes must have access to proper resources and right support in order to fully develop their potential. The salary of VFX artistes must be raised substantially in order to bridge their salary gap with their foreign counterparts. VFX studios must have proper Research and Development (R&D) laboratories with proper funding. The Indian VFX workforce must have protection from exploitation and must be paid their proper overtime dues timely. Infact a new set of Rules and Regulations governing the workforce of the Indian VFX industry must be promulgated with a minimum wage provision and maximum working hours. Moreover, more and more modern VFX studios replete with the latest technologies must be set up in India. More investment in Research and Development (R&D) must be made by the Indian VFX companies in order to retain their cutting-edge competitiveness vis-à-vis global standards. The government must do more in contributing towards a VFX-oriented environment in the country. There is a need for Indian content writers to harness their creativity in content writing for the digital platform, as the traditional way of content writing and associated thought process is not suited for the digital platform, more and more funds need to be ploughed into the Indian VFX industry for more good work to be produced that can compete in quality and standards of other VFX work being produced on the global stage. Ultimately, good VFX technologies and better content used will not only have a telling effect on the Indian economic landscape but also will be able to propel contemporary Indian work, Indian ethos and Indian culture onto the global narrative and make India a superpower in the true sense. The convergence of India's VFX expertise with emerging technologies like artificial intelligence and blockchain is opening new frontiers in digital asset creation and management. This synergy is enabling Indian VFX studios to develop innovative solutions for secure and efficient collaboration on complex international projects, further solidifying the country's position as a technological leader in the global VFX landscape.

The rise of India's VFX industry has not only transformed the global entertainment landscape but has also significantly impacted the country's digital economy. The sector's

growth has led to increased data consumption, particularly in urban and semi-urban areas, with smartphones becoming integral to entertainment consumption. This trend has been further accelerated by the COVID-19 pandemic, which has driven demand for OTT platforms and digital content, contributing to the exponential growth of India's media and entertainment industry.

The implications of India's VFX industry growth extend beyond entertainment, influencing sectors such as education and healthcare through innovative applications of augmented and virtual reality technologies. This expansion has led to increased collaboration between VFX studios and research institutions, fostering the development of cutting-edge visualization tools for medical training and scientific simulations.

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# ION BEAM IRRADIATION: A TOOL FOR MATERIAL PROPERTY MODIFICATION

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## **Abstract:**

There are different ways for purposeful generation of defects in materials e.g., ion-beam irradiation, thermal annealing, ball-mill grinding, ball-mill grinding followed by thermal annealing, chemical preparation process etc. In the present article main thrust has been given on the production of controlled defects by ion-beam irradiation. Ion beam irradiation is a very useful non-destructive technique for incorporation of surface and volume defects into a material in a control manner. One of the most exciting feature of this technique is that, it can introduce non-equilibrium defect states within the material which cannot be done in any other method of defect generation. These incorporated defects can modify different properties of a given material as well as can generate now and newer properties within the material which can be utilized for creation of different cutting edge devices. In this article I will describe in details the Ion beam irradiation technique and also the use of it in modification of material properties.

## **Introduction:**

Energetic ion beam irradiation is an important tool for incorporation of defects and disorder in materials in a controlled manner. These generated defects and disorders can be purposefully employed for controlled modification of material properties. It is one of the finest ways for introduction of non-equilibrium states into the mater [1]. Defect incorporation into the material is generally done through the techniques like annealing at high temperature [2], substitution [3,4], mechanical milling [5,6], chemical preparation process [7] and irradiation by energetic particles [8,9,10]. Except ion beam irradiation all other techniques generates equilibrium defect configuration (from requirement of the free

energy minimization) in the system, on the other hand energetic ion beam irradiation is an effective technique for introduction of non-equilibrium defect states (i.e. defect states generated and stabilized without fulfilling the condition of free energy minimization) in solid materials [1]. This is one of the key reasons for enormous increase of the importance of energetic ion beam irradiation induced material property modification in last few years [11,12,13]. Proper choice of ion, its energy and fluence can result very high degree of accuracy in tuning material properties. Hence an in-depth understanding of the interactions of ion beam with material properties is essential for achieving intended modifications of material properties.

### Radiation damage mechanism:

When energetic charged particles enters into the material and travels through the material it loses its energy through two main processes one by displacing the atoms through elastic collisions the other by exciting or ionizing the atoms through inelastic collisions. The loss of energy through inelastic collisions is referred as electronic energy transfer  $(dE/dx)_e$  and is denoted by  $S_e$ , while the loss due to elastic collision is known as nuclear energy transfer  $(dE/dx)_n$  and is denoted by  $S_n$ . At low energy nuclear energy transfer dominates

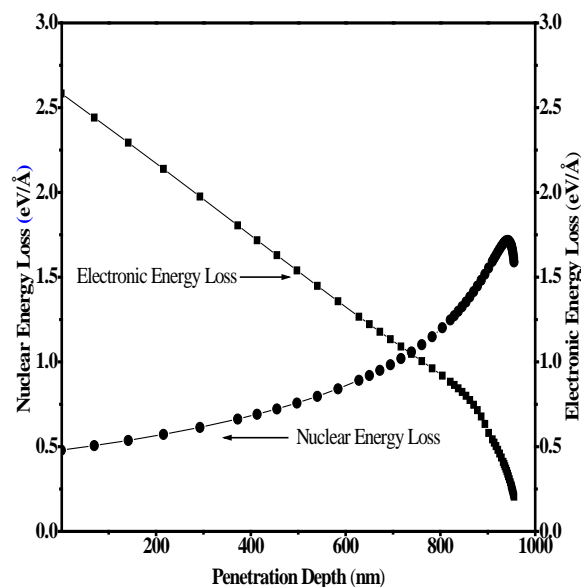


Fig. 1: Electronic and nuclear energy losses with penetration depth of 1.2 MeV Ar ions in ZnO as calculated from SRIM

whereas the electronic energy transfer dominates at high energies where the displacement of atoms due to elastic collisions are insignificant. Initially the high velocity ions transfer its energy to the bound electrons of the target atom leading to excitation and ionization. This inelastic collision contributes the major part of the energy transfer when the velocity of the ion is much greater than the orbital velocity of the K-shell electron bound to the target atom. As the ion penetrates more into the material and its velocity decreases and becomes much lower than the Bohr velocity ( $v_0 \sim 25 \text{ keV/amu}$ ) the ion suffers series of elastic collisions near the end of its trajectory. Scattering of the projectile by the target nuclei becomes significant at low velocities.

When the distance between the nuclei reduces to nearly half of the interatomic distance the repulsive force between the nuclei is practically suppressed by the interaction of their electron clouds. With further movement of the ion closer to the target nuclei purely repulsive force act between them and perfectly elastic scattering takes place. Though the basic energy deposition mechanism was known for years, but still controversy persists about the nature of the produced defect during electronic energy loss of a certain ion inside a solid. It has been inferred that the nature of produced defect during electronic energy loss depends on the amount of electronic energy loss of the ion and also on the target itself to some extent [14]. When the electronic energy loss decreases below a certain energy level only uncorrelated point defects are created. When  $S_e$  goes above this value correlated defects formation starts which leads the formation of track or column. This process is called the latent track formation or columnar defect production. The lower limit of the  $S_e$  below which track formation is not possible is called the threshold electronic energy loss ( $S_{th}$ ). Above  $S_{th}$  mainly two mechanisms explains the latent track formation viz, Coulomb explosion model and thermal spike model [15]. At such high energies the displacement of lattice atoms in insulating materials has been known to occur in a cylindrical core along the ion path. When the energetic ion passes, a long cylinder containing charged ions is created. These explodes radially due to the conversion of electrostatic energy to coherent radial atomic movements under Coulomb forces until there is a screening of ions by conduction electrons. The resulting cylindrical shock wave is responsible for formation of columnar defects. This technique of track formation is known as Coulomb explosion [15]. The thermal spike is the other competing processes that can lead to the formation of the defect columns [16]. As per this model, the kinetic energy of the ejected electrons is

transmitted to the lattice by electron-phonon interaction during the passage of SHI. The energy transmission is efficient enough to increase the local lattice temperature above the melting point of the material. The increase of temperature is then followed by a rapid quenching ( $10^{13}$  -  $10^{14}$  K/s) which produce an amorphous columnar structure when the melt solidifies. Beyond certain threshold of electronic energy deposition, such ion track formation has also been observed in metals [17-19].

### **Ion-beam irradiation as a tool to produce defects induces changes in material properties:**

Energetic ion beam irradiation is one of the best known tools for incorporation of defects and disorder in materials for controlled modification of material properties over the decades. It is one of the best ways to introduce non-equilibrium states into the mater [1]. The other defect generation techniques i.e., high temperature annealing, mechanical milling or substitution of impurity atom generally introduce equilibrium defect states into the system. This is one of the most significant reasons for huge surge of interest in ion beam induced material modification in last few years. By proper choice of ion, its energy and fluence, high degree of accuracy in tuning material properties can be achieved. So, in favor of proper ion beam induced modification, an in-depth understanding of the interaction of ion beam with material properties is necessary. Radiation-induced structural changes are used for producing materials with new interesting properties. Slow heavy ion irradiation is very much interesting for surface etching in a nanometer scale. Cluster beams are predicted for the emission of intact large organic molecules in the gas phase. In recent time the formation of latent tracks induced by SHI represent surely the most significant modification of material properties in term of applications. The creation of nanopores by chemical etching of ion tracks has already been used in industry. There are many uses of these nanopores in many fields, e.g. in medicine industry it is used for a well-controlled drug release, in housings of electronic circuits, in motor cars for water-repelling venting holes, and in miniature fuel cells it can be employed as semi-permeable membranes. At present, these applications are limited to nanopores in polymers but materials resisting to higher temperatures should be developed.

Chattopadhyay et al. observed modification of optical properties of ZnO due irradiation with low/ medium energy Ar ion beam [20]. It has also been reported that irradiation

with 1.2 MeV Ar ion introduces Zn interstitials ( $Zn_i$ ) – oxygen vacancy ( $V_o$ ) defect pair which is responsible for coloration, increase in defect level PL emission and decrease in resistivity of the ZnO sample [12]. Wendler et al.[21] have observed a saturation of disorder above fluence  $10^{16}$  ions/cm<sup>2</sup> due to irradiation of ZnO single crystal by 200 KeV Ar beam. Suppression of near band edge UV emission in ZnO at room temperature due to 700 keV oxygen ion irradiation has been reported by Pal et al. [13]. Modification of optical properties in nanocrystalline ZnO thin films by 15 KeV Ar beam have been studied by Krishna et al.[22]. Heavy damage in ZnO lattice by low KeV Ar ion beam have been reported by Kucheyev et al.[8]. Occurrence of room temperature ferromagnetism in 100 KeV Ar ion irradiated ZnO single crystal has been observed by Borges et al. [23]. Neogi et al.[24] reported modification of structural and electrical properties in 50 MeV  $Li^{+3}$  ion irradiated Mn-doped ZnO samples. They have also observed lowering of defect densities with increasing of irradiation fluence. Room temperature ferromagnetism and a metal–semiconductor transition has been observed by Kumar et al. [25] in 200 MeV  $Ag^{15+}$  ion-irradiated ZnO thin films implanted with Fe due to introduction  $V_o$  and/or  $Zn_i$  into the system due to irradiation. Increase in conductivity of the Al-doped ZnO thin films has been observed when irradiated with Xe [26] and Ni [27] ion beam, irradiation-induced band-gap modification is the possible reason of the observed increase in conductivity. Formation of single-phase Co-implanted ZnO thin films due to swift heavy ion (SHI) irradiation has been observed by Angadi et al. [28] and Kumar et al [29]. They found a decrease in the electrical resistivity of the irradiated samples and observed close interplay between electrical and magnetic properties. It has also been reported SHI irradiation modifies the Co-doped ZnO thin films and concluded that SHI irradiation can be used to improve the quality of the thin films by intrinsically modifying the structural and optical properties [30].

## Conclusion

From the above discussion it is very much clear that the ion beam irradiation technique can be utilised efficiently for purposeful defect generation in the system to modify the structural, optical, electrical and magnetic properties of the system. Unique defect state can be introduced with in the host lattice. These incorporated unique defect states can introduces unique changes in the properties of the system under investigation which can

be very much useful for future technological development. So more intense research work is required in this area to evolve new and newer properties within the given system, that can be used to produce some cutting age devices.

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## ŚAIVĀGAMIC TATTVAS AND ITS RELEVANCE IN THE MODERN INDIAN SOCIETY

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**Key words :** Āgama - Śaivāgama - Āgamic tattva - Sociocultural relevance-  
Modern India.

**Introduction:** It is found in the शैवसिद्धान्त of South India and also in शैवागम old Kashmir. शैवागम is mainly based on आगमशास्त्र. It is practised predominantly in South India. The followers of this cult consider themselves as different from the followers of Shiva according to Vedas and Upanishads. The आगमशास्त्र believed to be is originated by Mahadeva महादेव and is more sacred than the Vedas originated by ब्रह्म, the Creator. शिव, according to आगम, is five-faced. These five faces are of ‘सद्योजात, वामदेव, अघोर, तत्पुरुष and ईशान, आगमशास्त्रा’ are reported to have come out of these five faces of शिव. The period of the आगमशास्त्र is surmised as the 9th century A.D. आगम consists of मन्त्रs mostly taken from the Vedas.

According to शैवसिद्धान्त, विद्या, क्रिया, योग and चर्या are the four steps and पति, पशु, पाश are the three aspects. विद्यापाद consists of पति, i.e., शिव. शिव is the source of divine light and pleasure and also the means to achieve them. शिव is supposed to be endowed with five powers: creation, protection, destruction, illusion and grace-सृजन, पालन, संहार, माया, अनुग्रह । पशु is the individual soul- जीवात्मा । जीव is inclusive in शिवत्व but is not independent or free. It is always subject to the ever-free शिव । There are three categories of पशु— विज्ञानकल, प्रलयाकल and सकल । Those who fulfil their actions through knowledge and योग and are totally detached belong to विज्ञानकल group. Those who are made free through the deluge of the Universe belong to प्रलयाकल group. Those that are bound by the three पाश-मल, कर्म and माया belong to सकल group.

**Āgama:** ‘Āgama’ is derived from the root “gamlṛ gatau” (gam- to go) preceded by the preposition “āñ”. The Preposition “āñ” gives the meaning of what is handed down to

posterity' i.e., 'tradition'. The root "gam" which gives the meaning of 'gamana' (movement), conveys also the sense of 'knowledge'. 'Āgama' means 'that knowledge which has come down in tradition', i.e., 'that knowledge which is refined through tradition'. Those texts which contain such knowledge are called 'Āgama-s'.

Āgama-s have come down through tradition in order to fulfil the aim of Veda. The Mantra-s of Veda become fruitful only when they are brought into due practice (anuṣṭhāna).

**Śivāgama:** According to Kāmikāgama, Śivāgama-s are fourfold as Śaiva, Pāsupata, Soma and Lakula. Among these, the first one (Śaiva) is threefold as Vāma, Dakṣiṇa and Siddhānta: The same classification is found in Kāranāgama :

वामदक्षिणसिद्धान्तस्त्रिविधं शुद्धशैवकम् ।

According to Śri Siddhāntaśikhāmani, Śivāgama-s are fourfold as Vāma, Dakṣiṇa, Misra and Siddhānta. Vāmatantra is dedicated to Śakti, Dakṣiṇatantra to Bhairava, Misratantra to Saptamatṛka-s and Siddhānta is acceptable to Veda. Kapala, Kalamukha, Aghora, etc., are included under Vāmatantra and Kaśmīra Śaiva (Trika), Svachchanda, Bhairavottara, etc., come under Dakṣiṇatantra. The twenty-eight Saivagama-s from Kāmika to Vātula and their 208 Upāgama-s come under Siddhānta-Śaiva. Thus the extent of Śivāgama Literature is very vast.

**Tattva:** 'तत्त्व' (त्व) नं. तस्य भावः, तन-क्विप् तुक् ततो भावो वा त्व वातलोपः । तदिति सर्वनाम सर्वं च ब्रह्मतस्य नाम सर्वनाम तस्य भावः । सर्वस्मिन् दृश्ये 'बाध्यमानेऽपि तद्वाधाधिष्ठानत्वेन स्वयमबाध्यमानमनारोपितं स्वरूपतत्त्वमिति।"<sup>1</sup>

'तत्त्वज्ञानान्निः श्रेयसाधिगम्ः'<sup>2</sup> 'कार्यं सोऽवेक्ष्य शक्तिञ्च देशकालौ यतत्त्वतः'<sup>3</sup> 'तत्प्रतिषेधार्थं तत्त्वाभ्यासात्'<sup>4</sup> पतिपशुपाशभेदेन त्रिविधं तत्त्वमिति पाशुपतशास्त्रकोविदाः नकुलीशाचार्याः शैवाश्च । Essential nature, the real nature of the human soul considered as one and die same with the divine spirit animating the universe : the philosophical etymology of this word best explains it meaning वद् that, that divine being, and त्व thou, that very God art thou. The Supreme being, or BRAHMA.

"Truth. Relality or True Essence" from tad, that which is strictly speaking, there is only One Reality. That Reality is Brahman (the Supreme Being and Highest Truth), the परा तत्त्वम्. This is the original teaching of all true Scriptures. Tattvas are the primary principles, elements, states or categories of existence, the building blocks of the universe. According to आगम making ३६ tatvas in all. These are divided into three groups :-

1 विवरणकाराः

2 गौ.सू.

3 मनु

4 पा. सू.

1. First are the five शुद्धतत्त्वम्. (**pure**) These constitute the realm of शुद्धमाया.
2. Next are the seven शुद्धाशुद्धतत्त्वम् (**pure-impure**) These constitute the realm of शुद्धाशुद्धमाया.
3. The third group comprises the २४ अशुद्धाशुद्धतत्त्वम् **impure**. These constitute the realm of अशुद्धमाया.

#### शुद्धतत्त्वम्:

This is the superconscious realm, also known as shuddha (**pure**) maya or mahamaya. Bindu, transcendent light, is the “**material**” cause of this pure sphere. This is the Sivaloka, the region of the Devas (Gods), the myriad rishis and other beings who have attained freedom from the triple bondage.

**Socio-cultural relevance in modern India:** The mutual condemnation and claiming one’s superiority over the other speak their divergent nature and both traditions have survived simultaneously down the centuries. In course of time, a good sense prevailed and a greater reconciliation took place between the two traditions and a kind of synthesis was found. The Vedic tradition, which has no concrete form for the Supreme Reality, could accept its aniconic form of Āgamas and lent its mantras for use in the ritual process. Wherever there was an objection to utilise certain mantras, Āgamas formulated their own mantras. Āgamic initiation (dīkṣā) is substituted for the Vedic upanayana ceremony as a prerequisite to undertake any type of worship. As the Vedic rituals like invocation (āvāhana) and dismissal (visarjana) have found no relevance as the Supreme Being is ever present in an idol, the Āgamas introduced bījākṣaras, mudrā, nyāsa, yantra, maṇḍala etc. as an integral part of ritual procedure. The induction of arts like music and dance have contributed additional charm to the worship. Thus, the worship at temple has emerged as a dominating factor and acquired greater dimensions by being recognised as religio-cultural centres of the whole community. This transformation was succeeded by both ways by upholding the age-old Vedic spirit in one hand and by accommodating the wishes, aspirations, ambitions of the mass that was intended by the contemporary socio-economic conditions of the society on the other hand.

Study of Śaivāgamas has every relevance even today as the core content of the Āgamas, namely, the worship of the Supreme Reality in a temple is still very dear to masses. The characteristic expression of Indian culture is reflected in the temple culture. The temples in our country are not mere survivals of age old traditions, but have the contemporary relevance too. Despite the passage of time, enormous changes in socio-economical conditions of the society and political turmoils during the last few centuries,

the hold of the temple among masses has been remarkably persistent. The urbanisation, sophistication and technical advancement have exerted no influence on the significance of the temples, and the worship in the temple has been continued uninterrupted. Many more new temples have substituted those which were ruined and made disuse. The temples as local institutions being associated with socio-economic and cultural activities have been fulfilling the aspirations of the public and thus retaining their relevance even today. The Āgamas which govern the day-to-day activities in the temple are also equally relevant in this context.

The study of āgamic literature leads to an understanding of not only the spirit of Indian religion but also the socio-cultural conditions that necessitated the evolution of new traditions against the existing ones. The studies held so far are not sufficient enough to trace the origin and development of the āgamic tradition. A collective and comprehensive study is needed to unearth the hidden factors that prompted the rise of a new tradition.

We know from the statement of Kullukabhata, a commentator on Manusmṛti, that there existed two traditions namely Vedic and tantric<sup>5</sup>; The latter is also known as Āgama. These two are divergent and mutually conflicting traditions. The Vedic tradition, which enjoyed the advantage of traditional celebrity, had condemned the tāntric tradition, which used to involve five makāras<sup>6</sup>. The purānas assert that the purpose of the tantra is only to deceive and delude wicked folk<sup>7</sup> and also declared that the followers of tantras are vrātyas.

With the introduction of various upacaras and fine arts like music and dance as part of rituals, the worship obviously became popular and had positive appeal from the mass. The growing popularity of this tradition must have forced Aparārka, a commentator on the *Yājñyavalkyasmṛti (ārcānādhyāya, 7)* to make a cautious remark that the tantras should not be condemned or rejected as a whole and at the same time all parts of the tantra are not valid and authoritative.

The tāntras too retaliated by attacking the Vedic tradition. The Kulārṇavatantra makes a caustic comparison that the Vedas, Śāstras and Purānas are like common harlots, while the tantra is like a respectable house-wife.<sup>8</sup> The reference is to the chanting of Vedic and

5 श्रुतिश्च द्विविधा वैदिको तान्त्रिकी च, मनुस्मृति-२-१

6 मद्यं मांसं तथा मत्स्यो मुद्रा मैथुनमेव च । - गुप्साधनतन्त्र-vii

7 दुष्टानो मोहनाथीय सुगमं तन्त्रमीरितम्

8 वेदशास्त्रपुराणानि सामान्यगणिका इति।

Purāṇic hymns and performance of Vedic rituals in public. Contrary to this, the tantric rites are conducted in private places or in secrecy.

Hence, it is felt that serious and sincere attempts have to be made to study the Āgama literature, in order to trace the socio-religious conditions that prompted the rise of a new tradition against the existing one. In order to facilitate research in this direction, the original Āgamas as important sources of information are to be made available to the world of scholars.

धातुर्वक्ताम्बुजोद्वाराद्विमलाद्रुसन्निधौ ।  
 अनुष्टुप्छन्दसा पूर्वं निबद्धं कोटिसंख्यया ॥  
 सदाशिवेन देवेन ततोऽनन्तेन धीमता ।  
 भाषितं लक्षमात्रेण तदेवाहं तवाधुना ॥  
 उपसंहृत्य संक्षेपाद्वक्ष्ये पारमेश्वरम् ।  
 सहस्राणां त्रयेणाथ पञ्चभिश्च शतैः परम् ॥

The internal evidences found in the *tantrāvatāra* patalas refer to the extent of the huge body of agamic literature. For instance, the *Mātanga paramesvara Āgama* mentions that originally it consisted of one crore ,verses of anustup and was reduced to a lakh verses.

**Conclusion:** The Śaivasiddhānta school of Tamilnadu, and the *Vīraśaiva* school of Karnataka are the two living representations of two kinds of worship vouchsafed in the Śaivāgamas. The adherents of these two schools have evinced keen interest and attempted to bring out these literatures into light. As they give importance to only those Āgamas which contain the portions of their mode of worship, the remaining portions of the same Āgama have lost significance and gone out of sight. It is evident from the fact that the āgamic texts published in Tamilnadu are related to the worship of the temple (*parārthapūjā*) and the texts published in Karnataka contain only the portions relating to the worship at home (*ātmārthapūjā*).

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## শিক্ষা সম্পর্কে স্বামী বিবেকানন্দের চিন্তাভাবনার বিশ্লেষণ

নিরুপমা পুরকাইত মণ্ডল

বিভাগ: এডুকেশন, রবীন্দ্রভারতী বিশ্ববিদ্যালয়

সারাংশঃ- ঊনবিংশ শতাব্দীর শুরু থেকে শেষ পর্যন্ত ভারতীয় মঞ্চে এমন একটি আন্দোলনের প্রয়োজন ছিল যা সনাতনীদেব রক্ষণশীল মনোভাব এবং সংস্কারবাদীদের প্রগতিশীল মনোভাবের মধ্যে সমন্বয় ও সামঞ্জস্য স্থাপন করতে পারে এবং এইভাবে ভারতীয় ধর্ম ও সংস্কৃতিকে পুনরুজ্জীবিত করতে সক্ষম হতে পারে। এই গুরুত্বপূর্ণ মুহূর্তে, যুগের উদ্দেশ্য পূরণের জন্য স্বামী বিবেকানন্দ এবং শ্রী অরবিন্দ ঘোষের আবির্ভাব ভারত ও মানবজাতির ইতিহাসে একটি অবিস্মরণীয় ঘটনা। তাদের গভীর আধ্যাত্মিক অভিজ্ঞতার মাধ্যমে, এই উভয় মহাপুরুষ আত্ম-বিস্মৃত ভারতীয়দের দেখিয়েছিলেন যে ভারতের ধর্ম ও সংস্কৃতি অন্ধ বিশ্বাসে পূর্ণ কোনও বানোয়াট বা পরস্পরবিরোধী কল্পনা নয়; বরং, এতে অসীম শক্তি এবং সম্ভাবনা রয়েছে যা ভারতের পুনরুত্থান এবং মুক্তির কারণ হবে এবং বিশ্ববাসীকে প্রকৃত শান্তির পথ দেখাবে।

ভারতের পূর্বাঞ্চলে ব্রাহ্ম সমাজের প্রভাব এবং পশ্চিমাঞ্চলে আর্য সমাজের প্রভাবের কারণে, ভারতীয়রা তাদের সংস্কৃতির প্রতি আকৃষ্ট হয়ে ওঠে, যা অবশ্যই কিছুটা সচেতনতা এনে দেয়। শ্রী অরবিন্দ ‘পন্ডিচেরি আশ্রম’ প্রতিষ্ঠার মাধ্যমে তাঁর আন্দোলন শুরু করেছিলেন। স্বামী বিবেকানন্দ দক্ষিণেশ্বরে তাঁর গুরু শ্রী রামকৃষ্ণ পরমহংসের নামে ‘রামকৃষ্ণ মঠ ও রামকৃষ্ণ মিশন’ নামে একটি প্রতিষ্ঠান প্রতিষ্ঠা করে এটি করেছিলেন, যেখানে তিনি তপস্যা করেছিলেন। কলকাতাকে এই সমিতির প্রধান কেন্দ্র করা হয়েছিল। এছাড়াও, ভারতের অন্যান্য রাজ্যেও এর কেন্দ্র খোলা হয়েছিল এবং ভুলে যাওয়া ভারতীয়দের তাদের গৌরবময় অতীতের কথা স্মরণ করিয়ে তাদের মতো হতে উৎসাহিত করা হয়েছিল। কিন্তু একজন বিদেশী কর্তৃক অন্য দেশের সংস্কৃতি সংরক্ষণ এবং অনুকরণ নিশ্চিতভাবেই সেই সংস্কৃতির শ্রেষ্ঠত্বের প্রতীক। তাই শিক্ষার দর্শনে সংস্কৃতির প্রতিফলন ঘটানো উচিত। শৌধ প্রবন্ধে বিস্তৃত আলোচনা করা হয়েছে।

শব্দ সূচিঃ- শিক্ষা, সংস্কৃতি, আধ্যাত্মিক, বিবেকানন্দ, অরবিন্দ, রামকৃষ্ণ পরমহংস, কর্তব্য, উৎকর্ষতা।

শিক্ষা সম্পর্কে স্বামী বিবেকানন্দের চিন্তাভাবনার বিশ্লেষণ

ভূমিকাঃ- স্বামী বিবেকানন্দ (১৮৬৩-১৯০২) ছিলেন ঊনবিংশ শতাব্দীর একজন মহান ভারতীয় দার্শনিক, সমাজ সংস্কারক এবং আধ্যাত্মিক গুরু। তাঁর চিন্তাধারা শিক্ষার ক্ষেত্রে এক যুগান্তকারী দর্শন উপহার দিয়েছে, যা কেবল পুঁথিগত বিদ্যার মধ্যে সীমাবদ্ধ নয়, বরং মানবিক ও চারিত্রিক উন্নয়নের ওপর গুরুত্বারোপ করে। বিবেকানন্দের মতে, শিক্ষার প্রকৃত উদ্দেশ্য হলো “মানুষের অন্তর্নিহিত ঐশ্বর্যকে জাগ্রত করা” এবং সমাজের সার্বিক উন্নয়নে ভূমিকা রাখা।

তিনি শিক্ষাকে এমন একটি প্রক্রিয়া হিসেবে দেখেছেন যা ব্যক্তির শারীরিক, মানসিক, আধ্যাত্মিক ও

সামাজিক বিকাশে সহায়তা করে। তাঁর দৃষ্টিভঙ্গিতে শিক্ষা হলো জীবন গঠনের হাতিয়ার, যা শুধু তথ্য প্রদান নয়, বরং চরিত্র গঠন, আত্মবিশ্বাস বৃদ্ধি এবং সমাজসেবার মনোভাব তৈরি করে। বিবেকানন্দের শিক্ষাদর্শনে ভারতীয় ঐতিহ্য ও আধুনিক বৈজ্ঞানিক চিন্তার সমন্বয় দেখা যায়, যা আজও প্রাসঙ্গিক।

ভারতীয় শিক্ষার যেকোনো সমস্যা সমাধানের জন্য প্রথমে সাধারণভাবে শিক্ষার কাজের অভিজ্ঞতা থাকা প্রয়োজন, এবং এর জন্য সর্বশ্রেষ্ঠ এবং সবচেয়ে আকাঙ্ক্ষিত গুণ হল একজন শিক্ষার্থীর চোখ দিয়ে বিশ্বকে দেখা, এমনকি এক মুহূর্তের জন্য হলেও। শিক্ষার্থীর আকাঙ্ক্ষার বিপরীতে শিক্ষা প্রদান করলে ভালোর চেয়ে খারাপ ফলাফলই নিশ্চিত। তাই বিবেকানন্দের শিক্ষাভাবনা “শিক্ষা = অন্তর্নিহিত শক্তির প্রকাশ” এই ধারণাকে কেন্দ্র করে আবর্তিত, যেখানে ব্যক্তির স্বতন্ত্র বিকাশ ও আধ্যাত্মিক উৎকর্ষই মুখ্য।

**1. শিক্ষা হলো অন্তর্নিহিত শক্তির বিকাশঃ-** বিবেকানন্দের উপরোক্ত চিন্তাভাবনা থেকে এটা স্পষ্ট যে প্রকৃতিবাদী দার্শনিকদের মতো তিনিও শিশুকে শিক্ষার কেন্দ্রবিন্দু হিসেবে গ্রহণ করেন। তিনি প্রকৃতিবিদদের ‘প্রকৃতিতে প্রত্যাবর্তন’ স্লোগানের পরিবর্তে ‘বেদান্তে প্রত্যাবর্তন’-এর উপর বিশেষ জোর দিয়েছিলেন। বৈদিক ও উপনিষদ যুগে গুরু শিষ্যকে তার সামর্থ্য অনুসারে শিক্ষা দিতেন। অতএব, শিক্ষার ক্ষেত্রে প্রথম অপরিহার্য শর্ত হল শিক্ষা শিক্ষার্থীর দৃষ্টিকোণ থেকে তার যোগ্যতা এবং সামর্থ্য অনুসারে - প্রয়োজন অনুসারে দেওয়া উচিত। স্বামী বিবেকানন্দের মতে শিক্ষার অর্থ কী? প্রথমেই এই বিষয়টি বিবেচনা করা বুদ্ধিমানের কাজ হবে। বিবেকানন্দের মতে, শিক্ষাকে শক্তির বিকাশ হিসেবে ব্যাখ্যা করা যেতে পারে। তিনি বিশ্বাস করেন যে সমস্ত জ্ঞান মানুষের অন্তর্নিহিত, অর্থাৎ, এটি মানুষের মধ্যেই অবস্থিত, তাকে কেবল তার জ্ঞানকে বাইরে প্রকাশ করার জন্য সক্ষম করে তুলতে হবে। আমরা এটাকেই বলি যে মানুষ শেখে। বিবেকানন্দ বলেছেন যে, একজন মানুষ যা কিছু শেখে, তা সে মনোবিজ্ঞানের সাথে সামঞ্জস্যপূর্ণ ভাষায় ‘আবিষ্কার’ করে, ‘উন্মোচিত করে’ অথবা ‘প্রকাশ করে’। ‘আবিষ্কারের অর্থ মানুষের আত্মার উপর থেকে পর্দা অপসারণ করা, যা অসীম জ্ঞানের এক রূপ।’ মানুষের মধ্যে কিছু ক্ষমতা বিদ্যমান। শিক্ষা তার মধ্যে উপস্থিত এই শক্তি এবং গুণাবলীর বিকাশ ঘটায়। পরিপূর্ণতা বাইরে থেকে আসে না, বরং মানুষের ভেতরেই লুকিয়ে থাকে। মাধ্যাকর্ষণ তত্ত্বটি তার সূত্রের জন্য নিউটনের আবিষ্কারের জন্য অপেক্ষা করেনি। এটি নিউটনের মনে ইতিমধ্যেই উপস্থিত ছিল। গাছ থেকে আপেল পড়ে যাওয়াটা ছিল কেবল সেই আবিষ্কারের অনুপ্রেরণা যা তিনি তার মনে চিন্তার পুরাতন সংযোগগুলিকে সাজিয়ে নতুন সংযোগ যোগ করে করেছিলেন এবং একে আমরা মাধ্যাকর্ষণ সূত্র বলি।

তাই সকল জ্ঞান, পার্থিব ও আধ্যাত্মিক, মানুষের মনে নিহিত। এটি একটি আবরণ দিয়ে ঢাকা। যখন এই আবরণ ধীরে ধীরে সরানো হয়, তখন ব্যক্তিটি শিখতে থাকে। এই আবিষ্কারের প্রক্রিয়া যত এগোয়, মানুষের জ্ঞানও তত বৃদ্ধি পায়। যার উপর থেকে এই পর্দা সরানো হয়, সে অন্যদের তুলনায় বেশি জ্ঞানী হয়ে ওঠে। যার কাছ থেকে এই পর্দা সম্পূর্ণরূপে সরে যায়, সে সর্বজ্ঞ এবং সর্বজ্ঞ হয়ে ওঠে। জ্ঞানকে একটি রূপক দ্বারা ব্যাখ্যা করা হয়। উদাহরণস্বরূপ, আগুন একটি চকমকি পাথরের টুকরোতে থাকে এবং সেই আগুন ঘর্ষণের উদ্দীপক শক্তি দ্বারা প্রজ্জ্বলিত হয়। একইভাবে, সমস্ত জ্ঞান এবং শক্তি মানুষের মনে বাস করে; বাহ্যিক পরিবেশ জ্ঞানের সেই আগুনকে আলোকিত করে।

2. শিক্ষা আবিষ্কারের প্রক্রিয়া:- শিক্ষার এই ব্যাখ্যাটি ইংরেজি শব্দ ‘শিক্ষা’-এর ব্যাখ্যার সাথে সাদৃশ্যপূর্ণ বলে মনে হয় যেখানে ‘শিক্ষা’ শব্দের উৎপত্তি ল্যাটিন শব্দ ‘educatum’ থেকে বলে মনে করা হয়। এই অনুসারে, ‘Educatum’ দুটি শব্দ ‘A’ এবং ‘Duco’ দিয়ে তৈরি। A অর্থ ‘ভিতর থেকে’ এবং ‘ডুকো’ অর্থ ‘ভিতর থেকে বের করে আনা’।<sup>1</sup>

অতএব, আমরা বলতে পারি যে বিবেকানন্দ বিশ্বের সমস্ত তথ্য সংগ্রহকে শিক্ষা হিসাবে বিবেচনা করেন না। সমসাময়িক শিক্ষাব্যবস্থার প্রতি তাঁর কঠোর সমালোচনার কারণ ছিল এই যে, শিক্ষার লক্ষ্য অভ্যন্তরীণ শক্তির বিকাশের পরিবর্তে কেবল বাহ্যিক তথ্য সরবরাহ করা বলে মনে করা হত। বিবেকানন্দের ভাষায়, “শিক্ষা এমন কোনও বিবিধ তথ্যের স্তূপ নয় যা আপনার মাথায় ঠাসা থাকে এবং যা আপনার সারা জীবন ধরে আত্মস্থ না হয়ে সেখানেই থেকে যায় এবং বিশৃঙ্খলা সৃষ্টি করে।”

দার্শনিক লকের এই বক্তব্যের সাথে বিবেকানন্দ একমত হননি যে, শিশুর মন একটি পরিষ্কার স্লেটের মতো এবং শিক্ষক যা লেখেন তা তার উপর অঙ্কিত থাকে। বরং, তাদের দৃষ্টিভঙ্গি বিপরীত বলে মনে হয়; বাস্তবে কেউ কখনও কাউকে শেখায়নি; আমাদের প্রত্যেককে নিজেদেরকে শেখাতে হবে। বাহ্যিক গুরু কেবল পরামর্শ বা অনুপ্রেরণার উৎস যা আমাদের ভেতরের গুরুকে সকল বিষয়ের সারমর্ম বুঝতে অনুপ্রাণিত করে।

যেমন একটি বিশাল বটবৃক্ষের সম্পূর্ণ শক্তি তার বীজের মধ্যে নিহিত, তেমনি একজন মানুষের সম্পূর্ণ শক্তি তার আত্মার মধ্যে নিহিত। এটা জানা বা বোঝার নামই শিক্ষা। এই অভ্যন্তরীণ ঐশ্বরিক আলো বেশিরভাগ মানুষের মধ্যেই অপরূপ থাকে। এটি লোহার বাস্তব আবেদন একটি প্রদীপের মতো। যার মধ্য দিয়ে সামান্য আলোও বের হতে পারে না। পবিত্রতা এবং নিঃস্বার্থতার মাধ্যমে এই বাধার ঘনত্ব ধীরে ধীরে পাতলা হয়ে যায় এবং অবশেষে এটি কাচের মতো স্বচ্ছ হয়ে ওঠে। গুরুর কাজ হল এই বাধার ঘনত্ব কমানো।

3. শিক্ষাবিদদের মতবাদের বিশ্লেষণঃ- আধুনিক মনোবিজ্ঞানী এবং শিক্ষাবিদ ফ্রোবেলের মতামত অনুসারে, শিক্ষা হল উন্নয়নের একটি প্রক্রিয়া - শিক্ষা হল উন্নয়নের একটি প্রক্রিয়া যা ভেতর থেকে বাইরে নির্ধারিত হয়। শিশুর সহজাত আধ্যাত্মিকতা বাহ্যিকভাবে প্রকাশিত হয়; এটা তাদের ভেতরে লুকানো আছে। যার সংকেত খুব কম হতে পারে এবং এটি ভেতর থেকে বাইরের দিকে বিকশিত হবে। ফ্রোবেল একটি শিশুর জন্য শিক্ষার গুরুত্বকে একটি বীজ এবং একটি গাছের সাথে তুলনা করেছেন। যেমন একটি বীজ, যখন অনুকূল পরিবেশে পাওয়া যায়, আত্ম-বিকাশের মাধ্যমে একটি বৃক্ষে পরিণত হয়, তেমনি একটি শিশু আত্ম-বিকাশের মাধ্যমে মানুষে পরিণত হয়। ফ্রোবেলের মতো, বিবেকানন্দও একটি শিশুর বিকাশকে একটি উদ্ভিদের সাথে তুলনা করেছেন।

‘তুমি একটি শিশুকে শিক্ষিত করতে যতটা অক্ষম, ততটাই একটি গাছ জন্মাতেও’ একটি উদ্ভিদও তার প্রকৃতি নিজে থেকেই বিকশিত করে; একটি শিশু নিজেকেও শিক্ষিত করে। তুমি কেবল বাধাগুলো দূর করতে পারো এবং জ্ঞান স্বাভাবিকভাবেই প্রকাশিত হবে।”<sup>2</sup>

4. বিবেকানন্দের মতে শিক্ষার ভাষাঃ- “শিক্ষা হলো মানুষের সহজাত পূর্ণতার প্রকাশ।” এই ধারণাটি বেদান্ত দর্শনকে ভিত্তি হিসেবে গ্রহণের ফলে উদ্ভূত হয়েছে যার ভিত্তিতে এটি গৃহীত হয় যে মানুষের মধ্যে

ঐশ্বরিক পূর্ণতা বিদ্যমান, এই পূর্ণতা অনাদিকাল থেকে আমাদের মধ্যে বিদ্যমান, এটি প্রতিটি ব্যক্তির সহজাত প্রকৃতি, এই সহজাত প্রকৃতির প্রকাশ হল শিক্ষা।<sup>৩</sup>

অন্য কথায়, আমরা বলতে পারি যে শিক্ষা হল একজন ব্যক্তির মধ্যে বিদ্যমান পরিপূর্ণতার জ্ঞান এবং অভিজ্ঞতা। সমস্ত জাগতিক ও আধ্যাত্মিক জ্ঞান মানুষের মধ্যেই বিদ্যমান কিন্তু মানুষ তার আসল স্বরূপ সম্পর্কে সম্পূর্ণরূপে অবগত নয়। এই কারণে, সে সৎ, চিৎ এবং আনন্দ নামক আত্মার সাথে তার আধ্যাত্মিক পরিচয় স্থাপন করতে অক্ষম। যে কার্যকলাপের মাধ্যমে একজন ব্যক্তি পরিপূর্ণতার জ্ঞান লাভ করে এবং পরিপূর্ণতার প্রকাশ লাভ করে, তা আসলে শিক্ষা। আধুনিক শিক্ষার ব্যাখ্যা এবং বিবেকানন্দের শিক্ষার ব্যাখ্যার মধ্যে একমাত্র পার্থক্য হল স্বামীজি আধ্যাত্মিক উপাদানের উপর বিশেষ জোর দিয়েছেন। তিনি বিশ্বাস করেন যে আত্মবিশ্বাস শিক্ষার মাধ্যমে আসে এবং আত্মবিশ্বাস লুকানো ‘ব্রহ্ম’ জাগ্রত করে। ‘সমস্ত জ্ঞান মানুষের মধ্যেই নিহিত, তার কেবল জাগরণ এবং আলোকিতকরণের প্রয়োজন।’ শিশুদের জন্য আমাদের যা করতে হবে তা হল তারা যেন তাদের বুদ্ধিমত্তাকে তাদের হাত, পা, কান এবং চোখের সঠিক ব্যবহারের জন্য ব্যবহার করতে শেখে।”

শিশুদের স্বাভাবিক বিকাশের জন্য আমাদের তাদের উপর অযথা চাপ না দেওয়া এবং নেতিবাচক চিন্তাভাবনার পরিবর্তে ইতিবাচক চিন্তাভাবনা উপস্থাপন করা প্রয়োজন, কারণ নেতিবাচক চিন্তাভাবনা সবসময় মানুষকে দুর্বল করে। যে বাবা-মায়েরা সবসময় তাদের সন্তানদের পড়াশোনার জন্য বিরক্ত করে এবং বলে যে তুমি কখনোই কিছু শিখতে পারবে না, তুমি কেবল গাধাই থেকে যাবে - তাদের সন্তানরা আসলে এরকমই হয়ে ওঠে। আমরা যদি তাদের সাথে সহানুভূতির সাথে কথা বলি এবং উৎসাহিত করি, তাহলে তারা সময়ের সাথে সাথে অবশ্যই এগিয়ে যাবে। তাঁর চিন্তাভাবনাকে প্রভাবিত করেছে কারণ দার্শনিক চিন্তাভাবনা গভীর চিন্তাভাবনার ফলে অর্জিত হয়। অতএব, আমাদের শিক্ষা সম্পর্কিত তাঁর চিন্তাভাবনাগুলি একটি নিয়মতান্ত্রিক পদ্ধতিতে জানা উচিত।

**উপসংহারঃ-** স্বামী বিবেকানন্দের শিক্ষাচিন্তা একটি সমন্বিত ও মানবকল্যাণমুখী দর্শন, যা শুধুমাত্র পুঁজিগত জ্ঞান অর্জন নয়, বরং চরিত্র গঠন, আত্মউন্নয়ন ও সামাজিক দায়বদ্ধতা-এর উপর গুরুত্ব আরোপ করে। তাঁর মতে, শিক্ষার লক্ষ্য হলো ব্যক্তির মধ্যে আত্মবিশ্বাস, স্বাবলম্বিতা ও আধ্যাত্মিক চেতনাজাগ্রত করা, যা জাতীয় পুনর্জাগরণের ভিত্তি। তিনি বৈজ্ঞানিক দৃষ্টিভঙ্গি, সাংস্কৃতিক ঐতিহ্যের সংরক্ষণ এবং সেবাধর্মী মনোভাব-এর সমন্বয়ে একটি সার্বজনীন শিক্ষাব্যবস্থার প্রচার করেছিলেন।

আজকের যুগে, যখন শিক্ষা প্রায়শই প্রতিযোগিতা ও ডিগ্রি-কেন্দ্রিক হয়ে উঠেছে, বিবেকানন্দের চিন্তাধারাসমগ্র মানবতার বিকাশ-এর জন্য একটি প্রাসঙ্গিক দিকনির্দেশনা প্রদান করে। তাঁর শিক্ষাদর্শনসমতা, অন্তর্ভুক্তি ও আধ্যাত্মিক মূল্যবোধ-এর উপর ভিত্তি করে গড়ে উঠেছে, যা আধুনিক শিক্ষাব্যবস্থায় একটি সুখম ও নৈতিককাঠামো গঠনে সহায়ক হতে পারে। স্বামীজির বাণী—”শিক্ষা হলো মানুষের অন্তর্নিহিত সম্পূর্ণতার প্রকাশ”—আজও আমাদেরকে শিক্ষার প্রকৃত উদ্দেশ্য সম্পর্কে পুনরচিন্তনে অনুপ্রাণিত করে।

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The Role of Accredited Social Health Activist (ASHA) for Women's Health Protection in Rural Village: A case study of Shantipur Gram Panchayat in East Medinipur, West Bengal.

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**Abstract**

Health is a primary need for human wellbeing. An advance technology, the health sector has changed significantly on that day. However, the issue of women's health is still a cause of concern for developing countries like India. Particularly, socio-economic backwards and the low position accorded to women by society have always kept the issue of women's health as a secondary manner. To transform this perspective and provide noticeable medical facilities to give women for ensure their wellness. The role of Accredited Social Health Activist (ASHA) is very important in our country. ASHA is a grassroot level female health worker who selected from village for improving of women's health awareness and providing basic medical services, such as encouraging women to give birth in govt. hospital, bringing children to immunization clinics, encouraging family planning, treating minor illnesses and injures with first aid, keeping demographic records, and improving village sanitation. It is also known as community health worker. In West Bengal, women are facing various problems like malnutrition, maternal health problems, and disease like AIDS, breast cancer etc. ASHA workers are playing an important role for the protection of women health, mainly in rural village in west Bengal. So, there is a need to study their role for protecting women's health. In this paper, I have tried to investigate role played by ASHA workers in generating awareness as well as providing protection for women's health, their success and failures faced in Shantipur Gram Panchayat, East Medinipur district, West Bengal which is taken as case study.

**key Words:** Community Health Worker, ASHA, women's health awareness, grassroot level, family planning, AIDS etc.

## 1.0 Introduction

Health is the most important aspect in human survival. It means to state of being free of any illness or injury. Health can also refer to condition of well-being in which an individual can pursue personal growth. According to World Health Organization (WHO), Health is state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity (Constitution of the world Health Organization 2006).

The concept of human health is keeping connection men's and women's health. However, it is seen that issues of women's health take as secondary importance in our country, which owing to its traditional patriarchal social structure, has often victimised women gender discrimination. The preference for a male child across large parts of the country has often led to girls being considered as burdens, and hence the issues of women's wellness and health seldom received the required attention that they are suppose to receive otherwise. This oscitation towards women and women's health related issue, directly impacts not only the womenfolk but also society and the development of the state at large.

The Indian constitution's Articales 39 (e) (f) 42 and 47 clearly mentioned that state responsibility to ensure a health life for the people of our country to secure equal rights to health for all. It also claims that it is the state's responsibility to improve public health and raise the level of nutrition and living standard. At present public health is primarily the responsibility of the state Governments. Both the central and state government are given top priority on health. The central government has introduced a various of community base health care services with special focus on women's health to decrease gender discrimination and provide women with proper access to health care. In this paper, I focus on role of community health worker (ASHA) for protection women's health, with prime concentration on the ASHA programme was introduced in India 2005 as part of the National Rural Health Mission (NRHM). The idea behind the Accredited Social Health Activists (ASHA) was connected marginalized community to the health care system Shantipur Gram Panchayat in East Medinipur, West Bengal.

## 2.0 Origin and Meaning of ASHA

The Indian Government established the rural health scheme in 1977 in response to the Shrivastav committee's recommendation with the intention of "putting people's health in people's hands (1975)". The sub-centre, primary health centre (PHC), and community health centre (CHC) make the three-tier structure of primary health care infrastructure

in rural areas of India. This time Alma Ata International Health Conference in 1978, the World Health Organization set the world -wide societal objective of “Health for All by 2000AD”.

Health care delivery and access have historically presented substantial difficulties in India’s diversified and highly populated environment. Among the many initiatives to address this pressing issue, the introduction of Accredited Social Health Activist (ASHA) in 2005, as a part of NRHM, marked a significant step towards improving grassroots health care delivery, particularly among women and children, and reducing geographical and socio-economical disparities.

Accredited Social Health Activist (ASHA) is a grassroot level health worker who is selected from a village to serve that village. The success of several programmes under the NRHM lies on the shoulders of ASHA network. The ASHA works as a liaison between the local rural community and the public health system. They are educated, young members of the rural community who undergo rigorous and continuous training and development to serve the rural community better. They share information on basic health and hygiene practices, counsel women on child birth and related issues and act as the first point of repository of basic health kits. The ministry health and family welfare, Government of India describes an ASHA as: “..... Health activists in community who will create awareness on health and its social determinants and mobilize the community towards local health planning and increased utilization and accountability of the existing health services.” (<https://www.mohfw.gov.in/>)

### **2.01 Key Components of ASHA:**

➤ ASHA must primarily be a women resident of the village married/ widowed/ divorced, preferably in the age group of 25 to 45 years. She should be a literate woman with due preference in selection to those who are qualified up to 10<sup>th</sup> standard wherever they are interested and available in good numbers. This may be relaxed only if no suitable person with this qualification is available (<http://nhm.gov.in/>).

➤ ASHA is chosen through a rigorous process of selection involving various community group, Self-Help Group, Anganwadi institutions, the Block Nodal Officer, District Nodal Officer, the village health committee, and the Grame Sabha.

➤ ASHA must undergo service of training to acquire the necessary knowledge, skills, and confidence for performing her spelled out roles.

➤ The ASHAs receives performance-based incentives for promoting universal

immunization, referral, and escort services for Reproductive & child health (RCH) and others health care programmes, and construction of household toilets.

➤ ASHA provides information to the community on determinants of health such as nutrition, basic sanitation & hygienic practices, healthy living and working conditions, information on existing health services and the need for timely utilisation of health and family welfare services.

➤ She counsels women on birth preparedness, importance of safe delivery, breast-feeding and complementary feeding, immunization, contraception, and prevention of common infections including Reproductive Tract Infection/sexually Transmitted Infections (RTI/STIs) and care of the young child.

At the village level it is recognized that ASHA can not function without adequate institutional support. Women's committees (like SHGs, or women's health committees), village health and sanitation committee of the Gram panchayat, peripheral health workers especially ANMs and Anganwadi workers, and trainers of ASHA and in-service periodic training are the major sources of support to ASHA (<http://nhm.gov.in/>). The programme is totally incentive based where in women who volunteer from local community are selected and trained to reinforce community action for universal immunization, safe delivery, newborn care, prevention of communicable and non-communicable disease, improved nutrition, are of the senior citizens and promotion of household/community toilet (<http://nhm.gov.in/>). ASHAs are in place, in all states of India except in Goa, Paduchero, Himachal Pradesh the non-tribal of Tamil Nadu and the union territory of Chandigarh.

## **2.02 Responsibilities of ASHA:**

- Identifying and recording new pregnancies, births and deaths.
- Getting the community to demand and obtain health care through mobilising, counselling, and supporting them.
- Recognizing, managing, or referring sickness cases.
- Assisting with the delivery of health service, through home visits, First-aid, and Immunisation Programmes.
- Keeping track of statistics and taking part in community health planning.
- Participating in the Health and Nutrition Day in the village.
- Encouraging women to have their babies in hospital.
- Improving village cleanliness and encouraging family planning (e.g. surgical sterilisation).

### Key Responsibility of ASHA's



Source: [ntt://mhtf.org/2017/08/07](http://mhtf.org/2017/08/07)

### 3.0 The area of study: Shantipur Gram Panchayat under Sahid Matangini Block.

Shantipur Gram Panchayat is located on the eastern side of Kolaghat Thermal Power Project, district of East Medinipur, West Bengal. It falls under the Sahid Matangini Block. The Shantipur Gram Panchayat has 19 booths under its administrative jurisdiction, covering an area of 700 hectares of land. According to 2011 census, the total population under the panchayat is 19000. There are four villages in Shantipur Gram Panchayat: Bargachia, Guluria, Kakdhi, and Shantipur. This panchayat has a mixed population comprising of Hindu, Muslim, and Adivasi. It falls under Block Primary Health Centre, now its name is Janubosan Rural Hospital. Population of this panchayat is comparatively backward in relation to others. Hence, there are maximum population dependent on government health facilities.

**4.0 Objectives:**

1. To investigate the benefits received by the women through ASHA workers.
2. To know the level of awareness among the women population of Shantipur Gram Panchayat regarding the various functions of ASHA.
3. To study the satisfaction level of the women in getting required services through ASHA workers.
4. To know the problems faced by ASHA workers for implementation of their given duties.

**5.0 Work profile of ASHA in selective area:**

The ASHA worker in Shantipur Gram Panchayat undertake the following activities –

- Hole monthly awareness programme regarding women and child health which individual generating awareness, family planning, provision of adequate nutrition to children as per their age, care to be taken by women and her family during pregnancy etc.
- Providing information to the newly married couple about the importance of adopting sexual practices to prevent the occurrence and spread of sexually transmitted diseases.
- To promote women's wellness, sanitation and hygiene, ASHA workers distribute sanitary napkin to the womenfolk and provide information regarding their usage and proper disposal.
- They conduct home visit for promotion of health and preventive care wherein they gather information regarding the presence of pregnant women and girl child and provide them with necessary iron, folic acid, calcium tablets etc.
- ASHAs also provide awareness regarding of safe child delivery practices and accompany the pregnant women to the government hospital for periodic health check up.
- They ensure the proper conduct of immunization programmes to the newly born and infants.

**6.0 Methodology**

The study on the Role of Community Health Worker (ASHA) for protection of women health in Shantipur Gram Panchayat is both analytical and descriptive. The data used in this regard both primary and secondary. Primary data was collected through purposive random sampling method. Number of twenty (20) ASHA workers engaged in the panchayat area, five (5) ASHA workers were directly interviewed through open ended

questionnaire and the respondent of total 30 women beneficiaries under the supervision of the selected ASHA workers (one ASHA worker under 6 women beneficiaries) were collected through a questionnaire.

### 7.0 Data Analysis

Before I have discussed, in this study 35 sample respondents are selected from Shantipur Gram Panchayat. Their responses were collected and tabulated with the help of statistical tables. For analysis and interpreting data and obtaining meaningful conclusion, appropriate statistical measures are produced using various statistical methods.

Table: 7.01

#### Classification of respondents

Respondents	No. of respondents
ASHA workers	05
Beneficiaries (women)	30

Source: primary data

Analysis: from above table five (05) of respondents belongs to ASHA and remaining thirty (30) of the respondents belongs to beneficiaries' group.

Table: 7.02

#### Classification of women respondents (beneficiaries)

Division of female beneficiaries	No. of respondent	Percentage
Unmarried	13	43.3
Married	17	56.6

Source: primary data

Analysis: from the above table based on marital status, women(beneficiary) respondents are divided into two categorise i.e. unmarried and married. Majority respondents are married (56.6) and rest of respondents are unmarried (43.3) selected for the study.

Table: 7.03

#### Education qualification of ASHA workers

Qualification	No of respondent	Percentage
Below Secondary	00	00
Secondary	00	00
Higher Secondary	02	40
Graduated	03	60

Source: primary data

Analysis: form the above table, 40% of ASHA workers have passed the Higher Secondary and 60% of ASHA workers have passed graduate examination. ASHA workers have higher educated.

Table: 7.04

## Economic category of ASHA workers

Category	No. of respondents	Percentage
APL	05	100
BPL	00	00

Source: primary data

Analysis: from above table, all respondents are belonging APL category. They have stander of living approximately high from BPL category.

Table: 7.05

## Problems regarding transportation

Response	No. of respondents	Percentage
Yes	03	60
No	02	40
Total	05	100

Source: primary data

Analysis: The above table shows the response of ASHA workers regarding transportation problem due to beneficiaries live at remote village. Three respondents opined that they have problem regarding transportation. It means 60% of ASHA workers facing problem. Only 40% do not have any problem for transportation.

Table: 7.06

## Satisfaction level on salary

Response	No. of respondent	Percentage
Highly satisfied	00	00
Satisfied	01	20
Not satisfied	04	80

Source: primary data

Analysis: the above table shows that 80% of ASHA employees are dissatisfied their remuneration for their work. Only 20% of respondents said she was satisfied her remuneration or salary.

Table: 7.07  
Home visit of ASHA worker

Response	No. of respondents	Percentage
Yes	30	100
No	00	00

Source: primary data

Analysis: From the above table, 100% of the respondents' houses are visited by ASHA workers and they are working very sincerely in the field.

Table: 7.08  
Frequency of visit of ASHA workers

Frequency	No. of respondents	Percentage
Once	00	00
Twice	06	20
Thrice	05	16.6
More than that	19	63.3
Total	30	100

Source: primary data

Analysis: the table shows the frequency of visit of ASHA workers among the houses. ASHA workers visited more time for beneficiaries' home when they fell need and any kind of problem. It is shows that 0% of respondent's house is visited only once, 20% of the respondents' houses are visited twice, 16.6% of respondents' houses were visited thrice, and 63.3% of the respondents' opinion that ASHA workers visited more than that in month.

Table: 7.09  
Information provided by ASHA regarding health issues

Information	No. of respondents	percentage
Yes	30	100
No	00	00
Total	30	100

Source: primary data

Analysis: the above table shows that the provision of health-related information by ASHA workers. All respondents' (100%) are received health-related information from ASHA workers.

Table: 7.10

## Opinion about ASHA workers

S l . no	Factors	Very good	Good	neutral	Bad
01	Minor health injuries/ first aid	09	21	00	00
02	Nutrition	26	04	00	00
03	Sanitation	03	23	04	00
04	Delivery	24	06	00	00
05	Immunization schedule of new born babies	28	02	00	00
06	Prevention from sexually transmitted disease	02	28	00	00

Source: primary data

Analysis: As can be seen from the table, ASHA's performance on most of the tasks is deemed satisfactory. The vaccination schedule for new born babies is rated as very good by 28 out of 30 respondents, while the delivery performance of ASHA workers is rated as very good by 24 respondents, and sanitation-related activities of ASHA are rated as good by 23 respondents. In terms of nutrition, the most preferred service provided by ASHA workers. It is rated as very good by 26 respondents, while 21 respondents rated minor health tasks of ASHA workers as good, and 28 respondents rated sexual transmitted disease-related ASHA work as good. Here, all beneficiaries are aware their health problems and discuss regarding problem through ASHA workers. It is clear that rural women are protected by the ASHA workers.

Table: 7.11

## Services rendered by ASHA workers

Services	No. of respondents	percentage
Minor health injuries/ first aid	10	10.87
Nutrition	20	21.74
Sanitation	07	7.61
Delivery	22	23.91
Immunization schedule of new born babies	28	30.43
Prevention from sexually transmitted disease	05	5.43
Total	92	100

Source: primary

Analysis: the services provided by ASHA workers to the community are listed in

table 7.11 out of 30 respondents, 30.43% received delivery services, 23.91% received immunization schedules for new born babies, 21.74% received nutrition services. 10.87% received information about minor health injuries, 7.61% received sanitation services, and 5.43% received information about sexually transmitted disease prevention.

Table: 7.12

## Satisfaction level of beneficiaries

Level	No. of respondent	Percentage
Highly satisfied	20	66.67
Satisfied	07	23.33
Neutral	02	6.67
Dissatisfied	01	3.33
Total	30	100

Source: primary

Analysis: this table offers information about respondents' levels of satisfaction with ASHA workers' performance. 66.67% of respondents are highly satisfied with ASHA workers, 23.33% of respondents are satisfied, 6.67% of respondents are neutral, 3.33% of respondents are dissatisfied for ASHA's duties. Here, rural beneficiaries are always taken service for health-related issues from ASHA workers.

## 8.0 Findings

- The purpose of retain monthly community meetings by the ASHA workers gets partially fulfilled because of low attendance of women and girl child.
- The ASHA workers can not ensure timely distribution of personal hygiene materials like sanitary napkins because they do not receive them from the Government regularly.
- The ASHA can only distribute medicines to the women until stocks last. They do not have stock backups to meet additional requirements as well as in emergencies.
- Hesitation on the part of women and girls to freely discuss women related health issues with the workers.
- Lack of realization on the part of women regarding observance of personal hygiene and proper sanitary waste disposal mechanism.
- As the ASHA received the governmental incentive which does not ensure them for descent standard of living.

**9.0 Suggestion:**

- ASHA works on a population size of 1000. The population size should be reduced so that ASHA can adequately serve a small population.
- Awareness programmes and campaigns must include the use of more visible to attract the attention of the audience.
- The number of ASHA training programmes should be expanded.
- ASHAs compensation must be increased for more people to volunteer to help uplift rural community.
- More medical camps and seminars should be held by ASHA to raise public awareness.

**10.0 Conclusion:**

Accredited Social Health Activists are the backbone of community healthcare in rural India. By reimaging their role, strengthening their capacities, and embracing technology, India can significantly improve healthcare access and outcomes for its underserved populations. To keep pace with the evolving healthcare landscape, their role must be rediscovered and enhanced. ASHA has been successful with its actives like immunization schedules for new born babies, sanitation, and various healthcare programmes. By transforming ASHA workers into informed health educators, digital health programmes, and integral components of the healthcare coverage and improved health outcomes for all citizen. A comprehensive approach that integrates ASHA workers into the broader healthcare system will pave the way for a healthier and more equitable nation.

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### भारतीयज्ञानपरम्परायां व्याकरणे दर्शनस्य प्रभावः

समीरहालदारः

शोधछात्रः, संस्कृतविभागः पाण्डिच्चेरी विश्वविद्यालयः

**सारांशः-** भारतीयज्ञानपरम्परायां व्याकरणस्य विकासे दार्शनिकचिन्तनस्य प्रभावः अतीव गहनः अस्ति । संस्कृतव्याकरणं (विशेषतः पाणिनेयः अष्टाध्यायी) केवलं भाषानियमानां संकलनं न, अपितु दार्शनिकसिद्धान्तैः सह तस्य घनिष्ठः सम्बन्धः अस्ति । भर्तृहरेः वाक्यपदीये प्रतिपादितः स्फोटसिद्धान्तः व्याकरणदर्शनयोः सेतुः अस्ति । अस्य मते, शब्दः द्विविधः-वर्णनादरूपः, स्फोटः (अविभक्तं शब्दार्थस्य एककं सत्तात्मकं स्वरूपम्) । एषः सिद्धान्तः व्याकरणं भाषायाः बाह्यरूपात् अतीत्य तस्याः चैतन्यपरमार्थं विवृणोति । पाणिनेः सूत्राणां रचना न्याय-वैशेषिकदर्शनस्य तर्कशास्त्रेण सह समन्वयिता । यथा- "अणुदित् सवर्णस्य चाप्रत्ययः" (१.१.६९) इत्यत्र "अण्" इति सूत्रस्य विश्लेषणं परमाणुवादस्य (वैशेषिकदर्शन) प्रभावं दर्शयति । "भावे तावत्कृद्वचनम्" (३.४.६७) इत्यादौ क्रियायाः स्वरूपविचारः मीमांसकानां भावनावादेन सह सम्बद्धः। मीमांसकाः (यथा कुमारिलभट्टः) शब्दनित्यत्वम् (शब्दस्य अनादित्वं) प्रतिपेदिरे । एतत् पाणिनेयव्याकरणस्य लौकिक-वैदिकशब्दानाम् एकसूत्रतायाः आधारः अभवत् । "धातोः कर्मणः समानकर्तृकादिच्छायां वा" (३.१.७) इत्यादिसूत्रेषु कर्तृ-कर्म-भावादीनां विश्लेषणं मीमांसायाः कर्मसिद्धान्तैः सह तादात्म्यं रक्षति । नैयायिकैः सह वैयाकरणानां विवादः (यथा — "शब्दः किं गुणः उत द्रव्यम्?") भाषायाः प्रकृतिं लक्ष्यीकृत्य अभवत् । पतञ्जलिः (महाभाष्ये) "योगशास्त्र"स्य सिद्धान्तान् आधृत्य शब्दज्ञानस्य माध्यमेन चित्तवृत्तिनिरोधं व्याकरणस्य उच्चतमं लक्ष्यम् इति प्रतिपादयति । शङ्कराचार्यैः "शब्दब्रह्म" इति संज्ञितः व्याकरणस्य अध्यात्मपक्षः अद्वैतसिद्धान्तैः समर्थितः । "सोऽहम्" इति महावाक्यस्यव्याकरणिकं विश्लेषणं "अहं"(उत्तमपुरुषः) "सः" (प्रथमपुरुषः) इत्येतयोः एकत्वं ब्रह्मणः अखण्डसत्तां दर्शयति ।

भारतीयव्याकरणं केवलं "रूपसिद्धेः" नियमानां ग्रन्थः न, अपितु शब्दब्रह्मणः दार्शनिकं अनुसन्धानम् । अत्र व्युत्पत्तिः, योगः, स्फोटः इत्यादयः अङ्गानि वेदान्त-न्याय-मीमांसादर्शनैः सह संवादं कुर्वन्ति । एषः समन्वयः एव भारतीयपरम्परायाः विशिष्टः वैशिष्ट्यम् अस्ति ।

**शब्दसूचक-** व्याकरणम्, दर्शनम्, शब्दब्रह्मणः, ब्रह्मणः, स्फोटः, नैयायिकः, वैशेषिकः, योगशास्त्रम्

### भारतीयज्ञानपरम्परायां व्याकरणे दर्शनस्य प्रभावः

**भूमिकाः-** अत्र हि व्याकरणदर्शनमित्यस्य कोऽर्थः? एवं प्रश्ने तघटकदर्शन-शब्दस्यार्थः प्रथमं निर्णयिते। अयं हि दर्शनशब्दो भावसाधनः करणसाधनश्च। तत्र भावसाधनत्वे दृष्टिरित्यर्थस्तस्यावबुध्यते। करणसाधनत्वे तु दृश्यते प्रत्यक्षीक्रियते न तु अनुमीयते नापि शब्दजन्यबोधविषयीक्रियते अनेनेति व्युत्पत्त्या दर्शनसाधनमित्यर्थः। एवं सति यैर्यैरुपायैर्दृश्यते, ते सर्वेऽपि उपाया दर्शनपदव्यपदिष्टा भवितुमर्हन्ति। भावसाधनत्वे तु -

**श्रोतव्यः श्रुतिवाक्येभ्यो मन्तव्यश्चोपपत्तिभिः।**

**मत्वा च सततं ध्येय एते दर्शनहेतवः ॥<sup>1</sup>**

इत्युक्त्या श्रुतिवाक्यश्रवणमन्तरा यत् किञ्चिद् ग्रथ्यमानं वस्तु दर्शनमेव नहि भवितुमर्हतीति कथङ्कारं दर्शनपदव्यपदिष्टानां दर्शनपदव्यवहार्यता इति चेत् उच्यते, सर्वेषामपि दर्शनानामुद्भावकानां चेतसि सैव भगवती श्रुतिः साक्षात् परम्परया माणत्वात्। एवं च दर्शनहेतूनां दर्शकं प्रतिपादकं वा शास्त्रं लक्षणया दर्शनपदभाग् भवेदेव किमुत करणसाधनत्वे। तथा च व्याकरणमेव दर्शनमिति कर्मधारये सर्वं व्याकरणं दर्शनमेव भविष्यति। भावसाधनत्वे अष्टीसमासे व्याकरणस्य दर्शनमित्यर्थः। तत्रापि व्याकरणपदेन व्याख्यानापसंख्यानादिविशिष्टं शास्त्रं व्याकरणपदेन ग्राह्यम्। तस्य दर्शनमित्यत्र कर्तरि अष्ट्या समासे शास्त्रेण यद् यद् दृश्यते, तत् सर्वमपि दर्शनमेव भवेत्। अधिकरणस्य सम्बन्धत्वेन विवक्षया अष्ट्यन्तेन समासे तु व्याकरणशास्त्रे यत्परात्मनः तत्सम्बन्धिनो वा दर्शनस्य साधकं तदेव दर्शनं स्यात्। एवं सति उक्तासु व्युत्पत्तिषु यः कोऽपि व्याकरणसम्बन्धी विषयः, स सर्वोऽपि दर्शनपदव्यपदेश्यः सिध्यति। अस्यां स्थितौ पञ्चानां वृत्तीनामन्येषां वा प्रकृतिप्रत्ययसन्धिसमासकारकादीनां सर्वेषां दर्शनत्वे न काचिद् बाधाऽऽपतिष्यति। किञ्च येन केनापि वैयाकरणेन दृष्टो व्याकरणे पदार्थो व्याकरणदर्शनपदव्यपदेश्यो भवेत्, तथा चेदं शास्त्रं व्याकरणदर्शनं कथयितुं शक्यते।

विचारप्रयोजकज्ञानं तत्त्वज्ञानसाधनशास्त्रं वा दर्शनं दृश्यते प्रत्यक्षवदनुभूय-तेऽन्तस्तत्त्वमनेनेति दर्शयति अनुभावयति गूढतत्त्वमिदमिति वा व्युत्पत्त्या। इन्द्रियानुभवविषयस्यान्त - स्तत्त्वान्वेषणमेव दर्शनस्य बीजम्। व्यवहारे हि ईश्वर जीवजगतां तत्त्वान्वेषणपूर्वकं विवेचक शास्त्रमेव दर्शनपदेनाभिधीयते। सामान्यतो दर्शनपदं हि न्याय वैशेषिकसाङ्ख्ययोगपूर्वोत्तर -

मीमांसादिषु रूढम्। व्याकरणमपि तत्तल्लक्षणोपेतत्वाद्दर्शनत्वेन व्यवदिद्यते। तदेवाह  
हरिर्वाक्यपदीये – अनादिनिधनं ब्रह्म शब्दतत्त्वं यदक्षरम्।

विवर्ततेऽर्थभावेन प्रक्रिया जगतो यतः ॥2

अक्षरमनादिनिधनं शब्दतत्त्वं ब्रह्म कारणस्थं यतः सर्वं प्रवर्तते यत्र भवति सर्वमेकनीडम्। अर्थश्च  
जीवरूपो यतश्च चलति जगद्रूपो वाग्व्यवहार इत्यस्याशयः । दर्शनमिदं  
दर्शनान्तरवत्पुरुषार्थचतुष्टयसाधकमपि। छन्दोवत्सूत्राणि भवन्तीति सूत्राणां स्वरूपमेव  
वेदमयमिति तदध्ययनं स्वाध्यायः शब्दसिद्धिर्यज्ञः सूत्रपाठ एवं मन्त्रपाठः अध्यापकस्तत्र  
होत्राचार्याध्यापकस्तत्र होत्राचार्याध्वर्युरूपः शिष्यश्च यजमानः। तेन सूत्रप्रयोगेण  
शब्दसिद्धिर्महत्पुण्यप्रदाधर्मस्वरूपा च। अर्थसिद्धिरभीष्टार्थद्वारैव। अर्थज्ञो ह्यर्थानवासुं पारयति  
नानर्थज्ञः । अर्थैरर्था निबध्यन्ते गजैर्वनगजा इव। कामसिद्धिश्चार्थविशिष्टशब्दसाधुप्रयोगेण यथा  
आरण्यकोपात्तफलप्रसूतिस्तम्बेन नीवारइवावशिष्टः इत्यत्र नीवारशब्दस्य

'द्वयं गतं सम्प्रति शोचनीयतां समागमप्रार्थनया कपालिन'

इत्यत्र कपालिशब्दस्य। मोक्षसिद्धिश्च पारम्पर्येण तेषाम्। यथाह हरिरपि- इयं सा  
मोक्षमाणानामजिह्वा राजपद्धतिः (१.१६) इति तथैव 'शब्दब्रह्मणि निष्णातः  
परब्रह्माधिगच्छति' इति ।

यथा हि एकमेव सद् विप्रैर्बहुधा कल्पितं तथैव-

एकमेव यदाम्नातं भिन्नं शक्तिव्यपाश्रयात्।

अपृथक्त्वेऽपि शक्तिभ्यः पृथक्त्वेनैव वर्तते ॥3

एक एवाखण्डवाक्यस्फोटः वाक्यपदवर्णस्फोटेषु भेदत्वेन गृहीतोऽस्ति । स चापृथगपि पृथक्त्वेन  
कल्पित इति ज्ञानसौकर्याय। एवमेव -

नामैवेदं रूपत्वेन ववृते रूपं चेदं नामभावेऽवतस्थे ।

एके तदेकमविभक्तं विभेयुः प्रागेवान्ये भेदरूपं वदन्ति ॥4

एतत्सर्वं विचिन्त्य हरिणोक्तम्-

आसन्नं ब्रह्मणस्तस्य तपसामुत्तमं तपः।

प्रथमं छन्दसामङ्गमाहुर्व्याकरणं बुधाः ॥

प्राप्तरूपविभागायां यो वाचः परमो रसः।

यत्तत्पुण्यतमं ज्योतिस्तस्य मार्गोऽयमाञ्जसः ॥<sup>5</sup>

शब्दार्थसम्बन्धनिमित्तत्त्वं वाच्याविशेषेऽपि च साध्वसाधून् । साधुप्रयोगानुमितांश्च शिष्टान्न वेद यो व्याकरणं न वेद

अर्थप्रवृत्तितत्त्वानां शब्दा एव निबन्धनम् ।

तत्त्वावबोधः शब्दानां नास्ति व्याकरणादृते ॥

तद्वारमपवर्गस्य वाङ्मलानां चिकित्सितम् ।

पवित्रं सर्वविद्यानामधिविधं प्रकाशते ॥<sup>6</sup>

पदेकं प्रक्रियाभेदैर्बहुधा प्रविभज्यते ।

तद्व्याकरणमागम्य परं ब्रह्माधिगम्यते ॥ (१.१६)

तथैव -

आपः पवित्रं परमं पृथिव्यामपां पवित्रं परमञ्च मन्त्राः।

तेषाञ्च सामर्यजुषां पवित्रं महर्षयो व्याकरणं निराहुः ॥<sup>7</sup>

असत्यपि शास्त्रे दर्शनशब्दप्रवृत्तिनिमित्तमधिकृत्य निर्देशे सामान्यत आत्मतत्स्वरूपतत्साधक - प्रमाणमोक्षादिविषयान् प्राधान्येनान्येषामपि विषयाणां प्रासङ्गित्वेन विवेचकं शास्त्रमेव दर्शनशास्त्रत्वेन गृह्यते। तेन हि पदसाधुत्वासाधुत्वाख्यानपरं व्याकरणं कथं नाम दर्शनशास्त्रपदवीमारोहेतेति केचिदतत्त्वज्ञाः प्रलपितुं शक्नुवन्ति । तेषां कृते इदमेवोत्तरं यत् -

तस्माद्यः शब्दसंस्कारः सा सिद्धिः परमात्मनः ।

तस्य प्रवृत्तितत्त्वज्ञस्तद् ब्रह्मामृतमश्नुते ॥<sup>8</sup>

अर्थात् यदेव शास्त्रान्तराणि दर्शनशास्त्रत्वेन सम्मतातिप्रकारान्तरेण साधयन्ति तदेव व्याकरणमपि शब्दविद्याविवेकेन साधयतीति न प्रतिहतमस्य दर्शनत्वमिति ।

व्याकरणदर्शनं हि परमाणोरप्यनित्यत्वं मन्यते। एतदनुसारेण खानिलतेजोवारिपृथिवीषु उत्तरोत्तरस्य पूर्वपूर्वकारणं तत्र खस्य कारणं शब्दः। तेन हि शब्द एवाखिलस्य जगतः कारणम्। स एव ब्रह्म अनादिनिधनमक्षरञ्च। वैयाकरणा हि शब्दाद्वैतवादं मन्यन्ते। ते हितस्य बीजं श्रुतौ पश्यन्ति। यथा वाजसननेयके

**चत्वारि शृङ्गा त्रयो अस्य पादा द्वे शीर्षे सप्त हस्तासो अस्य।**

**त्रिधा बद्धो वृषभो रोरवीति महादेवो मर्त्या आविवेश ॥<sup>9</sup>**

तत्र व्याख्यानं यथा पतञ्जलिना महता देवेन नः साम्यं यथा स्यादिति अध्येयं व्याकरणमिति। यत्र चत्वारि शृङ्गाणि पदजातानि नामाख्यातोपसर्गनिपाताश्च । त्रयो अस्य पादा इति त्रयः काला भूतभविष्यद्वर्तमानाः। द्वे शीर्षे द्वौ शब्दात्मानौ नित्यः कार्यश्च। सप्त हस्तासो अस्येति सप्त विभक्तयः। त्रिधा बद्ध इति त्रिषु स्थानेषु बद्ध उरसि कण्ठे शिरसीति। वृषभो वर्षणात्। रोरवीति शब्दं करोति। महान् देवः शब्दः। मर्त्या मरणधर्माणो मनुष्या अन्येषामपि मरणधर्मत्वेऽपि तेषामात्मज्ञानेऽधिकाराभावात् । एवमेव -

**चत्वारि वाक्यपरिमिता पदानि तानि विदुर्ब्रह्मणा ये मनीषिणः।**

**गुहा त्रीणि निहिता नेङ्गयन्ति तुरीयं वाचो मनुष्या वदन्ति ॥<sup>10</sup>**

तदेवानुवदति हरिरपि -

**वैखर्या मध्यमायाश्च पश्यन्त्याश्चैतदद्भुतम्।**

**अनेकतीर्थभेदायास्त्रय्या वाचः परं पदम् ॥<sup>11</sup>**

परायास्तु त्रय्या एव विषयत्वमिति । उक्तमपि

**स्वरूपज्योतिरेवान्तः परा वागनपायिनी।**

**तस्या दृष्टस्वरूपायामधिकारो निवर्तते ॥**

यथा- हि साङ्ख्याः कार्यस्य सुखादिमत्तया तदीयमूलकारणप्रकृतेरपि तदात्मकत्वमेव मन्यन्ते यथा वा घटादिषु पृथिवीमयत्वं पश्यन्तो वैशेषिकास्तन्मूल-कारणपरमाणुष्वपि पृथिवीत्वं

पश्यन्ति तथैव वैयाकरणाः प्रपञ्चस्थकारणतायां शब्दमेव गृह्णन्ति शब्दब्रह्मणः प्रपञ्चस्य विवर्तोपादानत्वं विचिन्त्या। यत्तूच्यते अर्थज्ञानोपायः तथाऽर्थस्य शब्दसामानाधिकरण्यं न तु विवर्तोपादानतयेति तन्न, इन्द्रियाणां शब्दस्पर्शादिज्ञानकारणत्वेऽपि चक्षू रूपं श्रोत्रं शब्दसामानाधि-करण्यादर्शनात्। शब्दपूर्वक एवार्थसम्प्रत्ययो भवति न तु सामानाधिकरण्येन।

उक्तं यथा महाभाष्येऽपि येनोच्चारितेन सास्त्रालाङ्गुलककुदखुरविषाणिनां सम्प्रत्ययो भवति स शब्दः अथवा प्रतीतपदार्थको लोके ध्वनिः शब्द इति।

द्वौ हि शब्दात्मानौ कार्यौ नित्यश्च। कार्यो व्युत्पाद्यो नित्यस्तु सर्वेश्वरः सर्वशक्तिर्महान् यं हि वाग्योगवित् शास्त्रजशब्दज्ञानपूर्वकं प्रयोगेण क्षीणपापः पुरुषोऽहङ्कारग्रन्थीन् विच्छिद्य संसृज्यत इति तत्त्वज्ञाः। शब्दत्वमघोषा वाग्ब्रह्मकुण्डलिनी ध्रुवं विद्या शक्तिः परानादो महामायेति दैशिकैः, विन्दुरेव समाख्यातो व्योमानाहतमित्यपि। तस्याश्चतस्रो वृत्तयः वैखरीमध्यमापश्यन्ती सूक्ष्मेति। तत्र वैखरी श्रोत्रग्राह्या कृतवर्णपरिग्रहाऽर्थस्य वाचिका।

इयं प्रायः प्रयोक्तृणां प्राणवृत्तिनिबन्धना । केवलं बुद्धयुपादाना क्रमाद्वर्णानुपातिनी अन्तः सञ्जल्परूपा प्राणवृत्तिमतिक्रम्य स्थिता मध्यमा। वर्णानामविभागेन सर्वतः संहतक्रमास्वयम्प्रकाशा मयूराण्डरसोपमा पश्यन्ती। स्वरूपज्योतिरेवान्तः सूक्ष्माऽनपायिनी वाक् परा। एषैवामृतकला। तत्र वैखरी कण्ठदेशीया मध्यमा हृदयस्थिता पश्यन्ती नाभिदेशीया षड्चक्रस्था परा स्मृता। परैव वाग् वृत्तिमाश्रित्यात्मानं प्रकटयति इति शब्दाद्वैतरहस्यम्। उक्तमेव -विमर्श एव ब्रह्म तदेव नानारूपं भासतेऽविद्ययेति। केषाञ्चिन्मते तु प्रकाशो विमर्शश्चेति वस्तुद्वयम्। प्रकाश एव शिवो विमर्शस्तु स्वातन्त्र्यशक्तिरूपा। तथापि तयोरन्योन्यव्यतिरेकेणासत्त्वात्तयोरैक्यमविभक्तमेव। तन्मते विमर्शः परावाक्यप्रकाशश्चार्थः । तन्मिथुनं वागर्थयुगलम्। अपरे तु यत्प्रकाशः शिवो विमर्शश्च तत्प्रकाशकः। तेन प्रकाशस्यैव स्वप्रकाशत्वमभ्युपेत्य प्रकाशसम्भवे कोऽर्थो विमर्शेन। प्रकाश एव ब्रह्म यद्धि अविद्यामनिर्वचनीयामाश्रित्य नानारूपं भासत इति वदन्ति। इत्थं हि परमेश्वराद्वैतवादिमते प्रकाशविमर्शयोर्भेदाप्रतिभासात् प्रकाश एव विमर्शः ब्रह्माद्वैतवादिमते प्रकाश एवैकं तत्त्वं शब्दाद्वैतवादिमते विमर्श एवेति तेषु न तथा विचारवैषम्यं तत्त्वनिरूपणप्रणाल्येव विषमा । वैयाकरणमते विमर्श एव परा वाक् सैव शब्दब्रह्म येन तादात्म्यमेव जीवस्य मोक्षो यो हि शब्दावस्थानरूपः स एव स्फोटः -

अर्थप्राधान्यवादिनो हि काणादात्पदार्थस्वरूपज्ञानान्निःश्रेयसाधिगमं मन्यन्ते। एवमेव नैय्यायिका अपि। ज्ञानप्राधान्यवादिनो हि साङ्ख्याः योगवादिनो वेदान्तिनश्च। वैयाकरणास्तु शब्दप्राधान्यवादिन इति तेषां दर्शनान्तरैरेव गतार्थत्वात्कथं तेषां पृथक्दर्शनत्वमित्यपेक्षायामुच्यते-

**अर्थप्रवृत्तित्त्वानां शब्दा एव निबन्धनम् ।**

**तत्त्वावबोधः शब्दानां नास्ति व्याकरणादृते ॥<sup>12</sup>**

सिद्धमिदं व्याकरणस्य शब्दप्राधान्यवादिस्वतन्त्रदर्शनत्वम्। तर्हि कान्यस्य प्रमाणानीत्यपेक्षायामुच्यते प्रत्यक्षानुमानोपमानशब्दार्थापत्तिरनुपलब्ध्यभ्या-सादृष्टाख्यानीति । यद्यपि वैयाकरणाः शब्दप्रमाणकाः । उक्तमेव महाभाष्ये शब्दप्रमाणका वयम्। यच्छब्द आह तदेवास्माक प्रमाणम्। इति तथापि तैरकामैरपि लोकव्यवहारार्थं प्रत्यक्षप्रमाणमपि स्वीक्रियत एव। यथाऽह भगवान् पाणिनिः स्वयमेव - 'प्रधानप्रत्ययार्थवचनमर्थस्यान्यप्रमाणत्वात्' इति (१.१.५) महाभाष्येऽपि-लोकतोऽर्थप्रयुक्ते शब्दप्रयोगे शास्त्रेण धर्मनियमः इति। यदि हि प्रत्यक्षस्य प्रामाण्यं न स्वीक्रियेत तदा शब्दानां श्रावणप्रत्यक्षविषयताभाव आपद्येत यद्धि तेषामेवानर्थक्याय परिणमेत। न ह्यनुमानं विनाऽपि तत्सिद्धानां परिभाषाणाम-किञ्चित्करताऽऽपद्येत। न हि कोऽपि किञ्चिदपि वस्तु सर्वतोभावेन प्रेक्षितुं पारयति एककालावच्छेदेन सर्वावयवदर्शनासम्भवात् । यथाऽह स्वयमेव हरिः - **दुर्लभं कस्यचिल्लोके सर्वावयवदर्शनात्।**

**कैश्चित्त्ववयवैर्दृष्टैरर्थः कृत्स्नोऽनुमीयते ॥<sup>13</sup>**

महाभाष्येऽपि प्रत्यक्षानुमानयोः प्रामाण्यं स्पष्टमेव स्वीकृतं दृश्यते। शब्दप्रामाण्यं तु स्पष्टमेव वैयाकरणसम्मतम्। 'शब्दप्रमाणा वयम्' इति भाष्ये स्पष्टतयोक्तत्वात्। उपमानानि सामान्यवचनैः (२.१.५५) इति सूत्रे भाष्ये मानं नामानिर्ज्ञातार्थमुपादीयतेऽनिर्ज्ञातमर्थं ज्ञास्यतीति । तत्समीपे यन्नात्यन्ताय मिमीते तदुपमानं गौरिव गवयः इति। गौर्निर्ज्ञातो गवयोऽनिर्ज्ञात इति स्पष्टमुपमानस्य प्रामाण्यं वैयाकरणानामपि सम्मतम्। 'न ह्यन्यदुपलभ्यते' इति भाष्ये एकत्वानुप-लब्धिप्रमाणेनान्यथाभावनिश्चय इत्यर्थं इति कैयटोक्तेः, अनुपलब्धिरपि वैयाकरणानां सम्मतं प्रमाणम्।

'सम्बन्धिशब्दैर्वा तुल्यम्' इति वार्तिकभाष्यादर्थपत्तेरपि प्रामाण्यं वैयाकरणानां सिध्यति। तथैव हि रूपतर्काणां यन्मणिरूप्यादीनां न्यूनाधिक्यविषयकं ज्ञानं जायते तत्परेषामसमाख्येयमभ्यासादेव जायते नेन्द्रियादिभ्यः। तन्न प्रत्यक्ष विनाभ्यासं पटुभिरपीन्द्रियैरनधिगम्यत्वात् नानुमानिकं व्याप्तिज्ञानाजन्यत्वात्। उक्तमेव वाक्यपदीये-

परेषामसमाख्येयमभ्यासादेव जायते।

मणिरूप्यादिविज्ञानं तद्विदां नानुमानिकम् ॥<sup>14</sup>

एवमेव ऋषिभिर्यज्ज्ञातं तस्य तपः साध्यत्वात्तददृष्टमेव न तु प्रत्यक्षानुमानोपमानादिगम्यम्। यथोक्तं हरिणा

प्रत्यक्षमनुमानञ्च व्यतिक्रम्य व्यवस्थितः ।

पितुरक्षः पिशाचानां कर्मजा एव सिद्धयः ॥<sup>15</sup>

इत्थं हि वैयाकरणैरप्यष्टौ प्रमाणानि गृह्यन्ते प्रमेयसिद्धये। प्रमेयश्च द्विविधः शब्दः नित्यः कार्यश्च । नित्यः सूक्ष्मः कूटस्थः परः कार्यस्तु वैखरीविषय एव अत स्वानित्यो व्युत्पाद्यश्च । नित्यसिद्धये प्रथमनित्यस्य ज्ञानमावश्यकं भवति यथाऽहं हरिरेव - 'असत्ये वर्त्मनि स्थित्वा ततः सत्यं समीहते' इति। यथा हि अर्थप्रवृत्तित्त्वानां शब्दा एव निबन्धनं तथैव कार्यशब्दस्य नित्यशब्द एवोत्पत्तिस्थानं लयस्थानञ्च ।

सर्वेषामाकाशो योनिराकाशस्य च शब्द एवेति शब्दादेव सृष्टिप्रक्रिया प्रवर्तते तत्रैव विलयं यान्ति च। यथोक्तं-

शब्दस्य परिणामोऽयमित्याम्नायविदो विदुः।

छन्दोभ्य एव प्रथममेतद्विश्वं व्यवर्तते ॥<sup>16</sup> यथा च

श्रुतिरपि 'वागेव विश्वा भुवनानि जज्ञे वाच इत्सर्वममृतं यच्च मर्त्यम्'।

अपि च – विभजन् स्वात्मनो ग्रन्थीन् श्रुतिरूपैः पृथग्विधैः।

प्राणो वर्णानभिव्यज्य वर्णेष्वेवोपलीयते ॥

यथाऽहं भर्तृहरिरपि- न सोऽस्ति प्रत्ययो लोके यः शब्दानुगमादृते ।

अनुविद्धमिव ज्ञानं सर्वं शब्देन भासते ॥<sup>17</sup>

अन्त्ये च हरिः स्मर्यते - सम्बन्धिभेदात्सत्तैव भिद्यमाना गवादिषु ।

जातिरित्युच्यते तस्यां सर्वे शब्दा व्यवस्थिताः ॥

तां प्रातिपदिकार्थञ्च धात्वर्थञ्च प्रचक्षते।

सा नित्या सा महानात्मा तामाहुस्त्वतलादयः ॥

एवमेव- सत्यं वस्तु तदाकारैरसत्यैरवधार्यते।

असत्योपाधिभिः शब्दैः सत्यमेवाभिधीयते ॥

अध्रुवेण निमित्तेन देवदत्तग्रहं यथा।

गृहीतं गृहशब्देन शुद्धमेवाभिधीयते ॥ इत्यपि

नादैराहितबीजायामन्येन ध्वनिना सह।

आवृत्तपरिपाकायां बुद्धौ शब्दोऽवधार्यते ॥<sup>18</sup>

**उपसंहारः-** अत्र निराकारब्रह्मणः साकारोपमानैः सह सम्बन्धः दर्शितः। श्रुतिषु उपमानानां प्रयोगः ब्रह्मजिज्ञासूनां मनसि सरलतया तत्त्वबोधं जनयितुं भवति। यथा छायाप्रतिबिम्बादयः मूलवस्तुं विनापि तस्य आभासं ददति, तथैव साकारोपमाः निराकारस्य सत्यस्य सन्निधौ असत्याः अपि तत्प्रतीतिं जनयन्ति। शब्दाः अपि अर्थस्य सूचकाः, स्वरूपतः तु अर्थात् भिन्नाः – इति भाषायाः मायिकी शक्तिः उक्ता। एषा शाब्दिकी माया एव अद्वैतदर्शने "नामरूपव्यवहार" इति उच्यते, यत् ब्रह्मणि अध्यस्तं भवति। यथा- "देवदत्त" नाम्ना कश्चन व्यक्तिः न साक्षात् सूच्यते, अपि तु तस्य संकेतमात्रं क्रियते, तथैव "ब्रह्म", "ईश्वर" इत्येतैः शब्दैः परमतत्त्वं नाममात्रेणैव सूच्यते, न तु तत् स्वरूपेण। शुद्धचैतन्यरूपा सत्ता नाम्नो रूपस्य च अतीता, परं तस्याः अनुभवाय नामभिः सहायता आवश्यकी। "शब्दः (वाक्) मूलतः नादतः (ध्वनेः) उत्पद्यते। अयं नादः चेतसि किञ्चित् संस्कारं (बीजं) रोपयति। यदा एषः नादः अन्यैः संकेतैः (यथा भाषा,

प्रसङ्गः) सह संयुज्य बुद्ध्या च विश्लिष्यते, तदा एव शब्दस्य यथार्थार्थः बोध्यते। अत्र उक्तं यत् ईश्वरस्य वा ब्रह्मणः ज्ञानम् अपि मन्त्रैः, उपनिषद्भिः च शब्दरूपेण एव लभ्यते, किन्तु अन्ते तस्य अनुभवः शब्दातीत एव भवति।

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## INCLUSION OF WOMEN IN VEDIC SOCIETY

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### Abstract:

In society, every individual should attain a certain degree of freedom. Women constitute half of the total population of society. Therefore, to determine how cultured and progressive a society is, it is extremely important to understand the status of women within it. This writing attempts to analyze the role of women from the Vedic period to the post-Vedic period and their contributions to society. It examines the respect and recognition that women have received in different eras, especially in the Indian context. This analysis describes the joys and sorrows, pleasures and pains, honor, status, and daily life experiences of various women.

**Keywords:** Attendance to rights, merit, social status, education, spirituality

Man and woman are the two fundamental components of human society. They are mutually dependent on each other. Man and woman are considered like the two wheels of a chariot. The term “rights” refers to the status attained by an individual in a system, which includes respect and responsibility. Presenting an accurate picture of the status of women in ancient India is not an easy task. Although scholars have differing opinions, their views are generally similar. A comprehensive study of Vedic literature reveals that the status of women in the Vedic era was more satisfactory and superior compared to later periods. In the golden era of ancient Indian culture, that is, the Vedic period, women played an equal role alongside men in the upliftment, progress, and refinement of society. Therefore, the Vedic Samhita period is regarded as the golden age of women’s status. The facilities, opportunities, and resources provided to women in the Vedic era for the full development of their abilities were beyond the imagination of modern times. Just as different body parts hold significance, women held an important position in society. The women of that time were seen in all their forms—knowledge-giving, prosperity-be-

stowing, and power-embodiment. The highest creation of the Divine, woman, has made a unique contribution to the evolutionary process of the universe. The *bṛhadāranyaka Upanishad* describes a woman as the one who fulfills the void of creation — “*ayamākāśah striyā pūryate*” Similarly, the *Rigveda* honors women with the title of Brahma—“*strī hi brahmā vabhuvitha*”.

The equality of women with men is well expressed through the word *Ardhangini* (better half). The word *Dampati* also signifies that both men and women are equally the masters of the household. The story of the origin of man and woman, as described in Vedic literature, serves as a testimony to the sense of equality between them. In the Rigvedic period, daughters were honored in society just as sons were, as evidenced by a Rigvedic mantra in which a couple prays for the longevity of both their sons and daughters. Elsewhere, there is also a description of young, innocent daughters lying on their parents' chests, which testifies to the affection towards daughters. Although in some instances, an indifferent attitude towards daughters is found—such as in the *Atharvaveda Samhita* and the *Aitareya Brahmana*—these few references do not confirm a derogatory view of daughters. On the contrary, in the *Bṛhadāranyaka Upanishad*, there is a desire expressed for the birth of an intelligent daughter, along with references to specific rituals dedicated to this purpose. In the Vedic period, a daughter had the right to receive education just like a son. Before beginning her education, she was also initiated through the *Upanayana Sanskar* (sacred thread ceremony), making her eligible for study. They lived in *Gurukuls*, observing the vow of *Brahmacharya*, wearing the sacred thread (*Yajnopavita*), a girdle of *Munj* grass (*Maunji*), a sacrificial belt (*Mekhala*), and garments made of bark (*Valkala*), while receiving their education. This is clearly mentioned in the *Yamasmriti*:

**“Purākalpe kumārīṇām mauñjībandhamiṣyate |  
Adhyāpanam cha vedānām sāvitṛvachanam tathā” ॥**

In the Vedic period, it was essential for both men and women to be refined through sacred rituals (*Sanskars*). Some rituals, which are now reserved only for men, were also prescribed for women during that time. Due to a liberal perspective on women's education, it was not only necessary but also mandatory for girls to undergo the *Upanayana Sanskar* (sacred thread initiation). Girls wore the *Yajnopavita* (sacred thread) and resided in *Gurukuls* to acquire knowledge. References to women wearing the *Yajnopavita* can be found in the *Rigveda Samhita*. Additionally, the *Atharvaveda Samhita* also supports

women's right to *Upanayana* and Vedic studies. In the *Atharvaveda*, there is a reference to young women who, after observing the vow of *Brahmacharya* and completing their education, find a suitable husband. Numerous references can be found in the *Samhitas* supporting women's access to higher Vedic education, such as *Bahvrichi* (a scholar of the *Rigveda*), *Kathi* (one who studied the *Katha* branch), and *Apishala* (one who studied *Apishali's* grammar). These references confirm that women had the right to pursue advanced Vedic education.

The Vedas describe a woman as *Chatushkaparda*, meaning one who possesses knowledge of the four fundamental pursuits of life—*Dharma* (righteousness), *Artha* (wealth), *Kama* (desires), and *Moksha* (liberation). It also signifies a woman's ability to understand the profound knowledge of *Yajna* (sacrificial rituals) and the process of constructing a four-cornered *Vedi* (altar). Beyond Vedic education, women were also entitled to training in warfare, *Para* and *Apara* (higher and practical) knowledge, mathematics, crafts, dance, music, and other arts. Vedic hymns mention female warriors like *Vishpala*, *Vadhimati*, and *Mudgalani*. The *Rigveda* also describes women who excelled in dance and music.

In the Vedic period, the esteemed intellectual status of women is substantiated by numerous evidences. Several *Mantra-drashta Rishikas* (female seers who composed Vedic hymns) are mentioned in Vedic literature. Just like male sages, female sages also composed *Richa* (Vedic verses), which confirms that women were not restricted from studying or creating Vedic hymns. Women in the Vedic era had complete freedom to remain *Brahmavadini* (lifelong seekers of spiritual knowledge) and lead an austere life dedicated to learning. During this time, women were classified into two categories—*Brahmavadini* and *Sadyovaha*.

- *Brahmavadini* were women who chose to pursue lifelong Vedic study and spiritual knowledge.
- *Sadyovaha* were women who were entitled to education and Vedic study during their *Brahmacharya* (celibate student life) so that after marriage, they could perform various religious rituals and fulfill their responsibilities.

*Brahmavadini* women were free to reach the highest peaks of education. Along with studying Vedic hymns, they dedicated their lives to the study of profound subjects such as *Mantra-Darshana*, *Richa Srijan* (composition of hymns), and *Mimamsa* (philosophical inquiry). The title of *Rishika* (female sage) was accessible to women, as evidenced by the

mention of *Mantra-drashta* women in Vedic texts. Some of these notable women included *Aditi, Indrani, Lopamudra, Sikata Nivavari, Juhu, Surya-Savitri, Romasha-Kakshivani, Vak-Ambrini, Shachi Paulomi, Shashwati Angirasi, Ghosha-Kakshivati, Shraddha Kamayani,* and *Maitreyi*, among others, who composed various Vedic hymns.

Highly educated women not only studied but also taught like men, holding esteemed positions such as *Adhyapika* (teacher), *Acharya* (scholar-teacher), *Upadhyaya*, and *Upadhyayi*. Thus, they enjoyed complete freedom and equal rights in the field of education. Scholars such as *Shri P.H. Prabhu* and *Shri P.C. Dharma* have also agreed with this fact based on their studies.

During the Vedic Samhita period, since women were free to study the Vedas, they were granted the same *Yajnic* (ritualistic) rights as men. In one instance, the *Atharvaveda* authorizes women to participate in Yajnas (sacrificial rituals), perform them independently, and even guide others in conducting them. Additionally, several references mention rituals performed jointly by husband and wife. The *114th Sukta* of the *10th Mandala* in the *Rigveda* also confirms a woman's inherent right to perform Yajnas.

The *Taittiriya Brahmana* explicitly states that a householder (*Grihastha*) does not have the right to perform a Yajna without his wife, as mentioned: “*ayajñiyom vā eṣaḥ yo'patnīkaḥ*”

In the absence of a wife, a *Yajna* (sacrificial ritual) was not considered complete, and the oblations offered by the husband were not accepted by the deities. Therefore, women had full rights to participate in and perform religious rituals and ceremonies. In the field of marriage, women were also empowered. The practice of child marriage did not exist. Girls were married at a mature age and were free to make their own decisions regarding marriage. The *Rigveda* states that any eligible young woman at that time had the freedom to choose a groom of her liking. The Vedas mention:

**“*brahmacaryeṇa kanyā yuvānaṃ vindate patim*”**

This means that a girl would undergo complete celibacy and education before getting married. *Shri Madhu Shastri* has also confirmed this fact based on his studies. In Kshatriya society, the practice of *Swayamvara* was prevalent, which indicates that a girl was married only after attaining maturity when she was capable of making such a crucial decision.

A close analysis of a *Rigveda* mantra reveals that at the time of marriage, the bride was fully mature and developed. In Vedic society, marriage was considered a union between two fully developed individuals.

Additionally, indications of inter-caste marriages can also be found in the Vedic period. All these instances reflect the liberal views on marriage that existed during the *Samhita* period. Indications of remarriage or widow remarriage can be found in the Vedic period. The *Rigveda Samhita* states that a widow should leave her deceased husband and accept a future husband. Similarly, the *Atharvaveda Samhita* (9.5.27-28) also mentions instances of remarriage or widow remarriage in certain contexts. Additionally, several references in the *Rigveda* (1.124.7, 4.3.2, 10.71.4) highlight the practice of monogamy (*Eka-patni-vrata*), which further reflects the empowered status of women in that era.

In the society of that time, the *Niyoga* practice was prevalent. *Niyoga* referred to a childless wife or widow being appointed to conceive a child with her brother-in-law or a predetermined man. Indications of *Niyoga* are found in several places in the *Rigveda Samhita*, reflecting a highly liberal perspective toward women. During the *Samhita* period, the oppressive practice of *Sati* was absent, and there was no custom of *pardah* (veiling or seclusion). Women moved freely without restrictions and could interact openly with others. The existence of co-education and the freedom for girls to receive higher education further confirms this, as a veil system would have hindered their access to advanced learning. At one place, it is mentioned that a newlywed bride, blessed with good fortune, was presented before all the guests for their blessings.

Women of that era actively participated in *Vidatha* (assemblies and councils) and *Samana* (festivals and fairs), where they exchanged their thoughts. The term *Samavati* was used for women, indicating their participation in public gatherings. The presence of many *Rishikas* (female sages) who, like male sages, imparted Vedic teachings also signifies the absence of the *pardah* system in the *Samhita* period. In some places in the *Atharvaveda*, references to women going to court to claim their property rights can be found. Thus, the absence of the *pardah* system in the Vedic era allowed women to progress freely and carve their own paths. In the economic sphere as well, women were prosperous and empowered. They had several property rights, including co-ownership of their husband's property. During marriage, the husband would take an oath ensuring that in financial matters, his wife's rights and interests would not be violated in any way. To ensure wom-

en's strong financial position, the system of *Stridhan* (women's wealth) was established. *Stridhan* referred to the gifts and possessions a woman received at the time of marriage, over which she had exclusive rights. This property was known as *Pāriṇāhya*, as indicated in the *Taittiriya Samhita* (6.2.1.1), which states: "***Patnī vai pāriṇāhyasya īśaḥ***", meaning "A wife has full ownership over the gifts she receives."

Thus, after deeply analyzing the status of women in the Samhita period, it becomes evident that women of that era held an exceptionally esteemed and honorable position. They lived on equal terms with men, serving as a constant source of inspiration and strength. The contemporary society highly praised women's qualities such as patience, gentleness, and grace. Women were adorned with numerous glorious epithets. They were referred to as *Amritarasadayini* (bestower of the nectar of immortality) and were described as inspiring sweet and truthful speech, as well as being endowed with wisdom and good counsel. Their significance is highlighted in the *Rigveda*, specifically in the tenth Mandala, 85th Sukta, where they are honored with the prestigious title of *Samrajñī* (Empress). The importance of women is further reinforced by the saying: "***Gṛhiṇī grhamityāhu na grhaṃ grhiṇī vinā***",

### **Conclusion:**

We saw that women's position in the early Vedic period was respectful. Women were respected in society. They were given due respect as equal to men. Sometimes we saw that the yagyas were not conducted without the better half. As we saw, She and the men received an education, participated in assemblies and debates, studied Vedas and made sacrifices with their husbands.

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## BEYOND DHARMA AND MOKṢA: THE ROLE OF PURUṢĀRTHA IN SĀṆKHYA'S ONTOLOGICAL FRAMEWORK

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### **Abstract**

This paper explores the concept of puruṣārtha—the fourfold aims of human life—in the context of Sāṅkhya philosophy, a classical dualistic system of Indian thought. While most Indian philosophical traditions integrate all four aims—dharma, artha, kāma, and mokṣa—Sāṅkhya appears to recognise mokṣa alone as the ultimate goal. Through a detailed analysis of primary texts like the *Sāṅkhyakārikā*, classical commentaries, and modern interpretations, this study investigates whether Sāṅkhya's silence on the other three puruṣārthas amounts to rejection, irrelevance, or philosophical refinement. The paper examines how Sāṅkhya's ontological framework, based on the dualism of puruṣa and prakṛti, influences its understanding of human purpose. Comparative insights from Vedānta, Yoga, and Nyāya schools provide contrast, revealing both the depth and limitations of Sāṅkhya's singular focus. The study concludes that while Sāṅkhya restricts its goal to mokṣa, it allows for a reinterpretation of dharma, artha, and kāma as preparatory or transitional stages, thus opening space for broader applicability in ethical and spiritual discourse.

**Keywords:** Sāṅkhya philosophy, Puruṣārtha, Mokṣa, Prakṛti and Puruṣa, Indian ethics

### **Introduction**

The Indian philosophical tradition has long emphasised a fourfold schema of human goals known as Puruṣārthas—Dharma (righteousness), Artha (material prosperity),

Kāma (desire or pleasure), and Mokṣa (liberation). These aims are not merely personal aspirations but culturally and spiritually sanctioned ends that guide human life. While most classical darśanas (systems of philosophy) address the puruṣārtha framework in varying degrees, Sāṅkhya philosophy, one of the oldest and most systematic schools, presents a unique metaphysical model rooted in dualism, distinguishing puruṣa (pure consciousness) from prakṛti (primordial matter). Within this framework, Mokṣa as kaivalya (isolation or liberation of puruṣa) emerges as the dominant, and in some interpretations, the sole puruṣārtha recognised. However, this singular emphasis on liberation raises critical questions about the status and relevance of Dharma, Artha, and Kāma in Sāṅkhya thought. Are these three goals entirely excluded, or are they tacitly acknowledged within the practical realm of prakṛti? Is Sāṅkhya silent on them due to its metaphysical orientation, or does it actively devalue them as distractions on the path to self-realisation?

This research seeks to explore the nuanced role of Puruṣārtha in Sāṅkhya's ontological framework, particularly focusing on how Dharma, Artha, and Kāma are conceptualised, if at all, in relation to Mokṣa. By analysing primary sources like the Sāṅkhya Kārikā and Sāṅkhya Sūtras, alongside classical commentaries and modern interpretations, the study aims to fill a significant gap in existing scholarship. The paper also compares Sāṅkhya's stance with other prominent darśanas, such as Vedānta and Yoga, to better contextualise its metaphysical priorities. Methodologically, this study follows a textual-philosophical approach, critically examining doctrinal content and its ethical implications. Through this lens, the research intends not only to clarify Sāṅkhya's position but also to re-evaluate the broader philosophical significance of puruṣārtha in Indian thought.

### **The Classical Concept of Puruṣārtha**

The term Puruṣārtha, derived from *puruṣa* (person) and *artha* (meaning, aim, or purpose), refers to the four principal goals that are traditionally upheld as guiding principles for human life in classical Indian philosophy: Dharma, Artha, Kāma, and Mokṣa. Far from being isolated objectives, these aims are deeply interwoven with the Indian understanding of human nature, ethics, social order, and ultimate liberation.

### **Dharma**

Dharma encompasses ethical conduct, duty, and moral law. It provides the foundation for a harmonious life and ensures the well-being of both the individual and society.

Dharma is often context-specific and varies according to one's stage of life (*āśrama*) and social position (*varṇa*), but its overarching goal is to maintain *ṛta* (cosmic order).

### **Artha**

Artha signifies material prosperity, wealth, and means of livelihood. It is considered essential for sustaining life and fulfilling responsibilities. While it is a worldly goal, Artha is to be pursued within the bounds of Dharma, emphasising the ethical acquisition and use of resources.

### **Kāma**

Kāma relates to desire, pleasure, and emotional fulfillment. This includes not only sensual enjoyment but also artistic expression and aesthetic appreciation. Kāma, like Artha, is legitimate only when it aligns with Dharma.

### **Mokṣa**

Mokṣa represents spiritual liberation—freedom from the cycle of birth and death (*saṃsāra*) and the dissolution of ignorance (*avidyā*). It is often considered the parama puruṣārtha (highest goal), especially in philosophical schools like Vedānta and Sāṅkhya.

### **Interrelationship and Hierarchy**

The puruṣārthas are frequently viewed hierarchically, with Mokṣa at the apex. However, classical texts also depict them as interdependent, advocating a balanced life where Dharma guides the pursuit of Artha and Kāma, and these in turn may serve as stages leading toward Mokṣa. This holistic vision allows for the fulfilment of worldly responsibilities while not losing sight of spiritual aspirations.

### **Puruṣārthas in Other Philosophical Systems**

Other darśanas address puruṣārthas with varying emphasis:

- **Vedānta** integrates all four aims but especially highlights Mokṣa through Brahma-jñāna.
- **Nyāya-Vaiśeṣika** uphold Dharma and Mokṣa, viewing liberation as cessation of pain.
- **Yoga** (as codified by Patañjali) implicitly includes Dharma and Mokṣa through ethical discipline (*yamas* and *niyamas*) and meditative practices.

In this broader philosophical landscape, Sāṅkhya's apparent silence or singular focus

on Mokṣa invites deeper investigation. The following sections will examine whether the remaining puruṣārthas find any place in its framework or whether they are considered secondary or even obstructive to liberation.

### **Core Tenets of Sāṅkhya Philosophy**

Sāṅkhya, traditionally attributed to Kapila, is one of the six orthodox (*āstika*) systems of Indian philosophy. Known for its rigorous dualistic ontology, Sāṅkhya offers a metaphysical framework in which all reality is explained through the interaction of two eternal principles—Puruṣa and Prakṛti. This system provides the philosophical foundation upon which the Yoga school also builds, though Yoga incorporates additional elements like Ishvara (God) and disciplined practice.

#### **1. Dualism: Puruṣa and Prakṛti**

At the heart of Sāṅkhya lies the ontological distinction between:

- **Puruṣa:** The pure, passive, unchanging consciousness or self. It is non-material, innumerable, eternal, and the true subject of experience.
- **Prakṛti:** The primal matter or material cause of the universe. It is active, dynamic, and composed of the three **guṇas**—**Sattva** (light/purity), **Rajas** (activity/passion), and **Tamas** (inertia/darkness).

The entire phenomenal world, including the mind and body, emerges from the evolution of prakṛti for the purpose of serving puruṣa's experiential journey and eventual liberation.

#### **2. Satkāryavāda: Theory of Causation**

Sāṅkhya upholds the principle of **satkāryavāda**, the belief that the effect pre-exists in the cause. This theory asserts that all transformations are mere manifestations of what is already latent in prakṛti. Thus, the world is not a creation ex nihilo but an unfolding of existing potential.

#### **3. The 25 Tattvas: Evolution of the Cosmos**

From prakṛti evolve 24 tattvas (principles or elements), culminating in the empirical world:

- **Mahattattva (Buddhi)** → **Ahaṅkāra (Ego)** → **Manas (Mind)**, **Jñānendriyas** (sense faculties), **Karmendriyas** (action faculties), **Tanmātras** (subtle elements), and **Mahābhūtas** (gross elements).

- The 25th tattva is **puruṣa**, which remains unaffected by these evolutions.

This ordered system is not merely metaphysical but aims to explain the human condition, especially the bondage caused by ignorance of one's true nature.

#### **4. Liberation (Kaivalya) as the Ultimate Goal**

In Sāṅkhya, Mokṣa is equated with kaivalya, meaning absolute isolation or detachment of puruṣa from prakṛti. Liberation is not the result of rituals, ethical action, or devotion, but through discriminative knowledge (viveka-khyāti) that reveals the essential difference between puruṣa and prakṛti. Once this distinction is realised, the three guṇas cease their function, and prakṛti, having fulfilled its purpose, retreats. Puruṣa, now liberated, exists in its pure, conscious state—free from all suffering and rebirth.

#### **5. Absence of Ishvara and Bhakti**

Unlike other schools such as Vedānta or Yoga, classical Sāṅkhya does not posit a personal God (Ishvara). The system is strictly rational and non-theistic, relying solely on philosophical reasoning and metaphysical clarity for liberation.

#### **Reinterpreting Puruṣārtha in Sāṅkhya**

Sāṅkhya philosophy, in its classical articulation, places mokṣa (liberation) as the parama puruṣārtha, or the highest human aim. However, its treatment—or rather, omission—of the remaining three puruṣārthas (dharma, artha, and kāma) invites critical philosophical scrutiny. Whether these aims are excluded, subsumed, or functionally reinterpreted within the Sāṅkhya framework is a matter of nuanced debate.

##### **1. Mokṣa as Central and Final**

For Sāṅkhya, liberation (kaivalya) is the sole true aim of life. Mokṣa is attained through viveka-jñāna, the discriminative knowledge between puruṣa and prakṛti. Unlike other systems that advocate dharma or bhakti as means to liberation, Sāṅkhya posits that intellectual insight alone leads to freedom. All other pursuits are ultimately linked with prakṛti and hence regarded as binding or illusory from the standpoint of puruṣa.

##### **2. Dharma, Artha, Kāma: Excluded or Preparatory?**

Sāṅkhya does not explicitly endorse dharma, artha, or kāma as valid goals of life. These pursuits fall under the domain of pravṛtti (engagement with the world), whereas Sāṅkhya advocates nivṛtti (withdrawal from worldly action). However, these goals are not outright condemned—they are implicitly acknowledged as part of the evolutionary

experience of prakṛti, which serves to eventually awaken puruṣa to its separate identity.

- **Dharma:** May be seen as useful in disciplining the mind or refining the intellect (*buddhi*), thus indirectly supporting the path to viveka.
- **Artha and Kāma:** Are considered manifestations of rajas and tamas, perpetuating bondage by fostering attachment and ego-identification (*ahaṅkāra*).

Hence, Sāṅkhya may view dharma, artha, and kāma as pragmatic or instrumental, not ultimate ends in themselves.

### 3. Are the First Three Puruṣārthas Obstacles or Stages?

In the Sāṅkhya view, artha and kāma, when pursued for their own sake, strengthen attachment, reinforcing the mistaken identity of puruṣa with prakṛti. Even dharma, if not accompanied by discriminative knowledge, may lead to *punya* (merit) and rebirth rather than liberation. However, some commentators (e.g., Vācaspati Miśra in *Tattvakaumudī*) suggest that ethical discipline and intellectual refinement, though not ends, can prepare the mind for viveka, thus indirectly supporting the attainment of mokṣa.

### 4. Sāṅkhya's Philosophical Minimalism

Sāṅkhya may be seen as philosophically minimalist, focusing strictly on epistemology and metaphysics. Its silence on social ethics, religious duties, or ritual action is not necessarily a rejection, but a prioritisation. The system is goal-specific: all efforts are to be directed towards knowledge-based liberation, and anything outside this path is considered secondary or irrelevant from the ultimate standpoint.

#### Ontological Framework and Human Purpose

To fully understand the role of puruṣārtha within Sāṅkhya, one must delve into its ontological structure, especially the process through which prakṛti evolves and influences human cognition, action, and aspiration. In Sāṅkhya, the universe and all experiences, including the pursuit of life goals, are expressions of prakṛti's dynamic interplay of the three guṇas—sattva, rajas, and tamas—under the silent witness of puruṣa.

#### 1. The Role of Buddhi and Ahaṅkāra

The evolution of prakṛti begins with mahat (*buddhi*)—the faculty of intelligence—which allows for discernment and decision-making. Buddhi is followed by ahaṅkāra (*ego*), which misidentifies the self with mental and sensory processes. It is this mistaken identity that initiates the pursuit of artha and kāma, as individuals operate under the illusion that they are the agents and enjoyers of action. This ontological misidentification explains

why artha and kāma, though natural, are ultimately delusions in the Sāṅkhya framework. The puruṣa, being pure consciousness, is not the doer or enjoyer; it merely observes. All motivations arise in buddhi, shaped by ahaṅkāra and the guṇas, not in puruṣa itself.

### **2. The Influence of Guṇas on Human Aspirations**

Each guṇa plays a unique role in shaping an individual's orientation toward puruṣārthas:

- **Sattva:** Promotes clarity, introspection, and mokṣa-seeking tendencies.
- **Rajas:** Fuels desire, ambition, and activity, thereby aligning with artha and kāma.
- **Tamas:** Generates ignorance, inertia, and attachment, perpetuating bondage.

In this schema, the three lower puruṣārthas (dharma, artha, kāma) are products of rājasic and tāmasic tendencies, whereas mokṣa is associated with sattvic refinement leading to discriminative knowledge (*viveka-khyāti*).

### **3. Ontological Evolution and the Experience of Puruṣārtha**

Sāṅkhya's theory of evolution from subtle to gross not only accounts for the external universe but also the inner experiences of the human psyche. The pursuit of dharma, artha, and kāma occurs within the domain of vyavahārika satya (empirical reality) governed by prakṛti. In contrast, mokṣa represents the transition to pāramārthika satya (ultimate truth)—the complete cessation of misidentification and suffering. Thus, from an ontological standpoint, Sāṅkhya allows for the experience of all puruṣārthas as stages in the experiential evolution of prakṛti, but only mokṣa reflects the true purpose of puruṣa.

### **4. Implications for Human Purpose**

In Sāṅkhya, human purpose is not defined by social or moral imperatives, but by the metaphysical imperative of disentangling puruṣa from prakṛti. Ethical and material pursuits are not rejected outright but are seen as illusory projections that may serve or obstruct this higher purpose depending on how they are engaged with. Sāṅkhya's ontology thus implies that true fulfilment lies not in the accumulation or regulation of worldly aims, but in the realisation of one's essential nature as pure consciousness.

### **Comparative Insights**

While Sāṅkhya philosophy clearly prioritises mokṣa as the supreme goal, other darśanas (philosophical systems) adopt more integrative approaches toward the puruṣārthas. A comparative analysis offers valuable insights into how Sāṅkhya's ontological purism both aligns with and diverges from other traditions, particularly Vedānta, Yoga, and Nyāya systems.

### 1. Vedānta: Harmonising All Four Aims

In the Vedānta tradition, especially Advaita Vedānta, mokṣa is indeed the highest puruṣārtha, yet the path to liberation often includes the performance of dharma and regulated engagement with artha and kāma. Vedānta acknowledges that worldly duties and pleasures, if pursued in accordance with dharma, do not necessarily hinder spiritual progress. Instead, they may purify the mind and prepare the individual for self-inquiry. Mokṣa in Vedānta is the realisation of the identity between ātman and brahman, attained through śravaṇa (listening), manana (reflection), and nididhyāsana (meditation).

### 2. Yoga: Ethical Structure with Sāṅkhya Ontology

Patañjali's Yoga system adopts the metaphysical dualism of Sāṅkhya but enhances it with a strong ethical foundation through the yamas (restraints) and niyamas (observances). These disciplines represent dharma-oriented practices, necessary for the stilling of the mind (*citta-vṛtti nirodha*). Yoga thus provides a more practical framework, implicitly incorporating dharma into the spiritual path, unlike classical Sāṅkhya which remains theoretically detached from moral duties.

Yoga also introduces Ishvara (God) as a special puruṣa, a notion absent in Sāṅkhya. The inclusion of bhakti (devotion) allows Yoga to appeal to a broader range of aspirants, offering multiple approaches to mokṣa while respecting the individual's karmic journey through artha and kāma.

### 3. Nyāya-Vaiśeṣika: Rational Ethics and Liberation

The Nyāya-Vaiśeṣika system is more explicit about the ethical and rational means to attain mokṣa. For Nyāya, dharma is crucial because it ensures correct action in the world, which is necessary for intellectual clarity and moral readiness. Their view of mokṣa is not metaphysical isolation but rather the cessation of suffering through the elimination of false knowledge (*mithyā-jñāna*). Artha and kāma are accepted as legitimate, but only when regulated by dharma and subservient to mokṣa.

### 4. Sāṅkhya's Silence: Rejection or Refinement?

In contrast to these schools, Sāṅkhya does not prescribe a moral or ritual code, nor does it engage with social duties or emotional devotion. This has led some scholars to interpret Sāṅkhya as philosophically austere—its focus is epistemological and ontological rather than ethical. Yet, it may be more accurate to interpret Sāṅkhya's silence not as a rejection

of the other *puruṣārthas*, but as a philosophical refinement, stripping the spiritual path of any element that does not directly serve liberative knowledge.

### **5. Commentarial Perspectives**

Later commentators like Vācaspati Mīśra and Gaudapāda attempt to bridge this gap by inferring the value of preliminary disciplines such as self-control and ethical restraint as preparatory aids to *mokṣa*. These developments suggest that even within Sāṅkhya's dualistic framework, there is room to understand the role of *dharma* as functionally significant, if not ultimate.

### **Critical Reflection**

The exploration of *puruṣārtha* within Sāṅkhya philosophy reveals both the intellectual elegance and practical limitations of its metaphysical system. By defining *mokṣa* as the sole and supreme goal of human life, Sāṅkhya offers a clear and focused vision of liberation. Yet, this uncompromising stance prompts several critical reflections on whether such a narrow definition truly encapsulates the plural dimensions of human existence.

#### **1. Strength: Philosophical Precision and Clarity**

Sāṅkhya's greatest strength lies in its ontological clarity. It identifies ignorance (*avidyā*) as the root of bondage and prescribes a singular solution: discriminative knowledge (*viveka*). This epistemological pathway avoids ritualism, dogma, and even moral relativism, making Sāṅkhya one of the most rationalist and systematised of all Indian *darśanas*. The emphasis on *mokṣa* ensures that the aspirant does not get distracted by impermanent pursuits.

#### **2. Limitation: Neglect of Social and Ethical Dimensions**

However, this strength is also its limitation. In prioritising metaphysical liberation, Sāṅkhya offers no explicit space for social ethics (*dharma*), responsible livelihood (*artha*), or aesthetic and emotional fulfilment (*kāma*). Human beings, as embodied and socially embedded entities, engage with the world at multiple levels—psychological, ethical, emotional, and relational. The absence of a structured ethical framework in Sāṅkhya raises concerns about its applicability to real-world moral dilemmas and interpersonal contexts.

While one might argue that *prakṛti*'s functions include all worldly experiences, and thus

dharmā and kāma are implicitly covered under its evolution, this remains philosophically inferred rather than explicitly affirmed. In contrast, systems like Vedānta and Yoga offer integrated pathways, respecting the layered nature of human striving.

### **3. Is Integration Possible Without Compromising Purity?**

A compelling question arises: Can Sāṅkhya's mokṣa-centric approach be expanded to incorporate the other puruṣārthas without diluting its philosophical essence? Some scholars argue that dharmā can be understood as a discipline that refines buddhi, while artha and kāma, if approached mindfully, may lead to disillusionment and detachment, thereby indirectly supporting the pursuit of mokṣa.

Such an interpretation does not undermine Sāṅkhya's ontology but rather re-contextualises it, allowing a more humanistic and complete vision of life. This view also aligns with commentarial traditions that recognise the pedagogical value of worldly experiences on the path to transcendence.

### **Conclusion**

This research has examined the nuanced positioning of puruṣārtha within the Sāṅkhya philosophical system, revealing its distinctive prioritisation of mokṣa as the highest and, arguably, the only explicitly recognised goal of life. Grounded in a dualistic ontology, Sāṅkhya explains human suffering and bondage as the result of misidentification between puruṣa (pure consciousness) and prakṛti (material nature). Liberation, or kaivalya, emerges not through ritual, ethical action, or devotion, but through discriminative knowledge that severs this mistaken identity. While dharmā, artha, and kāma are not directly addressed in classical Sāṅkhya texts, this study has argued that they are not entirely irrelevant within its framework. Rather, they exist as phenomena of prakṛti, serving either as distractions from or preparatory stages toward the attainment of mokṣa. Comparative insights from Vedānta, Yoga, and Nyāya further illustrate how other darśanas integrate the full range of puruṣārthas into a more holistic philosophical vision, whereas Sāṅkhya remains strictly liberation-focused. Critically, this raises philosophical and ethical questions about the completeness of Sāṅkhya's vision of human purpose. While its metaphysical clarity is commendable, its practical application to the moral, emotional, and social dimensions of life appears limited. Nevertheless, when read as a specialised path for the spiritually advanced, Sāṅkhya offers a profound and unambiguous trajectory toward ultimate

freedom. The role of *puruṣārtha* in Sāṅkhya may not be expansive, but it is deeply focused, offering a model of human fulfilment centred not on multiplicity of desires, but on the clarity of liberation. Future research could further explore interdisciplinary dialogues—between classical Sāṅkhya, ethics, and modern psychology—to extend its insights into contemporary philosophical and spiritual discourse.

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