

Qualitative and quantitative phytochemical analysis and in vitro antimicrobial activity of *Calycopteris floribunda* plant extract. Yogesh P. Thawari1^{*}, Ashish C. Kavale2, Kishor S. Itankar3

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ABSTRACT

In order to maintain health and to prevent, diagnose, or to treat physical and mental illness, traditional medicine plays key role. These traditional medicine practices can include plants and herbs. The current study focused on the preliminary quantitative and qualitative analysis with antimicrobial activity of various extract of different bits of wild *Calycopteries Floribunda* plants. plant parts include leaves, flowers, stem etc. *Calycopteris Floribunda* is a rich source of secondary metabolites as well as this study is also includes the investigation of antimicrobial potential of n-hexane, Methanolic, acetone and aqueous extract of given plant species. The various extract of *C. Floribunda* was tasted against pathogenic bacteria such as *E. coli* and *P. Vulgaris*. The maximum zone of inhibition was shown by the Methanolic and aqueous extract. As *Calycopteries Floribunda* is rich source of biochemical constituents and therefor to be considered as an important medicinal plant with antimicrobial property.

Keywords-Antimicrobial activity, Calycopteris Floribunda, Phytochemical analysis, Qualitative and Quantitative analysis, Secondary metabolites

1. INTRODUCTION

Our biological ecosystem composed of number of known and unknown variety of plant species includes poisonous, medicinal and non-poisonous. [1] The plant has been an important source of medicine used by man from prehistoric time for relieving, diagnosis, treatment and ailments. [2,3] Medicinal plants play vital role in disease prevention [4,5].

C. Floribunda is a climbing shrub and found in low laying tropical region forest of western ghat and rarely in the eastern ghat of India. This plant species having various name in distinct region. It is commonly known as Ukshi, kokkarai in Hindi, minnarakoti in Tamil, adivijama in Telugu. *C. Floribunda* is also grown in central and southern parts of india also in the vidharbha region of Maharashtra. Plant synthesize diverse range of bioactive molecule make them rich source of different type of medicine. Higher medicinal plant consists of rich source of natural product play a dominant role in drug development program in pharmaceutical studies. [6,7].



Methods of treatments and effect of medicinal plants on human health were known till 18th century, but the presence of bioactive molecules was unknown. [8,9]. The use of medicine was gradually expanded until today, in modern medicine, medicinal plants displaced from direct used and therefor they are used as raw material in many cases. [10]. The large area of world continues to use traditional medicine based on direct used of medicinal plant due to their low cost [11].

C. Indicum belonging to same family as *C. Floribunda*. Phytochemical study of *C. Indicum* reveals the occurrence of proteins, carbohydrate, tannins, steroids, etc. as well as quantitative analysis determined ash percentage in it. [12]. Similarly, *T. Arjuna* is one of the important medicinal plant of *combretaceae* family also exhibit bioactive molecule therefor it makes this plant as potential medicinal species. [13,14]. *Terminalia Catappa* is native to southern Asia which used traditionally by villagers due to its strong antimicrobial activity against *P. aeruginosa*, *P. testosterone*, *P. Vulgaris*, etc. The further investigation also indicates its wound healing and antidiabetic activity [15].

There are several species are found in combretacea family, most of the species exhibit numerous secondary metabolites and shows antimicrobial properties against pathogenic bacteria. [16,17] Among these species C.Floribunda is unrevealed species in combretacea family. The current research investigation is based on C. Floribunda, that reveals the presence of natural product present in it with the help of various solvent extract as well as its antimicrobial activity.

2.MATERIAL AND METHOD

2.1. COLLECTION OF PLANT

Healthy and disease free various segments of C. *Floribunda* were collected from forest region of Bramhapuri taluka dist. Chandrapur and the identification of collected species were doing through professors of department of botany N.H. college Bramhapuri. The accumulated plants bits i.e. leave, flowers and stem was thoroughly washed 2 to 3 times with deionized water and kept in shaded area for drying purpose at room temperature for 10 to 15 days.

2.1. PREPARATION OF LEAVE, FLOWER AND STEM EXTRACT

Different solvent like n-hexane, acetone, chloroform, methanol, and water used for extract preparation. Dried plant segments were separately pulverized into medium fine powder using grinder. 10 to 15 g powder of each segments of selected plant were taken in different thimbles made up of filter paper and was put into soxhlet extractor. All material was extracted using soxhlet extraction apparatus for approximately 10 to 12 hours using following solvents.[18,19,20]

- i. n-hexane 10 to 12 hrs. (leaves, flowers and stem)
- ii. Acetone 6 to 8 hours (leaves, flowers and stem).

iii. Chloroform - 10 to 12 hours. (leaves, flowers and stem).

- iv. Methanol 10 to 12 hours. (leaves, flowers and stem).
- v. Water 10 to 12 hours. (leaves, flowers and stem).

Leaf, flower and stem extract in different solvent appears different colour as shown in fig.1.

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leave extract flower extract stem extract

Fig. 1: Different solvent extract of leaf, flower and stem

3.PRELIMINARY PHYTOCHEMICAL SCREENING:

3.1. QUALITATIVE ANALYSIS

In order to perform qualitative analysis, miniature portion of extract was used for phytochemical test which shows the presence of anthocyanin, Saponins, carbohydrates, terpenoids, proteins, flavonoids, in various extract. The test of presence of these bioactive molecule was done by method given by Rahul S. Patil et.at. [2015] [21]. The result analysis of above study is given in the table no 1. **Table no 1**: Observation table of phytochemical test showing presence of secondary metabolites in *C*.

<i>Floribunda</i> p	lant extract
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Solvent Extract	Phytochemical	Leaf	Flower	Stem
	Constituent			
	Flavonoid	+	+	-
	Tannin	+	-	-
	Carotenoid	+	+	-
	Saponins	+	+	+
n-hexane Extract	Alkaloid	+	-	+
	Cardiac glycoside	+	-	-
	Protein	+	-	-
	Fatty acid	+	-	-
	Volatile oil	+	+	+
	terpenoids	-	+	+
	Tannin	+	+	-
	Carotenoid	+	+	+
	Saponins	-	+	+
	Alkaloid	-	+	+
	Cardiac glycoside	+	-	-

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Acetone Extract	Protein		-	+
Accione Extract			-	1
	Fatty acid	+	-	-
	Volatile oil	+	+	+
	terpenoids	+	+	+
	Flavonoid	-	+	-
	Saponins	-	+	-
	Alkaloid	+	+	+
	Cardiac glycoside	+	+	-
Methanol Extract	Volatile oil	+	+	+
	terpenoids	+	+	+
	Phenolic	-	+	+
	Flavonoid	+	-	-
	Carotenoid	+	-	+
Chloroform Extract	Saponins	+	-	+
	Alkaloid	+	+	+
	Volatile oil	+	+	+
	terpenoids	+	-	+
	Flavonoid	+	+	+
	Tannin	+	+	+
	Carotenoid	+	+	-
	Saponins	+	+	+
Water Extract	Alkaloid	+	+	+
	Cardiac glycoside	+	-	-
	Phenolic	+	-	+
	terpenoids	+	+	-

3.2 QUANTITATIVE ESTIMATION

3.2.1 ALKALOIDS: -

Alkaloids estimation was performed by taking 1gram of plant material was weighed into 250ml beaker and 40ml of 10% acetic acid in ethanol was added and covered and allowed to stand for 4 hours. This was filtered and the extract was concentrated on water bath to one quarter of the original volume. Concentrated ammonium hydroxide was added drop wise to the extract until the precipitation was complete. The whole solution was allowed to settle and the precipitate was collected and washed with dilute ammonium hydroxide and then filtered. The residue is the alkaloid, As shown in fig.2. Which

was transferred into a pre-weighed beaker and weight the alkaloid present in material. And it was found that 1 gm of leaf contained 0.013 g of alkaloids.



Leaves Flower Stem

Fig.2 :The quantitative estimation of alkaloid observes green solid precipitate.

3.2.2FLAVONOIDS: -

1 gm of leaf powder was taken in a soxhlet extractor and the compounds were extracted with methanol for 48 hrs. till it becomes colourless. The Methanolic extract was concentrated and filtered. 5-10 ml of water was added to the filtrate and lead acetate was added in the solution. The flavonoids get precipitate as lead phenolate. The precipitate was taken and suspended in ethyl alcohol. Through this alcohol filtrate, H₂S was passed for 5-10 minutes. The lead Sulphide gets precipitate out as black solid as shown in fig.3. The solution was filtered through filter paper and filtrate was concentrated in after transferring into a pre-weighed beaker. The beaker and its constituents were dried and the increase in weight was noted. After weighing the amount of flavonoid contained found to be 0.0203 g.



LeaveFlowerStemFig 3: The quantitative estimation of flavonoid observes black solid precipitate

4. ANTIMICROBIAL ACTIVITY OF PLANT EXTRACT

Along with phytochemical study the aim of the current study was also focused on antimicrobial activity of *C*. *Floribunda* plant bits' extract. Antimicrobial activity of n-hexane. acetone, methanol, chloroform and water extract of leave, flower and stem of *C. floribunda* were determining by using well diffusion method against gram negative bacteria i.e. *E. coli* and *P. Vulgaris*.

Antimicrobial test was carried out by using nutrient broth and Muller-Hinton agar media. Nutrient broth was prepared using method given by P. Poovendram et.al. [2011] [22] spread on Petri plates, after solidify

bacterial culture was spread by using spread plate techniques. The agar was carefully punched using cork-borer of 5 mm in diameter. 0.5 ml of prepared extract was dispensed into the well of agar using micropipette. The positive antibacterial activity was established by the presence of assessable zone of inhibition after the 24 hours of incubation at 36 °C temperature.

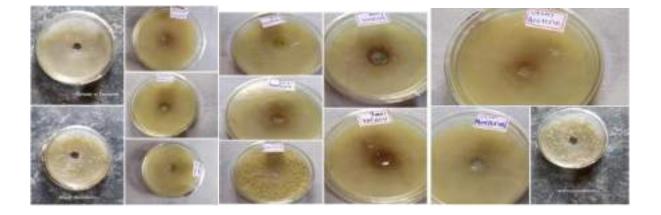


Fig. 4. Antibacterial activity against *P. Vulgaris* of n-hexane, chloroform, methanol, acetone and water extracts of *C. Floribunda* plant extract.

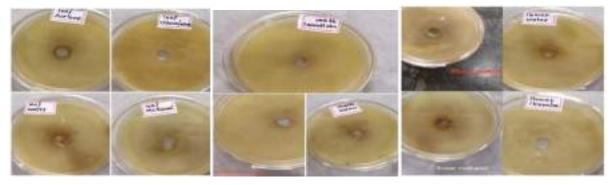


Fig. 5. Antibacterial activity against *E. coli* of n-hexane, chloroform, methanol, acetone and water extracts of *C. Floribunda* plant extract.

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Solvent extract	Plant section	Zone of in	hibition
		(indian	neter)
		E.coli	P.Vulgaris
n-Hexane	Leaf	-	0.5 mm
	Flower	-	-
	Stem	-	-
Methanol	Leaf	1.5cm	1.6 cm
	Flower	1.3 cm	1.2 cm
	Stem	0.2 cm	1 cm
Acetone	Leaf	0.5 mm	0.7 mm
	Flower	0.6 mm	0.9 mm
	Stem	0.8 mm	0.1 mm
Chloroform	Leaf	-	1 cm
	Flower	-	-
	Stem	-	-
Water	Leaf	0.6 mm	1.5 cm
	Flower	0.3 mm	0.7 mm
	Stem	0.2 mm	-

 Table no 2: Observation table indicates zone of inhibition by various solvent plant extract against gram negative bacteria. [(-) – Show no zone of inhibition].

Antimicrobial activity of each extract against given gram negative microorganism was detected by calculating their zone of inhibition in mm and cm. The obtained analysis shows that n-hexane extract of leaf, flower, and stem does not show any activity against *E. Coli*, while n-hexane extract of leaf show little inhibition of 0.5mm diameter against *P. Vulgaris*. as well as chloroform extract leaf also gives the zone of inhibition against the same microorganism.

Concerning solvent of extraction, it was observed that Methanolic, acetone, and aqueous extract had the maximum significant antimicrobial activity and while of chloroform and n-hexane extract had least antimicrobial property against *E. coli* and *P.Vulgaris*.

5. CONCLUSION

Result of phytochemical test of different extract of *C. Floribunda* plant were summarized in table no. 1. In natural product screening n-hexane extract of leaf, flower, and stem yielded flavonoids, tannins, carotenoids, Saponins, alkaloids, proteins, terpenoids etc. During the analysis of Methanolic extract and aqueous extract detect flavonoids, volatile oil, cardiac glycosides, phenolic compound, tannin, terpenoids, Saponin in all sections



of *C. Floribunda*, moreover detection of acetone and chloroform extract shows least results compared to other. The presence of such active ingredients makes *C. Floribunda* as one of the essential medicinal species in *combretaceae* family. This plant was observed to be rich source of alkaloids and flavonoids as major component in quantitative analysis. 0.013 g and 0.0203 g of alkaloids and flavonoids was extracted from 1 g leaf extract using quantitative analysis.

The scientist in recent year has made attempt to reveal the effectiveness of better known plant having certain medicinal value, mainly to determine their antibacterial phenomenon against different pathogenic microbes [23]. The objectives of current study focused on phytochemical evaluation for presence of natural product and antimicrobial activity of given plant and has disclose the capability higher plant look as new anti-epidemic agent as serving drug discovered from natural product. The study prefers *E. Coli* and *P. Vulgaris* a gram negative microbes for its antimicrobial activity were used against n-hexane, acetone, Methanolic, chloroform and aqueous extract. The inhibitory action was observed in terms of inhibition zone. the antimicrobial activity was maximum of Methanolic and acetone extract as they show highest zone of inhibition while that of others extract i.e. n-hexane and chloroform show minimum activity. Amongs this aqueous extract of *Calycopteris Floribunda* shows moderate activity against given microorganism.

Now a day'speoples irrespective of the region are in search of the herbal are to avoid the obnoxious effect of the commonly available treatment modalities. *Calycopteries floribunda* is one of the unexplored plant with various phytochemical constituents and antimicrobial potential so as to derived novel antimicrobial agents for the treatment of various infection for developing new medicine.

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REFERENCES:

[1]Tesfahuneygn, Gebrehiwet & Gebreegziabher, GebremichaelMedicinal Plants Used in Traditional Medicine by Ethiopians: *A Review Article*.(2019). *2 (4)*;18-21.

[2]Harney N.V. Ethnomedicinal Plants Diversity of Bhadrawati Tahsil of Chandrapur District, Maharashtra, India. (2013).*3(8)*.

[3]Salmerón-Manzano E, Garrido-Cardenas JA, Manzano-Agugliaro F. Worldwide Research Trends on Medicinal Plants. *Int J Environ Res Public Health*.(2020) .12;17(10):3376.

[4]Sofowora A, Ogunbodede E, Onayade A. Aug The role and place of medicinal plants in the strategies for disease prevention. *Afr J Tradit Complement Altern Med*.(2013) *12;10(5)*:210-29.

[5]KC, Kiran & Dhanush, C. & C V, Gajendra & Reddy B, Madhusudhana. Diversity and Seasonal Availability of Potential Wild Edible Plants from Vidarbha Region of Maharashtra State, India. *International Journal of Current Microbiology and Applied Sciences*. (2019).8. 1434-1446.



[6]D.A. Dhale1 and S.K. Markandeya. Antimicrobial and Phytochemical Screening of Plumbago zeylanica Linn. (Plumbaginaceae) Leaf. *Journal of Experimental Sciences*. (2011).2 (3) Pages 04-06.

[7]Om, Ahmad & Azizan, Azlan & Baharum, Syarul. Phytochemical Screening of Ubi Gadong (Dioscorea hispida) by using GC-MS.(2016).

[8] Aiyegoro, O.A., Okoh, A.I. Preliminary phytochemical screening and *In vitro* antioxidant activities of the aqueous extract of *Helichrysum longifolium* DC. *BMC Complement Altern Med.* (2010) *.10, 21.*

[9]Najafi, Shahla & Sanadgol, Nima & Sadeghi-Nejad, Batool & Beiragi, Maryam & Sanadgol, Ehsan. Phytochemical screening and antibacterial activity of Citrullus colocynthis (Linn.) Schrad against Staphylococcus aureus. *Journal of Medicinal Plants*. (2010).4. 2321-2325.

[10]Khatun, Shahanaz & Pervin, Farzana & Karim, Md. Rezaul & Ashraduzzaman, Mohammad & Rosma, Ahmad. Phytochemical screening and antimicrobial activity of Coccinia cordifolia L. plant. *Pakistan journal of pharmaceutical sciences*.(2012). *25*. 757-61.

[11] Eman Abdullah M. Ali. Antimicrobial activity, cytotoxicity and phytochemicals screenings of Epipremnum aureum (Linden and Andre) G. S. Bunting extracts. *Egypt. J. Exp. Biol. (Bot.)*.(2018).14(2): 219-255.

[12] Jyothi Jose , Subrahmanya P , Ravi Rao S . pharmacognostical and phytochemical study on leaf of combretum indicum (1.). *Jyothi Jose et al / Int. J. Res. Ayurveda Pharm.*(2021). *12 (5)*.

[13] N.Tensingh Baliah, and A. Astalakshmi. Phytochemical analysis and antibacterial activity of extracts from Terminalia chebulaRetz. *Int.J.Curr.Microbiol.App.Sci.*(2014). 3(3): 992-999.

[14] Devi, P. & Kaleeswari, S. & Mani, Poonkothai. Antimicrobial activity and phytochemical analysis of fruit extracts of Terminalia Bellerica. *International Journal of Pharmacy and Pharmaceutical Sciences*. (2014).6.
639-642.

[15] Anand, Vijay. An updated review of Terminalia catappa. *Pharmacognosy Reviews*.(2015).9. 93-8.
[16] Vemuri P. K, Dronavalli L, Nayakudugari P, Kunta A, Challagulla R. Phytochemical Analysis and Biochemical Characterization of Terminalia Chebula Extracts for Its Medicinal Use. *Biomed Pharmacol J*;(2019).2(3).

[17] Yahaya, O. & Yabefa, J.A. & Usman, Bukar. Phytochemical Screening and Antibacterial Activity of Combretum glutinosum Extract against Some Human Pathogens. *British Journal of Pharmacology and Toxicology*.(2012). *3*. 233-236.

[18] Mr. Akshay G. Deshmukh, Dr. S. P. Rothe. Phytochemical Analysis of Cissus RepandaVahl: an Uncommon Medicinal Plan. *International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)*.(2017).02 (01).

[19] Singh, Manju & Kumari, Rajesh & Nandini, Durgesh & Kotecha, Mita. Preliminary phytochemical screening of Basella rubra Linn. *Journal of Pharmacognosy and Phytochemistry*.(2016). *224*. 224-226.
[20] Khatua, Souti & Pandey, Akhil & Biswas, Surjyo & Surjyo, Correspondence & Biswas, Jyoti.
Phytochemical evaluation and antimicrobial properties of Trichosanthes dioica root extract.(2016). *410*. 410-413.



[21] Patil, Rahul & Harale, Pooja & Shivangekar, Kiran & Kumbhar, Pooja & Desai, Ranjeet. Phytochemical potential and in vitro antimicrobial activity of Piper betle Linn. leaf extracts. *Journal of Chemical and Pharmaceutical Research*.(2015).7. 1095-1101.

[22] Mandal S, Patra A, Samanta A, Roy S, Mandal A, Mahapatra TD, Pradhan S, Das K, Nandi DK. Analysis of phytochemical profile of Terminalia arjuna bark extract with antioxidative and antimicrobial properties. *Asian Pac J Trop Biomed*.(2013).*3*(*12*):960-6.

[23] Sathish, Sahaya & Vijayakanth, Periyasamy & Palani, Ar & T, Thamizharasi & Vimala, A.. Antimicrobial And phytochemical screening of Tragia Involucrata L. using UV-VIS and FTIR. (2013).*1(1)*.

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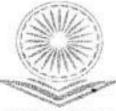


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भंडारा जिल्ह्यातील प्रमुख कृषी पिकांचे अभिक्षेत्रिय विश्लेषण : एक भौगोलिक अभ्यास

प्रा. डॉ. के. वाय. ठाकरे

भूगोल विभाग प्रमुख, यशवंतराव चव्हाण कला, वाणिज्य व विज्ञान महाविद्यालय, लाखांदूर. प्रा. डॉ. गणेश एल. घोटे

सहा, प्राध्यापक, भूगोल विभाग, यशवंतराव चक्राण कला, वाणिज्य व विज्ञान महाविद्यालय, लाखांदूर.

सारांश

जिल्हयातील हवामान मान्सून प्रकारचे असून पावसाळा दमट आढळता. या हवामान प्रकारात पावसाचे प्रमाण भरपूर असल्यामुळे सर्वत्र तांदूळ या पिकांची लागवड केली जाते. याशिवाय रब्बी हंगामात गहू, तांदूळ, उळीद, मुंग, तूळ, तेलंबिया व इतर पिके यांचे उत्पादन चेतले जाते, उन्हाळी हंगामात सर्वत्र तांदूळ हे पिक घेतले जाते. एकंदरीत जिल्हयातील हवामान तांदूळ पिकांकरिता अनुकूल असल्यामूळे तुमसर, मोहाडी, भंडारा, लाखनी, साकोली, पवनी व लाखांदूर या तालूक्यात तांदूळ हे प्रमुख पिक चेतले जाते. तांदूळ पिकांचे सर्वाधिक उत्पादन व क्षेत्र मोहाडी तालूक्यात तर कमी लागवड क्षेत्र साकोली तालूक्यात दिसून येते. याशिवाय ऊस, मिरची, वटाना, सोयाबिन, कापूस, कुळीय, बरबटी व भाजीपाला यासारखे पिक जिल्हयात चेतली जातात.

बीज संज्ञा :- कृषी उत्पादने, जलसिंचन, उदर्रानवौह शेती, व उत्पादकता, आधुनिक तंत्रज्ञान

प्रस्तावना

कृषी हा भारतातील प्रमुख व्यवसायापैकी एक असून यातून मानवाच्या मूलभूत गरजांची पूर्तता केली जाते. म्हणून शेती व्यवसायाला मानवी जिवनाचा मुलभूत आधार मानले जाते. शेती विकासावर अनेक घटकांचा प्रभाव पडत असून यात भौगोलिक, सामाजिक व आर्थिक हे घटक प्रमुख आहे. यावरच शेतीचा विकास अवलंबून असतो. याशिवाय शेतीखालील प्रदेश व मातीची सुपिकता या गोष्टीचा त्या प्रदेशातील पिक प्रारूपावर विशेष प्रभाव पडत असतो.

भारतासारख्या देशांत ६५% लोक शेती व शेतीवरील उदयोग धंदयात अवलंबून आहेत. व राष्ट्रीय उत्पन्नापैकी २२ ते २६% इतके उत्पन्न हे शेती व्यवसायातून प्राप्त होते. म्हणून शेतीला भारतीय अर्थव्यवस्थेचा कणा संबोधले जाते. असे असले तरी पिकांच्या बाबतीत प्रदेशानुसार भिन्नता दिसून येते. म्हणजेच कृषी पिकांवर तापमान, पर्जन्य, आईता, मृदा ई. नैसींगंक, आर्थिक यासारख्या घटकांचा प्रभाव पडतो. याचाच परिरणाम म्हणून भंडारा जिल्हयात सुध्दा विभागानूसार कृषी पिकाच्या बाबतीत अभिक्षेत्रिय विविधता आढळून येते.

उद्देश : भंडारा जिल्हयातील प्रमुख कृषी पिकांचे अभिक्षेत्रिय दृष्टीकोनातून भौगोलिक अध्ययन करणे हा या अभ्यासाचा मुख्य उद्देश आहे.

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परिकल्पना : भंडारा जिल्हयात जलसिंचनाच्या बन्याच सोयी आहेत त्यामुळे कृषी पिकांत विविधता दिसून येते. यात खरीप व रब्बी हंगामात हवामानानुसार वेगवेगळी पिके घेतली जातात. असे असले तरी मुख्य पिक म्हणून भात हे या शेतीतील प्रमुख पिक आहे. भात पिक जिल्हयात खरीप व उन्हाळी हंगामात मोठ्या प्रमाणात घेतले जाते.

अभ्यास पध्दती

प्रस्तूत रिसर्च पेपेर मध्ये वापरण्यात येणारी सांख्यिकीय आकडेवारी ही दुय्यम स्वरूपाची असून ती आर्थिक व सामाजिक समालोचन कार्यालय, जनगणनापुस्तीका व शासनाचे प्रकाशित मासिक व वर्तमान पत्रे यातून मिळविलेली आहे. म्हणजेथ यात दुय्यम आकडेवारीचा वापर करून अथूक विश्लंषणाकरोता तिचा यापर करण्यात आलेला आहे.

अभ्यास प्रदेश

महाराष्ट्र राज्याच्या पूर्वेस भंडारा जिल्हा असून १ मे १९९९ ला भंडारा जिल्हयाचे विभाजन होऊन गोंदिया जिल्हयाची निर्मिती झाली, भंडारा जिल्हयाचा बहुतांश भाग वैनगंगा नदी खोज्यात असून अंशाक्षिय विस्तार २०[°]३९ मिनिटे उत्तर ते २१[°]३८ मिनिटे उत्तर अक्षांश, तर रेखावृत्तीय विस्तार ७९[°]२१ मिनिटे ८०[°]४२ मिनिटे पूर्व रेखांश इतका आहे. जिल्हयात भंडारा, मोहाडी, तूमसर, साकोली, लाखनी, पवनी व लाखांदूर अशी ७ तालूके आहेत. जिल्हयाचे एकूण क्षेत्रफळ ३७१७ चौ. किमी इतके क्षेत्र व्यापलेला असून राज्याचा १.२१% इतके आहे.

(नकाशा क.१)

जिल्हयातील घुपृष्ठ रचनेचा विधार केल्यास जिल्हयाचे प्राकृतिक रचनेनूसार दोन भाग पडतात.

- १, उत्तरेकडील डोंगराळ प्रदेश
- २. वैनगंगेचा मैदानी प्रदेश

जिल्हयाच्या उत्तरेकडील भागात सातपूडा पर्वतरांगा असून तो उंचवटयाचा व डॉगराळ भाग आहे. यात आंबागडचे डॉगर प्रमुख आहे. याशिवाय चांदपूर, गायमुख या इत्तरही टेकडया आहेत. यात तुमसर व मोहाडी तालूक्याच्या काही भागाचा समावेश होतो. साकोली तालूक्यात गायखुरी टेकडया, भंडारा तालूक्यात भिमसेन टेकडया, तर मोहाडी तालूक्यात कोका टेकडया व गायखुरी डॉगराच्या रांगा पसरलेल्या आहेत.

यंनगंगा मैदानी प्रदेशात वाळू मिश्रित व काळी खोल, चिकट व आईता टिकवून ठेवणारी मृदा असून पिकांस अतिशय उपयुक्त आहे. याशिवाय याच भागात खरडी व बरडी मृदा आडळते. लाखांदूर व पथनी तालूक्यात ''चौरास'' प्रदेश आडळतो. यातील मृदा, काळी, सुपिक, व भरपुर भूजलसाठा असलेली आहे ही शेती करीता अत्यंत उपयुक्त आहे. या भागात वर्षातून तीन पिके घेतली जातात.

जिल्हयातील सर्यांत मोटी नदी वैनगंगा असून ती जिल्हयाच्या तूमसर, मोहाडी, पवनी, लाखांदूर, भंडारा या तालुक्यातून वाहते. या नदीला वाघ, पागोडी, सुर, गाढवी, चंदन, बावनथडी व चुलबंद अशा अनेक लहान मोठया नदया येवून मिळतात. भंडारा जिल्हयात वैनगंगा नदीची एकूण लांबी २००km असून पवनी तालुक्यात गोसेखुद गावाजवळ इोंदरासागर धरणाची निमिती करण्यात आलेली आहे. याचा फायदा जिल्हयात पाणीपुरवठा, जलसिचन व विदयूत निर्मिती करीता होतो.

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शेती पिक उत्पदनाकरीता मृदेला अत्यंत महत्व आहे. या घटकावरच शेतीचा विकास अवलंबून असतो. भंडारा जिल्हयात रेगूर, पिवळसर, गाळाची मृदा आढळते. पचनी तालुक्यात ८५% काळी मृदा, १५% पिवळसर मृदा, लाखांदुर तालुक्यात २०% गाळाची मृदा व ७०% काळीमृदा, १०% पिवळसर मृदा, भंडारा तालुक्यात ३०% गाळाची मृदा, तर लाखनी, साकोली, तूमसर, मोहाडी या तालूक्यात पिवळसर मृदा आढळते. या मृदेत प्रामुख्याने तांदूळाचे उत्पादन मोठया प्रमाणात घेतले जाते.

जिल्हयात मान्सून प्रकारचे हवामान आढळते. येथे उन्हाळे उष्ण (मे व जून) तर हिवाळा थंड (डिसेंबर ते जानेयारी) आढळतात. पाऊस साधारणत: जून ते सप्तेंबर या महिण्यात ८०% इतका पडतो म्हणजेच जिल्हयाचे हवामान विषम प्रकारचे असून उन्हाळे उष्ण व हिवाळे सौम्य व कोरडे आढळतात. जिल्हयात सरासरी १०५० मिली. इतका पाऊस पडतो हे पायसाचे प्रमाण भात पिकांकरीता अनुकूल आहे.

अभ्यास विषय

शेतीला जलसिंचनाची खुप गरज आहे. कारण शेती मधून योग्य ते उत्पादन घेण्याकरीता योग्य जलसिंचनाची आवश्यकता भासते. म्हणूनच जलसिंचन हा शेतीचा महत्वाचा घटक समजला जातो. यावरच शेती पिकांची उत्पादकता अवलंबून असते. जिल्हयात मान्सून कालार्वाधत ८०% पर्जन्य पडत असल्यामुळे कोरडया ऋतूत शेतीला विविध स्त्रोताद्वारे सिंचन केले जाते. जिल्हयात जलसिंचनाचे स्त्रोत पुढील प्रमाणे आहेत.

सिचनाचे	रवोत	संख्या	
कुपर्ना	लका / विहीरी	38,840	
- ¹⁰ - 5	ে নলাৰ	११६९	
	ਸੀਰੇ	02	
प्रकल्प (मध्यम	04	
10000101	लधुसिंचन	203	
	कोळबंधारे	808	
	उपसासिचन	04	

सारणी क्र. १

भंडारा जिल्हयातील सिंचनाचे स्त्रोत

स्त्रोत : भेंडारा सामाजिक व आर्थिक संब्हेक्षण, अहवाल २०२१

महाराष्ट्रात सर्वाधिक ओलित होतो. क्षमता असलेला जिल्हा म्हणून भंडारा अग्रेसर आहे. जिल्हयात विहोरो/कृपर्नालका, तलाव, प्रकल्प व उपसा सिंचनाद्वारे २,४५,२१९.१७ हेक्टर आर. निव्वळ लागवडी क्षेत्रापैकी १,२१,००४,२८ हे. आर. क्षेत्राला सिंचिन केले जाते.

जिल्हयात कुपर्नालका/विहीरीची संख्या ३१,९९० (२०२१ नुसार), गांव तलाव ११६९, मोठे प्रकल्प ०२, मध्यम प्रकल्प ०५, लर्घुसिंचन प्रकल्प २०३, कोळ बंधारे १७९, उपसा सिंचन ०५, असून याद्वारे निव्वळ लागवड क्षेत्रापैकी ६६.३९% क्षेत्राला सिंचिन केले जाते. भंडारा जिल्हयात तलावांची संख्या जास्त असल्यामुळे, तलावाचा जिल्हा म्हणून भंडारा जिल्हयाला ओळखल्या जाते. तर जिल्हयात भंडारा, पवनी, लाखनी, लाखांदुर व साकोली तालूक्यात विहीरीची संख्या जास्त आहे. जिल्हयात गोसेखुर्द येथे, इंदिरा सागर प्रकल्प, इंटियाडोह प्रकल्प, बघेडा, सोरणा, चांदपूर, चोरखमारा, बोदलकसा, भानागड, संग्रामपूर, चुलबंद, खैरबांधा, बेटेपार, रंगेपार इ. मोठे व मध्यम, लघू प्रकल्प आहेत. सिंचनामुळेच जिल्हयात दुबार ते तिबार पिके घेणे शक्य झालेले आहे.

सारणी क्र. २

भंडारा जिल्हयातील जलसिंचनाची साधने व सिंचित क्षेत्र (२०२१ नुसार)

एकूण	8.26008.59	200.00%
तलाय मोटे, मध्यम व लघु उपसा सिंचन प्रकल्प	66366,68	48.84%
कुपनलिका/विहीरी	48638.68	84.84%
जलसिंचनाचे स्त्रोत	सिंचित क्षेत्र हे.आर	टक्केवारी

स्त्रोत : भंडारा जिल्हा सामाजिक व आधिक समालोचन पुस्तिका -२०२१

जिल्हयात विहीरी हारे ५४६३४.६४ हे.आर. क्षेत्रास म्हणजेच ४५.१५% क्षेत्रास, तर तलाव, प्रकल्प व सिंचन प्रकल्प याहारे ६६३६९.६४ हे. आर. क्षेत्र म्हणजेच ५४.८५% क्षेत्रास जलसिंचन केले जाते. अशाप्रकारे एकूण १,२१,००४.२८ हे. आर. क्षेत्रास जलसिंचन होते.

सारणी क्र. ३

भंडारा जिल्हयातील प्रमुख पिकांखालील क्षेत्र

सन-२०२१ (क्षेत्र हेक्टर मध्ये)

		विविध पिके								
अ,क्र	नालूके	खादयानं पिर	5	कडधान्य	कडधान्य दाळी					एकूण क्षेत्र
5		नांदूळ	गह	हरभरा	तूर	उळीद	मूंग	त्तेलविवा	इतर पिके	
8	तुमसर	38355.0	१ ६७०,००	650.00	883.00	88.00	२७ ६,००	₹८७.० 0	8497.84	३७०४४.७ ५
\$	मोहाडी	३४७५७.० ६	383250	1393.00	१०६४.० ५	200,20	રહ્ય શ્વ	१३७,६०	3886.00	**509.7 3
9	भंडारा	78846.00	३२४७.४ ८	१७२४.४ ०	१६३.२७	निरंक	११७.६०	90.64	2648.86	३२८५२.७ ८
z	साकोल १	82348.20	530.98	420.73	ધ્વરૂ.૪૧	निरंक	निरंक	836.00	ૡ હર.રૂ૪	70683.80
4	लाखनी	7034X,40	£ 89.44	430.84	55.090	१२७.६ ५	809.89	23.95	શ્લહ ય, દ્	२४२२८.५ ३
5	पचना	28265 24	3054.02	2982.34	05.9839	220.84	449.84	8.30	8842.00	83636.24

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U	स्नाखादू र	20002.59	1163.00	१४५५.७ ५	९३६ ५८	82504	२२९०५	6.53	5409.92	88628.43
एक्ट्रण	क्षंत्र	164886.0	१३८२७.३	९४२३१	44884	२४२९ ४	3570.6	684.9	53000 X	284288.8
		ø	4	6	6	9	٩	4	\$	3
टकके	वारी	45.03%	4.53%	3.68%	2.59%	0,99%	880%	0.38%	6.83%	800.00%

स्त्रोत : भंडारा जिल्हा सामाजिक व आधिक समालोचन अहवाल - २०२१

भंडारा जिल्हयातील प्रमुख पिकांखालील क्षेत्र

- १. तांदूळ : भंडारा जिल्हयांचे एकूण भौगोलिक क्षेत्र ४०८७००,०० हे. आर. एवढे आहे. लागवडी लायक क्षेत्र ३०००५८.४४ हे. आर. असून यांपैकी २,४५.२१९.१७ हे. आर. क्षेत्र लागवडी खाली आहे. जिल्हयात तांदूळ या पिकांचे उत्पादन खरीप व उन्हाळी हंगामात घेतले जाते. जिल्हयातील हवामान. मृदा, जलसिचंन इ. अनुकुलतेमुळे तांदूळ पिकांचे उत्पादन सर्वाधिक क्षेत्रावर घेतले जात असून १,८६,४४८.०० हे.आर. एवढे आहे. तांदूळाचे उत्पादन सातही तालूक्यात प्रामुख्याने घेतले जात असून तांदूळ हेच प्रमुख पिक आहे. एकूण लागवड क्षेत्रांपैकी ७६.०३% भागात तांदूळाचे उत्पादन होते. जिल्हयात सर्वात जास्त तांदूळाचे क्षेत्र मोहाडी तालुक्यात ३४७५७.०६ हे. आर. तर सर्वात कमी क्षेत्र साकोली तालुक्यात १८३६४.८० हे.आर. इतके आहे.
- २. गहू पिक: जिल्हयात राहू पिकांखालील क्षेत्र १३८२७,३५ हे. आर. असून ५.६३% इतके क्षेत्रावर गव्हाचे पिक घेतले जाते. हे पिक रब्बी हंगामात घेतले जाते. या पिकांचे सर्वाधिक क्षेत्र मोहाडी तालूक्यात ३४३१.६० हे. आर. असून सर्वात कमी क्षेत्र लाखनी तालूक्यात ६१९.५५ हे. आर. एवडे आहे. गह पिकांचे उत्पादन जिल्हयातील सर्वच तालक्यातून कमी अधिक प्रमाणात होतांना दिसून येते.
- ३. कडधान्ये (दाळी पिके) : जिल्हयात हरभरा, तूर, उळीद, व मूंग इ. कडधान्य पिके घेतली जातात. या पिकांची एकृण २१०३०.१० हे. आर. क्षेत्रावर लागवड केली जाते. याचे प्रमाण ८.५५% एवढे आहे. यात हरभरा ९४२३.१८ हे. आर. तूर ५५४९.५८, उळीद २४२९.४५, मूंग ३६२७.८९ हे. आर. क्षेत्रावर घेतले जाते.
- 8. तेलबिया (भूईमुंग, जबळ, तीळ) : या पिकांचे जिल्हयात ८४५.९५ हे. आर. म्हणजेच ०.३४% क्षेत्रावर लागवड केली जाते. व हे पिक सर्वच तालुक्यात कमी अधिक प्रमाणात घेतले जाते.
- ५. इतर पिके : भंडारा जिल्हयांमध्ये इतर पिकांखालील क्षेत्र २३०७७.४२ हे. आर. असून याचे प्रमाण ९.४३% एवढे आहे. लाखांदूर तालूक्यात इतर पिकांचे क्षेत्र सर्वाधिक ६५०९.२८ हे. आर. असून सर्वात कमी क्षेत्र साकोली तालूक्यात ५७१.३४ हे. आर. एवढे आहे. इतर पिकांत ऊस, मिरची, भाजीपाला, मसाल्याचे पदार्थ, आंबा, लिंबू वर्गीय पिके, केळी, फळे इ. समायेश होतो.

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वरील विवेचनावरून असे लक्षात येते को, जिल्हयात संवीधिक क्षेत्र तांदुळ पिकांच्या लागवडी खाली असून त्यांचे प्रमाण ७६,०३% इतक आहे, य तांदुळ पिकांची दर हेक्टरी उत्पादकताडी जास्त दिसून येते. त्यानंतर इतरही पिके जिल्हयाच्या विविध तालुक्यात घेतली जातात.

निष्कर्ष

भंडारा हा किल्हा तलाखांचा जिल्हा म्हणून आंळखला जातो. जिल्हयातून वैनगंगा नदी खहते. तसेच इतर नदया वाहतात या नदयावर धरणं बाधून यातून जलसिंचन केले जाते. याचा लाभ यंथिल पिक पध्दतीवर दिसून येतो. शिवाय येथे पायसाथे प्रमाण अधिक असून तांदुळ हे प्रमुख पिक जिल्हयाच्या सर्वच तात्नुक्यात दिसून येते. येथिल जलसिंचनामूळे जिल्हयान तांदुळाचे पिक खरीप व उन्हाळी हंगामात चेतले जाते. रब्बी हंगामात गहू, कडधान्ये (हरभरा, तूर, ठळीद, मूंग) गळीनाची पिक, उस, भाजीपाला, मसाल्याचे पिके, भरडधान्ये, फळफळावळे अशी दुय्यम पिके सुध्दा घेतली जातात. तांदूळाचे उन्पादन सर्वच तात्नुक्यात होत असल्याचे स्वानिक बाजारपेठाही उपलब्ध आहेत. त्यामूळे भातगिरण्याचा विकास झालेला दिसन येतो.

उपाययोजना

जिल्हयात तांदूळाचे पिक हे पारंपारीक पथ्वतीने घेतले जाते. त्यामूळे तांदूळाच्या चॉगल्या जातीचे वाण, वापरून या शती पच्चतीत बदल करणे आवश्यक आहे. याकरीता शेतकऱ्यांना योग्य प्रशिक्षण देणे, तांदूळाच्या जातीचे नविन नविन वाण शांधून काढण्याकरीता संशोधन केंद्र मांठया प्रमाणात स्थापन करणे आवश्यक आहे. त्यामूळे अधिक चांगल्या जातीची लागवड करून, तांदूळ उत्पादनात प्राविण्य प्राप्त करणे काळाची गरज आहे. याकरीता ग्राम पातळीवर शेतकरी मेळावाचे आयोजन करणे आवश्यक आहे.

संदर्भग्रंथ

- १. सामाजिक व आर्थिक समालोचन, भंडारा जिल्हा -२०२१
- महाराष्ट्र शासन, जलसंपदा विभाग पुस्तीका, भंडारा जिल्हा
- डॉ. सुरेश फुले, "कृषी भूगोल", संग्रेम प्रकाशन १७२ विवेकानंदनगर, ईवार्ड, कोल्हापुर-२०१७
- था. माजिद हसेन, "क्यी भुगोल", रावत पब्लिकेशन, नई दिल्ली.
- 4. www.maharashtra.nic.in/www.bhandara.nic.in/www.maps.google.com

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बुध्दाचा धम्म: जीवन जगण्याची आबारसहिता

प्रा.डॉ.हरिंग्स्वंद गोविंदा बोरकर प्रश्नवंतराव पत्राण महानिगालय लाखाएर, जि जंहान E-mail - bbockar1965id gmail.com

साराशः :

निसर्ग आणि त्याची शक्ती याच्यामांगे लपलेल्या नियमाचे अध्ययन म्हणजे विज्ञान होय. त्याला चागल्या प्रकारे समजून थेणे, त्याचे निर्गक्षण करणे आणि प्रयोगाव्दारे परिक्षण करणे विज्ञान होय. विज्ञान मानवाला भौतिक सुख देते परंतु मानवाला फर्क्त भौतिक सुखर नाही तर मानसिक सुखाची सुध्दा आवश्यकता आहे. जगाच्या पाटीवर मानसिक सुखाशिवाय क्षेष्ट सुख दुसरे नाही. परंतु मानसिक सुखाची पूर्वता विज्ञन करू शकत नाही त्यामुळे धम्माची आवश्यकता आहे. धम्म म्हणजेच निर्मळ जीवन जगण्याचा मार्ग आहे, सुव्यवस्थित जीवन जगण्याचा मार्ग होय. हा मार्ग मानवाला भौतिक सुखापेक्षा मानसिक सुख जास्त देतो. एकंदरीत विनाशापासून जगाला तारायचे असेल तर धम्माशिवाय दूसरा पर्याय नाही.

प्रस्तावनाः

विज्ञानपूर्व काळात सर्वच देशातील लोकांवर धर्मांचा प्रभाव होता. तत्कालिन सामाजिक जीवनावर धर्माचे अधिराज्य होते. जीवनात जे जे सनातन आहे हे सर्व हिंदु धर्मांत आहे. त्यामुळे धर्म स्थिर व्हायला पाहिजे ही विचारसरणी भारतात रूढ झाली मानवी स्वभावाचे स्वरूप स्थिर आहे. त्यामुळे त्याचे नियमन करणारा धर्म स्थिर असायला पाहिजे ही विचारसरणी भारतात प्राचीन काळापासून चालन आलेली आहे.

पूर्वाग्रह आणि अंधश्रश्देच्या विरुध्द केला जाणांग बंड जाणांग बंड म्हणजे विज्ञान' अशाप्रकारची फ़ॉशिश बेकनन यांनी विज्ञानाची व्याख्या प्रतिपादित केलों आहे प्रा एफ मी कोनट यांच्या मतानुसार मानवी बुध्दीने नैसर्गिक घटनापासून कार्यकारणभाव लक्षात घेवून निरीक्षण आणि प्रयोगाव्दारे घटनांचे केलेले सुसंबध केलेले अध्ययन म्हणजे विज्ञान बुध्द म्हणजे विज्ञान आणि विज्ञान म्हणजेच बुध्द अशाप्रकारची व्याख्या केलों जाते

धम्म आणि विज्ञान हे विषय २१ व्या शतकातील महत्वपूर्ण विषय आहेत. हा विषय मानवाच्या सुख आणि विकासाचा आहे. जगात अनेक मनप्रवाह आहेत. प्रत्येक धर्माच्या संस्थापकाने आपल्या तत्त्वप्रणालोनुसार समाजाला मार्गदर्शन केले आहे. हे मार्गदर्शन करनांना विज्ञानाला विरोध केला या सर्व धर्मसंस्थापकानों मानवाला भगवान, आत्या, ईश्वर, परमेश्वर, स्वर्ग, नरक, पुनर्जन्म, भुनपिशाच्च, राक्षस, पूर्वकर्म या ग्रामक कल्पनांमध्ये जखडून ठेवले आहे.

ई.स. पूर्व ५६३ मध्ये सिध्दार्थाचा जन्म झाला. त्यांनी आपल्या जीवनात वयाच्या ३५ वर्षापर्यंत अनेक विषयावर अध्ययन व विचार विमर्श केला. ऋषींच्या आश्रमात राहुन कठोर तपश्चर्या आणि अध्ययन केले. परत् यामध्ये त्यांना कुठलेहो सत्य दृष्टीस पडले नाही. सत्याचा शोध घेण्याकरिता मनन चिंतन केले. शेवटी वैशाख पौर्णिमेला त्यांना सम्यक सम्बोधी प्राप्त झाली आणि पूर्वापार चालत आलेल्या रूढोपरंपरां विरूध्द उभे राहिले. मनुष्याला काल्पनिक गोष्टीपासून दूर करण्याचा प्रयत्न सुरू केला त्यांनी एक नवीन विचारप्रणाली प्रस्थापित केली. हो नवीन विचार प्रणाली विज्ञानाशी सुसंगत होती. तिला 'धम्म' या नावाने संबोधित केल्या गेले तिला 'धम्म' या नवीन नावाची ओळख दिली. धम्म काय आहे हे समजावून सॉगितले आणि मानवाला जुन्या रूढी परपरांपासून दूर सारण्याचा प्रयत्न केला. त्यामुळे 'धम्म' काय आहे हे समजावून सॉगितले आणि मानवाला जुन्या रूढी

भगवान बुध्दाने प्रतिपादित केलेला धम्म विज्ञान व तर्कावर आधारित आहे. मनुष्याला ज्ञानी, सदाचारी, मानवतावादी, समतावादी, कर्मवादी, बनविणारा भगवान बुध्दांचा धम्म विकासाकडे घेऊन जाणारा आहे. दु:खापासून मुक्त करणारा हाच खरा जीवनाचा मार्ग आहे. भगवान बुध्दाने सांगितलेल्या धम्मात कुठल्याही.

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प्रकारणी अंधक्रथ्या आणि कर्मकाह वाही कारण बध्याने आत्मा परणात्मा, ध्वर्ण, वरक, पूर्वजेम मणवान, ईत्रवा मात्र यांना आमान्य केले आहे. हाँ, वावासाहेव आविद्यकर यांची श्रामाण्डे तील भाग साणितले आहेन --१, सम्म २, अध्यम्म ३, सभ्दम्म

भगवान बुध्दांचा धम्म मानवाच्या मागाऱ्यावर, वृष्टीच्या कसोटीवर आधारित आणि विज्ञानात्री सुमंगत आहि डों बाबासाहेब आंबेडकर स्पिखन 'बुध्द आणि त्यांचा धम्म' प्रवाला उपरोक्त तीन विधाणत विधात्रित केले आहे कारण सामान्य व्यक्तित्वा सुध्दा भगवान बुध्दायी तत्वप्रणात्वी समजायत्वा पाहिजे धगवान बुध्दाच्या तत्वाच्या आवरणाने मनुष्य श्रानी, सदाचारी, मानवतावादी आणि प्रबुध्द बननी अन्ना व्यक्तिचा मर्गत्र सम्मान होने.

विक्रान हे क्रम अतिशय पवित्र, नम्न समय प्राणाणिक आगे आणि विक्रान तर मर्वायटरी मोकल जात विक्राम आहे. तशाप्रकारे दश व सुसञ्ज सुभ्दा आगे याशिवाय विक्रानाजयळ सर्वय प्राण्ताये उत्तर आह. दाता नारी होय जानावों खरी ओळख आहे. एखाटा प्रयोग सिभ्द झाला तर कोणाला काम वाटेल किया कोणाला काम वाटणार? या गोष्टोंची विज्ञानाला पिना नाही. भगवान कृष्टांनी ईश्वर, आत्मा, स्वर्ग, नरक या भ्रामक काम वाटणार? या गोष्टोंची विज्ञानाला पिना नाही. भगवान कृष्टांनी ईश्वर, आत्मा, स्वर्ग, नरक या भ्रामक काम वाटणार? या गोष्टोंची विज्ञानाला पिना नाही. भगवान कृष्टांनी ईश्वर, आत्मा, स्वर्ग, नरक या भ्रामक काल्पनाना नाकारले विज्ञान माणजे कुछ आणि कुछ महणजे विज्ञान अशाप्रकारणो व्याख्या केलो जाते. भगवान काल्पनाना नाकारले विज्ञान माणजे कुछ आणि कुछ महणजे विज्ञान अशाप्रकारणो व्याख्या केलो जाते. भगवान कृष्ट एक महान वैज्ञानिक,अनुलनीय महापुरूष आणि शास्वज्ञ होने. जगानील पाहिले वैज्ञानिक, शाम्वज्ञ आणि मनोचिकित्सक म्हणुन भगवान कृष्टाची ओळख आहे. त्यांनी मानवाला सुख समुभ्दीये जीवन जनगण्याचा मार्य शोभून काढला. तर्कशास्व विज्ञान आणि कुष्टीवादावर आधारित मार्ग माणजे धम्म असे अनेक कुष्टीवन विज्ञानवादी लोकाचे मन आहे.

विज्ञानानुसार धम्म सांगतो को, प्रत्येक वस्तु गतिशिल अवम्थेतून परिवर्तित होत असते उत्कातीच्या नियमानुसार परिवर्तनाची क्रिया सतत सुरू राहते हा आधुनिक विज्ञानाचा नियम बौध्द धम्म तत्वज्ञानाचा अनित्यवाद आहे ज्यावेळी विज्ञानाच्या स्तराला एक सिमित दायऱ्यामध्ये जखडले जाते. त्यावेळी धम्म त्या सर्व प्रश्नांना सोडवितो. धम्म मानवाला सदाचार शिकवितो. तसेच शांती, मनाचा समतोल राखण्यासाठी जोवनात स्थिरता आणि मानवो जोवन निर्दोष राखण्यासाठी मदत करतो.

या भूतलावर जन्म ग्रहण करणाच्या प्रत्येक मृत्यें मानवाला आपल्या जीवनात काहीतरी सत्कर्म कगवे लागतात त्यामुळे त्याचे जीवन सुखी आणि समृष्ट होते व इतरांना सुष्टा तो सुखी आणि समृष्ट करू शकतो. परंतु सद्या स्थितीत जग एका वेगळयाच मार्गाला लागलेले आहे धर्मसंस्थापकांच्या काल्पित भगवान, आत्मा, परमात्मा, ईश्वर, परमेश्वर, स्वर्ग, नरक, पुनर्जन्म भुतपिशाच्च, राक्षस, पूर्वकर्म तसेच रूढी परंपरा, कर्मकाड, वाईट बालोरिती यामध्ये मनुष्यप्राणी एवढा जखडला आहे को, त्यातुन त्यांची सुटका होणे कठोण झालेले आहे त्यामुळे त्याचा मार्नसिक विकास झाला नाही व त्याचे जीवन मुखी व असृष्ट होता पुन्हा तो अज्ञान अधकारात वाहून जात आहे. यातृन मानवाला स्वत:ला मुक्त करून सुखी व प्रगतीशील जीवन जगायचे असेल तर बुध्दाच्या धम्माशिवाय दुसरा पर्याय नाही. हा धम्म मार्ग त्यावरील शेवटवा उपाय आहे. धम्माचेच तत्व म्हणून मानवाने पंचशिलाबे जरी अनुसरण केले किवा ऑगिकर केला तर त्याचे अंतरंग सुजलाम सुफलाम होईल, त्याचे जीवन सुखी व समृष्ट होईल.

बौध्द धम्मान पंचशिलाला अनिशय महत्वपूर्ण स्थान आहे. शौलम्हणजे सदाचार होय. या सदाचाराच्या पाच पायऱ्या बुध्द धम्मात सॉगितल्या आहेत. यालाच 'पंचशिल' असे म्हणतात.

- १) पानातिपाता वेरमणो सिक्खा पद समादियामि ।
- २) अदिन्नादाना वेरमणी सिक्खा पद समादियामि ।
- ३) कामेसमेन्छाचारा वेरमणी सिक्खा पर्द समादियामि ।
- ४) मुसावादा वेरमणी सिक्खा पद समादियामि ।
- ५) सुरामेरवमज्जपमादव्दाना वेरमणी सिक्खा पदं समादियामि ।

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- मो जीव हिंसेपासून आहिरुक राहण्याची शपच येतो
- मी खोरी करण्यापासून आहिष्ण राष्ट्रण्याची झापचं चेतें।
- मो कामवासनेच्या अनाचारापासून अलिप्ल राहण्याची शपथ घेतो.
- मी खोटे बोलण्यापासून अलिप्त गहण्याची शपद पेता.
- मी महा मादक पदार्थ तसेच इतर मोहात पाडणाऱ्या सर्व मादक वस्तुंच्या सेवनापासून अलिप्त

या बुभ्दाच्या धम्मातील पंचशिलात व्यक्तींच्या संपूर्ण विकासाची पाळेमुळे रोवलेली आहेत. याच्या अनुसरणाने कोणाचेही अहित किंवा अकल्याण तर होणार नाही गरतु हित किंवा कल्याण झाल्याशिवाय राहणार नाही

निष्कर्ष :

अज्ञा या बुध्दाच्या धम्मातील पंचशोल व इतर तत्त्वामुळे व्यक्तीचे घर,कुटूंब, समाज यांच्यावर चांगले संस्कार तर होण्यास मदत मिळते. त्याचबरोवर भयमुक्त, भितीमुक्त जीवन जगता चेत असल्याने स्वतःचो प्रगती इतरांना दुःख न देता, इतरांना ज्ञास न पोहविता, इतराशी सन्मानाने वागून स्वतःचे जीवन सुदर, मुबक व विकसित करण्यास मदत मिळते. एकंदरीत धम्मातील तत्त्वामुळे शासिरिक व मानसिकरित्या आरोग्य ममुष्टी लाभून व्यक्तो आसटी जीवन जगु शकतो व दुसऱ्यास तसे जीवन जगण्याची प्रेरणा बनु शकतो. म्हणून भगवान बुध्दांचा धम्म हा सुव्यवस्थित जोवन जगण्याची आचारमहिता आहे, गुरुकिल्ली आहे हे चोरकाल टिकाणारे मत्य आह

संदर्भ :

- १. बृध्द आणि त्यांचा धम्म, डॉ.बाबासाहेब आंबेडकर.
- ब्रुट तत्त्वज्ञान आणि प्रबोधन कांती, निरंजन पार्टील
- धम्म प्रबोधन प्रवचने, एम डी सरोदे.
- ४ व्यलिद प्रश्न– अनुवादक भदन्त महास्थवीर, प्रबुध्दभारत पुस्तकालय,नागपुर २०१४

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प्रस्ताविक

80

मराठी साहित्यामध्ये एक रजनप्रधान आणि समाजभिमूख साहित्यप्रकार म्हणून या साहित्य प्रकासस अनन्यसाधारण महत्व आहे. एक समिश्र कला म्हणून या साहित्य प्रकासकडे पाहिले जाने शिवाय प्रयोगधमता हे या वाङ्मय प्रकाराचे अंगभूत वैशिष्ट्य असल्याने लोकमाणसामध्ये अधिक लोकप्रिय झाला. विविध ललिन कलांचा मधुर अविष्कार नाटवकलंत होन अयल्याने नाटवकला ह मानवी जीवनाचे एक अविभाज्य अंग बनलेली दिसते. मानवी जीवनातील विविध घटना, प्रयंग आणि व्यक्तिरेखा यांचा एक अद्भूत असा अविष्कार नाट्यकरुंतृन घडतांना दिसतो. प्राचीन काळापासून चालत आलेली ही कला अजुनही रसिकांच्या मनावर मोहिनी घाठनांना दिसते. आपल्या भारतीय रंगभूमीला एक समृद्ध व प्रदिर्घ अशी परंपरा लाभलेली आहे. मराठी रंगभूमीनेही त्यात मोलाची भर टाकून नाट्य विश्वामध्ये महत्वाचे योगदान दिलेले आहे.

'महाराष्ट्राये भरतमुनि' विष्णुदास भावे यांच्या 'संगीत सीता स्वयंवर' या नाटकाने मगुदा रंगभूमीचा पाया घातला. ५ नोव्हंबर १८४३ ला सागंली येथे या नाटकाचा पहिला प्रयोग चिंतामनराव पटवर्धन यांच्या दरवारात झाला. आणि यातृनच रमराठी नाटकाचा जन्म झाला. यज वाइमय प्रकाराने मराठी मध्ये पुढे मोठीच परंपरा निर्माण केली आणि मराठी सारत्व समृद केले. यापूर्वी मराठीतून नाटके लिहिली गेली, तसेच ती निराळवा स्वरूपात समाजात नांदत होती. ''मरादी नाटक हे मराठी मनाचा स्वभावधर्म असल्यामुळे ते मराठीच्या जन्मावरोवरच उपजत आहे हे खरे" असे जे कु. पा. मराठे म्हणतात, ते योग्य वाटते.

बीज शब्द :— रंगभूमी, स्वातंत्र्योल्तर कालखंड, नाटककार, नाट्य लेखिका, दलित, स्वीया इत्यादी. व्याख्या -१)''रंगभूमीवर दृश्यात्मक रूपाने प्रयोगीत होईल अशी वाङ्मयीन रचना म्हणजे नाटक होय'' २)''नाटक है काल्पनीक अथवा खरोखरी होऊन गेलेल्या एखाद्या व्यक्तिच्या व तिच्याशी संबंध असलेल्या इतर व्यक्तिच्या आयुर्वर्तनातील काही भागांचे दृश्यरूपाने मर्यादित कालात दाखवता येणारे व मनोरंजन करून उपदेश करणारे दृश्य काव्य आहे''

१९२० नंतर मराठी रंगभूमीची स्थिती अधिक विकट होती. प्रतिभाशाली नाटककार नव्हते. त्यामुळे कलात्मक नाटक तयार होत नव्हेत. नाटकांच्या प्रातांत असे घडत असतांनाच मुखपटाची सुरूवात झाली. आणि करमणुकीचे एक नवे साधन समाजाला उपलव्ध झाले. १९३४ नंतर मुखपट हाँ बोलपट बनला त्यामुळे कलात्मक नाटकच संपले होते. परंतु मराठी नाटकाला नवे रूप मिळवूण टेण्यासाठी१९३३ स्थापन झालेल्या नाट्यमन्वंतर या संस्थेने कलावंतानी सादर केलेला पार्श्वनाय आळतेकर यांची'आंधळ्यांची शाळा' या नाटकाने खऱ्या अर्थाने मराठी रंगभुमीच्या इतिहासत आशय व अविष्कारदृष्ट्या वास्तवाचे एक नवे भान आणले.

१९३३ नंतर मराठीरंगभूमीला चित्रपटाबरोबर स्पर्धा करावी लागली. चित्रपटासारख्या प्रभावी माध्यमामूळे संगीत नाटक मागे पडू लागले. नंतरच्या काळात सामाजिक, राजकीय आणि ऐतिहासिक स्वरूपाची नाटके लिहिली गेली. मो. गा. रांगणेकर ब्रांचे 'कुलवधु' आणि श्री. बौ. वर्तक यांचे

'आंधळ्यांची शाळा' या नाटकापासून वैभवाचे दिवस येऊ लागले. भा. वि. वरेरकर, प्र के. अत्रे, पु. ल. देशपांडे, वि. वा. शिरवाडकर, वसंत कानेकर, वसंत कानेटकर, जयवंत टळवी. विजय तेंदूलकर, विश्राम वेडेकर इत्यादी धोर नाटककारांनी मराठी रंगभूमीला भरभराटीचे दिवस आणून दिले.१९६० नंतर प्रयोगीक रंगभूमीला सुरूवात होतांना दिसते. त्यामध्ये विजय तेंदूलकर, रत्नाकर मतकरी, महेश एलकुंचवार आदी लेखकांनी स्वातंत्र्योत्तर काळातील मराठी समृद आश^व आणि विषय असलेली नाटके दिली आहेत. तसेच स्वातंत्र्योत्तर काळातील लक्षात राहणारी नाटके म्हणून पुढील नाटकांचा उल्लेख करावा लागेल. हिमालयाची सावली, घाशिराम कोतवाल,

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B.Aadhar' International Peer-Reviewed Indexed Research Journal ISSN : Impact Factor -(SJIF) -8.575, Issue NO, (CCCLXXX.) 380 - B 2278-9308 (Lab) December 2022 इंट्रनिवॉण, तुझे आहे तुझपाशी, ती फुलराणी, संध्या छाया, सूर्यास्त आणि उद्ध्यस्त धर्मशाव्य ही

ती नाटके होत.

_{ाटक लग}. _{वरेरकर,} अत्रे, रागणेकर इत्यादी महत्वाचे नाटककार जरी नाटबेलेखन करीत असले तरी वर्रवार अस नाट्यलखन करीत असले तरी तभूमीची स्थिती दोलायमान होती. निरनिराळे कंत्राटदार, क्लब, मंडळे यामधून जुन्या-नव्या राभुमा प्रयोग होत होते. पण रंगभूमी सुसंघटीत नव्हती,

दलितेत्तर नाटकारांनी दलिताविषयी पुढील नाटके लिहिली आहेत. त्यामध्ये झुंज, सूर्यास्व, लोकफ्रधा ७८, कन्यादान, पुरूष, स्मारक आणि धर्मान्तर ही ती नाटके होत. हा नाटकामध्ये दुरंज, सूर्यास्त, लोकफेया संघर्षांचे चित्रण केलेले आढळते.दलित रंगभूमीची पाळेमुळे आंबेडकरी जलशात जीवनातार हमतात. सत्येशोधक जलसे, छत्रपती मेळे, आंबेडकरी जलसे यांनी प्रवोधनाचे कार्य केलेले दिसते. हिंग्रतीत. काळात म. भि. चिटणीस यांच्या पासून दलित रंगभूमीला सुरूवात होते. म. भि. खातना यांच्या 'युगयात्रा' या नाटकाने दलित रंगभूमीच्या उदयाचे रंणशिंग फुकले. भि. शि. शिर्द विष्ठणार जिल्लोखाच्या गर्भात' ह्या नाटकाने दलित रंगभूमीला गती मिळाली. एकामागुण एक सकस बाटके लिहून सादर करण्यात आली. दत्ता भगत, प्रेमानंद गज्वी, भि. शि.शिदे, टेक्सास नावन गर्भ रामनाथ चव्हान आणि संजय पवार ही नावाजलेल्या दलित नाठककारांची नावे आहेत. वहित रंगभूमिने 'हिट अँड हॉट' या व्यावसायिक वर्तुळात अडकलेल्या मराठी नाटकांना समृद्ध जीवनाशय देण्याचा प्रयत्न केला. प्रेमानंद गज्वी यांची 'तनमाजोरी' आणि 'किरवंत' ही गाजलेली हरितावरील अन्याय अत्याचाराचे प्रसंग आपल्या नाटकातून प्रतिकाररित्या मांडलेले आहेत. दलित नाटकातले विद्रोह आणि आक्रोश हे त्या नाटकातले प्रमुख स्वर आहेत. प्रकाश विभूवन यांचे 'शांवा रामराज्य येतय', रामनाथ चव्हान यांचे 'वामनवाडा' टेक्सास गायकवाड यांचे 'देशाचे मानकरी', संजय पवार यांचे 'कोण म्हणतो टक्का दिला' , अरूणकुमार इंगळे यांचे 'काय रं' ही प्रेश्वकांच्या पसंतीला उतरलेली नाटके आहेत.

दलित नाटककारांनी नाटकातही अनेक प्रयोग केले. दलित नाटक थिएटरमध्ये बंदिस्थ होऊ नये म्हणून त्यांनी चौका चौकात करता येणारी पधनाट्य लिहिली. पधनाट्याने दलितांच्या प्रश्नाना वाचा फोडण्याचे काम केले. 'मसन्याऊद' हे पथनाटच खूप गाजले.ह्या पथनाट्यात दलितांचा प्रश्न अत्यंत प्रभावीपणे मांडलेला दिसतो. प्रेमानंद गज्वी ह्यांनी 'देवनवरी' आणि 'घोटभर पाणी' ह्या एकांकिका लिहिल्या आहेत. 'तनमाजोरी', 'जय जय रघुवीर समर्थ', 'पांढरा बुधवार', नाट्ययात्रा', 'किरवंत', आणि 'गांधी —आंबेडकर', अशी नाटके लिहिली आहेत. दलित शोषित आणि स्रिंयाच्या दुःखाना वाचा फोडण्याचे काम या सारख्या नाटकातून केलेले दिसते. वेठ—विगारापासून ते ब्राम्हणातील किरवंतापर्यंत गज्वींची लेखणी संचार करतांना दिसते. प्रेमानंद गज्वीच्या लेखनात काव्यात्मकता, नाट्यात्मकता आणि प्रतिकात्मकता ठळकपणे दिसून येते. नाट्यतंत्रावर त्यांची प्रभावी हुकूमत असल्याचे जाणवते. सामाजिक प्रश्नांची सखाल जाण असलेला हा प्रतिभावान नाटककार अहे. गज्वींच्या 'घोटभर पाणी' या एकोकिकेमध्ये दलितावर पाण्याच्या अनुसंगाने जे अन्याय अत्याचार केले जात त्याचे प्रभावी चित्रण केलेले दिसते.

वरेरकर, अत्रे, रांगणेकर इत्यादी महत्वाचे नाटककार जरी नाट्यलेखन करीत असले तरी रंगभूमीची स्थिती दोलायमानच होती. कंत्राटदार, क्लब, मंडळे यामधून जुन्या-नाटकांचे प्रयोग होत होते. पण रंगभूमी सुसंगतीत नव्हती. तीला निश्चित दिशा नव्हती. नेमके सुत्र नव्हते. अशा स्थितीत रंगभूमीचा शतकोत्सव डॉ. अ. ना. भालेराव यांच्या प्रेरणेने साजरा झाला. आणि रंगभूमीला दिशा देण्याचे काम ह्या एका दृष्ट्या माणसानी केले.प्रयोगाच्या बरोबरीने तसेच रंगभूमीच्या भविष्याच्या दृष्टीने विस्ताराने चर्चा केली रंगभूमीच्या परंपरेचे भान ठेवून भविष्यात काय करता येके येईल यावा विचार केला. आणि रंगभूमीमध्ये नवचैतन्य निर्माण झाले. तसेच श्री आत्माराम भेंडे योक गणा विचार कला. आणि रगभूमामध्य नववताचे गणते जाणतेपणाने रंगभूमीवर योव्या 'कलाकार ' या नाटन संस्थेने वेगवेगळना विषयावरची नाटके जाणतेपणाने रंगभूमीवर आण्ली अण्यकार या नाट्य संस्थन वगवगळना विषया प्रहत्याचे ठरले. त्यामुळे त्यांच्या आण्ठी, हे दोन्ही प्रयत्न १९४० ते १९५० या दशकात फार महत्याचे ठरले. त्यामुळे त्यांच्या कार्यने कार्याचे पडयाद आणि इन्ट परिणाम स्वातत्र्योत्तर मराठी रंगभूमीमध्ये आपल्याला जाणवतात. गोटकरण व गटककार थि. वा. शिरवाडकरांना नाटक रिहिन्यास डॉ. भालेरांवांनी प्रवृत्त केले. तसेच नट, गोटककार थि. वा. शिरवाडकरांना नाटक रिहिन्यास डॉ. भालेरांवांनी प्रवृत्त केले. तसेच नट, मोटककार, दिग्दर्शक अशा विविध विभागातील कलाकारामधला. प्रतिभेचा कॉभ फुलवण्याचे कार्य

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या काळात पडले. एक नवी दृष्टी, नवी जान यानिमित्ताने आली. तिच्यातूनच रंगभूमीचे अनेक लहानमोठे प्रवाह निर्माण झाले.

स्वातत्र्योत्तर काठखंडात मराठी साहित्याच्या स्वरूपात फरक जाणवू लागला. दुसरे महायुद नुकतेच होऊन गेले होते. त्यामुळे त्याचा जनमानसावर फार मोठा परिणाम झाला होता. मानवी जीवन किडवामुंग्या सारखे बनले होते. यत्रयुगाने मानसाला भावनाशुन्य बनवले होते. या परिस्थितीचा परिणाम सर्वच साहित्यप्रकारावरही झाला. अशातूनच नवकाव्य, नवकांदवरी, नवकशा, नवनाटव नव्याने जन्माला आले. स्वातंत्र्योत्तर कालखंडात मराठी रंगभूमीला उत्क्रांत अवस्था येत गेली. अशा रंगभूमीच्या प्रवाहात अनेक नाटककारांनी आनखीनच जास्त जोमाने मराठी रंगभूमी विकसीत केली.त्यात प्रवाहाचा विचार करता दलित रंगभूमी, कामगार रंगभूमी, बालरंगभूमी, एकांकिका, नाटिका, भारतीय समांतर रंगभूमी ह्या होत.

यातूनच नाट्यवाड्मयाच्या क्षेत्रात स्वी – पुरूष संबंधाना तसेच स्वियांच्या भावनांचा सामाजिक स्थितीचा, प्रश्नांचा अतिशय कळवळ्याने आपले विचार नाटककारांनी मांडले. या बरोवरच स्वातंत्र्योग्तर काळात स्त्री नाट्य लेखिका यांच्या लेखनाला अंशतः का होईना सुरूपात झाली, आणि त्यातून स्त्री – पुरूप असा भेद करण्याचे कारण नाही, तशी आवश्यकताही नाही, रवी म्हणून तिचे स्वतःचे अनुभव क्षेत्र असते. त्यात काही आकलनाचे विषय असू शकतात. म्हणून १९४७ नंतर स्वीरवातंत्र्य लढगाची महती निर्माण झाली. तिला स्वतःचे आत्मभान येऊ लागले त्यासोबतच आर्थिक स्वातंत्र्याच्या दिशा स्पष्ट होऊ लागल्या. नव नवीन कार्यक्षेत्र उपलब्ध झाली या नव्या जाणिवेतून नवे प्रश्न समस्या निर्माण झाल्या.उद्ध्वस्त होऊ पाहणारी कुटूंब व्यवस्था. कागदावरच राहीलेली समानता, स्वी—पुरूप संबंधातील नवे आयाम, स्वातंत्र्योत्तर कालखंडातील शिक्षित, सुसंकृत स्वीने पाहिले, अनुभवले, भोगले ते सर्व प्रश्न स्वी नाटचलेखिकांच्या नाटकातून पूर्णतः जरी उतरले नसले तरी आत्मभान आलेल्या स्वी नाटन लेखिका आपल्या समंस्याना वाचा फोडू लागल्या. एक डाम जीवनदृष्टी बाळगुन नाट्य लेखन करणाऱ्या लेखिकांचा उदय या काळात झाला.यात गिरजाबाई केळकर, 'हीच मुलीची आई', मालती तेडुलकर 'मराठ्यांचा राजा', शकुंतला पराजपे 'चढाओढ', वनिता देसाई 'म्हाराची पोर', माई वरेरकर 'काकाची शशी', अनुसया वाघ, 'बालसंवाद', आनंदीबाई किलेंस्किर' नव्या वाटा' ज्योती मापसेकर, 'मुलगी झाली हा' इत्यादी होत. नाटचवाङ्मयाच्या क्षेत्रात स्वातंत्र्योत्तर कालखंडात जी संमृद्धी आल्याचे दिसते या काळातील नाटकांचे स्वरूप सुटसूटित, सफाईदार आहे. मराठी रंगभूमी नव्या सौंदर्याने आणि सामर्थ्यांने संपन करण्याचा प्रयौल स्त्री नाट्य लेखिका करू लागल्या. त्यामधून वेगवेगळ्या स्त्रीविषयक समस्यांना हात पालण्याचा प्रयत्न करू लागल्या. स्त्रियांच्या दुःखाचा शोध घेण्यावरोवरच स्वत्वःसाठी आत्मसन्मासाठी स्त्री मुक्तीच्या लढ्याची उभारणी करण्याचा प्रयत्न केला आहे. या व्यतिरिक्त मराठी नाट्यसृष्टीला विविध अंगानी बहर आणण्यासाठी या कालखंडात सामाजिक, कौटुबिक, राजकिय, पौराणिक, कल्पनारम्य, भक्तिरसप्रधान, विनोदी. फार्स, आत्मचरित्रात्मक, ऐतिहासिक, शास्त्रीय अशा विविध विषयावर नाट्य लेखन केलेले दिसतात. मनोविश्लेषणात्मक, सारांश:—स्वातंत्र्योत्तर कालखंडात मराठी रंगभूमीच्या स्वरूपाच्या वाटचालिचा विचार करतांना नाटकाची ऐतिहासिक पार्श्वभूमी , व्याख्या यांचा आढावा घेण्यात आला. आशय–विषय आणि प्रयोग या बाबतीत खुपच विकसित झालेली दिसते. प्रेक्षकांचे रंजन करतांना विविध परिवर्तनवादी विषय मांडण्याचेही प्रयत्न मराठी नाटककाराकडून झालेले आहेत. व्यवसाय आणि सामाजिक समस्या या दोन्ही याबीकडे मराठी नाटककारांनी लक्ष दिल्याचे दिसते. मराठी नाटकांच्या वाटचालित

दलित रंगभूमी ही वेगळ्या जिवनानुभूतिची नाटके सादर करणारी रंगभूमी आहे. दलितांच्या समस्या आणि प्रश्न यांना केंद्र माणून दलित नाटककारांनी नाटके लिहिली. नाटकबरोबरच पथनाट्य हा प्रकारही या नाटककारांनी प्रभावीपणे वापरल्याचे दिसते. याच काळात स्त्रीयांच्या विविध प्रश्न आणि समस्यांना वाचा फोडणारे नाटकही 'मुलगी झाली हो' (ज्योती मापसेकर) या नाटकानेही वादळी वर्चेया विषय बनले.स्वातंत्र्योत्तर काळातील मराठी नटकातून सामाजिक प्रश्न जसे मांडले आहेत. तसेच प्रेथकांसाठी 'हिट अँड हॉट' प्रकारचे नाटकेही लिहिले आहेत.

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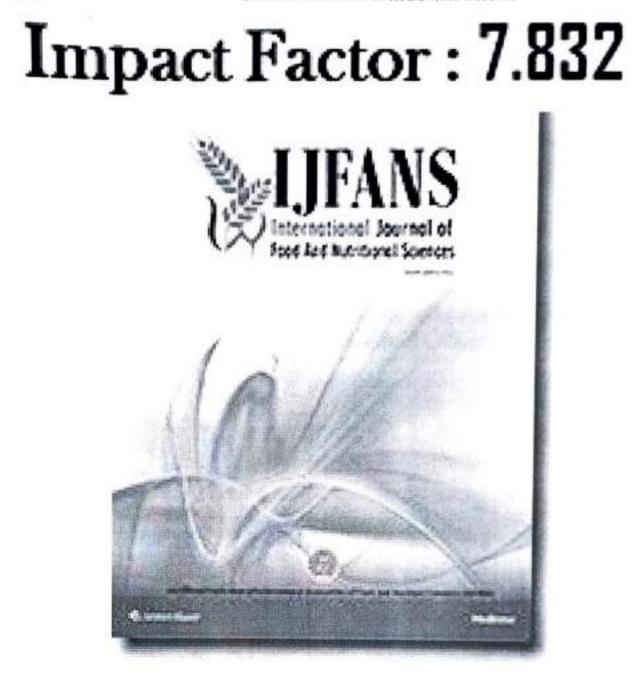
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AFFECT OF GLOBALIZATION ON CLIMATE CHANGE AND FOOD PRODUCTION : A GEOGRAPHICAL STUDY

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Abstract:

Climate change ensues due to Global Warming causing decreases in agricultural production. It possibly began with development which was followed by a fast growth of fossil petroleum ingesting. This question has drawn international attention since the 1970 and it has been extensively recognized by scientists that the Greenhouse gas formations are the reason of global warming. Global warming and climate change can effect agriculture in a variety of ways. This paper means to deliberate about the causes and impact of Global warming on agriculture area.

Key Word: Global Warming, Agricultural, Climate change, Crop produce. Introduction:

The impact of Global Warming can affect Agriculture production and food security. The research hence looks into how adaptation can take place along with alleviation and how these steps can integrate into the overall development methods and program. It is the fact that agriculture still offers a livelihood for the most of the people particularly the underprivileged throughout the world. 15% population lives in India out of the world population. Agriculture performs a vital role in the comprehensive economic and social progress of India. The most approaching weather changes in present time is the increase in the atmospheric temperature due to increased level of Greenhouse gases Carbon -dioxide, methane nitrous -oxide and chlorofluorocarbons. There is a wonderful growth in the temperature of earth surface and sea water. During 1951 to 2005 the normal temperature of the earth was 0.74° to 1.33° Fahrenheit, do climate change.

Agricultural facilities add to around 20% of the yearly rise in anthropogenic greenhouse gas issue. Agricultural sector adds to global warming through carbon-dioxide, methane, sulpherdioxide, nitrous-oxide and chlorofluorocarbon [cfcs]. The growing attentions of those dangerous or Green House gases, there is much nervousness about future variations in our weather and direct or indirect influence on farming.

Objective :

1% To determine the variation of crop Production.



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2% To calculate the changing in Ecosystem.

3½ To determine the Climatic effects on food Production.

Evidence of climate change

The most convincing climate change evidence scientists have of climate change is long term data connecting atmospheric CO2 levels and global temperature, sea level, the area of ice, the relic record and the distribution of types.

This data, which goes back billions of years, shows a robust correlation between CO2 levels and temperature. Recent data shows a trend of increasing temperature and growing CO2 levels start in the early 19th century. Because all parts of the global climate are connected, scientists have been able to generate models of how changes produced by heating should work their way through the whole system and appear in different areas, for example, sea level, intemperate weather, the movement of fish species in the ocean.

Testing whether or not forecast alterations have occurred is an important way to confirm important theory. This can be done in two ways. First, it is imaginable to load a model with important data and request. How well does this model forecast what we know happened. A second way to test is to use the model to forecast upcoming changes and then to see if emerging reality turns. It is possible to way the rapid departure of glaciers and observe the summer melting of the Polar Ice Cap. Sea levels are rising evidently, the temperature of the world's oceans is clearly rising and consequently many fish type are moving to follow waters that are the right temperature for them. Relating these changes to the timing of rises in CO2 levels and temperature suggests relationship. In specific occurrences, for example, CO2 levels, temperature and ocean pH, the chemical progresses are noticeable showing finished fundamental connection.

Visual Effects of Climate Change Evidence Melting Glaciers



Rising Sea Levels

Flooding



Worsening Droughts



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Changing in ecosystems

As the world warms, whole biomes will transfer. Before increasing temperatures at the equator consume lacking such main crops as rice north into once cooler areas, many fish types have migrated long distances to stay in waters that are the proper temperature for them.

In once colder waters, this may increase fishermen's catches; in warmer waters, it may eliminate fishing; in many places, such as on the East Coast of the US, it will need fishermen to go further near feast angling lands. Farmers in temperate regions are conclusion drier environments hard for crops such as slop and wheat, and once main rising regions are now weak. Some areas may see complete ecological transformation. In California and on the East Coast, for example, climate change impacts and warming will soon fundamentally change the forests; in Europe, hundreds of plants species will disappear and hundreds more will move thousands of miles.

How climate affects :

Climate change can distressed farming in several ways. Outside a definite range of temperature, warming inclines to decrease crops because crop speed through their progress, creating a reduced amount of grain in the procedure. The greater temperature, also restrict the aptitude of plants to get and use humidity. Evaporation from the soil hastens when temperature increase and plants growth transpiration. That is dropping wetness from their leaves. Because worldwide warming is perhaps to increase rainfall, the net influence of advanced temperatures on water availability is a competition between better evapotranspiration and greater precipitation. Usually, that race is accomplished by increased evapotranspiration.

Finally the climatic change could upset agricultural in numerous manners:

- Production, in terms of number and standard of crops.
- Agricultural practices, through variations of water consumption [Irrigation] and agricultural. Contributions such as herbicides, pesticides and fertilizers.
- Environmental effects, in specific in relation of frequency and intensity of soil. Drainage, soil
 erosion, reduction of crop change.
- Rural space, over the loss and gain of cultivated land, land conjecture, land renunciation, and hydraulic amenities.

Adaptation, organisms can develop more or less competitive, as well as humans may develop urgency to develop more competitive, organisms, such as flood resistant or salt resistant varieties of rice.



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The big misgivings to find, particularly because there is lack of information on countless particular, local regions and contain the uncertainties on greatness of climate change, the impacts of technological changes on efficiency, global food demands, and the several capabilities of variation.

Most of the agronomists believe that, agricultural production will be regularly affected by the harshness and place of climate change, not so much measured trends in climate. If change is measured, there may be adequate time for biota adjustment. Rapid climate change, however, could harm agricultural in many countries, especially those that are already suffering form rather poor soil and climate conditions, because there is less time for optimum natural selection and change.

India and Global Warming affects:

In India different produce are developed by varied farming means in fifteen Agro-climate regions these farming crops are intensely affected by global warming that take to climate variations. It is fact that Indian agriculture is based on rainwater for irrigation. Indian agriculture regularly go through that, certain area of is scarcity disposed to and the other sectors are inclined to inundating initial part of many parts in India, have been fighting with drought and simultaneously, agrarian soil is drenched with inundations. In such a nation, the impact of Global Warming will be hazardous as weather change is supposed to influence on agrarian output and changing crop system. As a developing country India is poorly prepared to face Global Warming which exaggerated such dangerous weather change. The lassitude in government technology will turn it harder to deal with this question. The issue will be more critical and it is understandable from the point that, if the normal temperature is a by one degree Celsius it takes to augmented melting of the glaciers of Himalaya.

Climate change and Food Production:

One of the maximum attractive impacts of increasing temperatures is touched in <u>World agriculture</u>, though these effects are touched very differently in the largely temperate developed world and in the more tropical developing world. Different crops grow best at quite exact temperatures and when those temperatures change, their production changes meaningfully. In North America, for example, growing temperatures may decrease corn and wheat productivity in the US mid-west, but increase production and production north of the border in Canada. The productivity of rice, the main food of more than one third of the world's population, failures 10% with each 1° C growth in temperature. Previous climate persuaded problems have been balance by major advances in rice technology and always larger applications of fertilizer; prospects are that in Thailand, the world's largest exporter of rice, though, upcoming increases in temperatures may decrease production 25% by 2050. At the equal period, global population models suggest that developed world will add 3 billion people by 2050 and that developing world food producers must dual main food crop production by then just to uphold present levels of food ingesting.

Climatic inconsistency and occurrence of dangerous actions are key doubts for the Indian subcontinents. In India, the study of recurring and yearly outside air temperatures has uncovered a important warming leaning of 0.57° Cen. per hundred years. The warming is seen to be principally added by the post-monsoon and winter seasons. The monsoon temperatures do not display a important leaning in any main area of the nation. Like warming leaning has also remained understood in Pakistan, Nepal, Srilanka, and Bangladesh. The rainwater differences in India take remained typically chance over a Century, with no systematic difference obvious in



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summer monsoon season. But, parts of rising propensity in the episodic rain take continued implicit through the West Cost, North Andhra Pradesh and Northwest India and those of decreasing tendency done East Madhya Pradesh, Orissa and Northeast India during changed years.

Conclusion:

The climate change, as observed through inclinations of temperature increase and increased Co2 attention, is matter of primary concern. The various studies for measuring its impact on Farming area has increased .Crop progress models have been revised and assessed for many significant crops of this area under different climate variation conditions. But most of the result occur to be area exact and with fixed deductions. Accuracy in evaluating the extent of the climate change on higher spatial and temporal determination scale is the key requirement for exact assessments of the influence. Indian farming is probable to experience damages because of heat, unreliable weather, and declined irrigation availability. Adaptations policies can help minimize negative influences. This requires research, funding, and policy support.

References :

- Agrawal, P.K, ^Impact of climate change on Indian Agriculturae'
- 2. Cline,W.R.(2008),Global Warming and agriculture. Southwestern Zimbabwe:finance &
- 3. Dr. Kundan A. Alone, 'The Effect of Global Warming on Agriculture', Global Warming and its Effect, The Planet, Proceeding 2012, pp.44-47.
- Dr.K.A. Alone,2012, * The effect of Global Warming on Agriculture.
- south rainfall in increase to 5. Express,I.2012.525,Global likely warming http://www.indianexpres-Asia.Retrieved,122012,13,from,http://indianexpress-com:

com/new/globalwarming-likly-to-increase-rainfall-in-south-asia/966479 6. lingram, y. p., (n.d.). Effects of higher day and night temperature on growth and yields of

- some crop plants.Retrived 12,12,2012, from http://www.fao.org 7. P.S. Meshram, 'Global Warming and its Impact on Agriculture.', Global Warming and its
- Effect, The Planet, Proceeding 2012, pp.26-28 8. Ruchita, S, & Rohit, S., 'Effect of Global warming on Indian Agriculture.'
- 9. Wikipedia, the free encyclopedia.



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प्रास्ताविक :--

१९६० ततर मराठी साहित्य जे अनेक प्रकाह निर्माण झाले त्यांग झाला लोगण, त महत्वाचा प्रवाह आहे. नवा आशाय, जिवनाचे वर्षे क्षेत्र मराठी वाणकारमाती झामल साहित्यान त्यूज करून दिले.

'ग्रामीण' या शत्वातून ग्राम-गाय-खोडे याणी रचना, त्याने स्वमय, वैशिष्ट समजून धनव्यात ग्रामीण साहित्य ही संकल्पना स्वप्त होते.

व्याख्यां -

ज्यात आजचे व कालचे प्राप्त जीवन, त्याचे मनोव्यापार सायग्रतित संवटना आणि त्यांगण स्वरूप व्यक्त होते असे म्हणता येईल... (यो म कुलकर्णों) प्रामीण साहीत्याये केंद्र हामव्यवस्थ आहे प्रामव्यवस्थेचा केंद्रचिंदू शेतकरी आहे असे प्रमोद मुनमाटे यांनी मान्य केलं आहे प्राणीण साहित्य म्हणजे प्रामिणांनी प्रामिणांचे अस्सल जीवनदर्शन घडविणारे देशी वळणाचे साहित्य होय आग क्षेराम गुंदेकर यांनी व्याख्या केली आहे.

ग्रामिण साहित्यात कथा,कादयरी,कविता इ प्रकारना समावेश होतो त्या दृष्टित वटिण्णवर्ण चौधरी याच्या कवितेतील प्रामीण दर्शन घडवून आणणे हा या शोध नियधाना विषय तांग उदिष्टये –

बहिणाबाई चौधरी यांच्या काव्यामुळे ग्रामीण जीवनावर प्रष्ठलेखा प्रभाव अभ्यामणे त शोधनिबंधाया प्रमुख उदिष्टये आहे.तर बहिणाबाईच्या जोवन चरित्राया परिचय पडवून रेणे ता दृष्यम उदिष्टये आहे.

जीवन चरित्र्य -

आधुनिक मराठी कवितेच्या क्षेत्रात बरेब कवी विद्वान व्यासगी होने पण बहिणावाई जोभन वण अशिक्षीत होत्या बहिणाबाई बौधरी यांचा जन्म २४ ऑगरट १८८० रोजी खानवेणातील व्यान वा गांची झाला अंसोद हे गांव जळगाव जिल्हयात आहे त्याच्या वडीलाच नाय उखाजी महातान तम आईचे नांव भिमाई होते बहिणाबाई एकुण सहा भावडे होती त्यान तीन बहिणी व तीन भाउ होते

इ.स.१.८८० हा काळ भारतीय पारतंत्र्याच्या काळ होता भारतावर ब्रिटीशाचे राज्य होते या काल्टखडात भारतीय सुधारकांची दुहेरो लढाई सुरू होती एक सामाजिक सुधारणंसाठी यमाजनील अनिष्ठ रूढीविरूदध लढा सुरू तर दुसरीकडे भारतीय स्वातत्र्याची लढाई सम होते। अज संघर्षाच्या काळात बहिणाबाईचा जन्म झाला होता तत्कालीम रूढीप्रमाने वयाच्या २६ व्या वर्ग जळगावच्या नत्थुजी चौधरी याच्या सोंबत बहिणाबाईया विवाह (लग्न) झाले बलिणाबाइंना मजार एकत्र कुटूंब पदधती होता.परंतू घरगुती वादामुळे त्यांना विभव्त गहण्याचा प्रसंग आत्मा न नत्यांन संसार सावरतांनाच त्याचा पतीचा म्हणजेच नत्थुजी चौधरी यांचा १९१० ला मृत्यू झाला

बहिणाबाई हया तीन लेकर व धोडीशी शेतजमीन हयावर संसार करनाना त्याना फार पाम सहन कराव लागलो तत्कालीन समाजात एक विधवा म्हणून जगनाना बहिणावार्ड याग जनेक समस्यांना तोंड दयांवे लागले शेतातील व दैनदिन कामे फरनाना मन ग्रमोवण्यामाडा प्राणा जानेक सिंथयांनी गोताचा आधार ध्यावा लागला ओव्या,गीत अभंग म्हणून त्या कार्य कर्णन जगन जाते जीवनातील हिंदोळयावर वेगवेगळे विषय हेच बहिणाबाई चौधरी याच्या कविता आतळनान जाग बहिणाबाईचा मृत्यू ३ डिसेंबर १९५१ ला झाला.

ग्रामीण कवितांचा अभ्यास --

धरातील व श्रोतातील काम करतांना बहिणाबाईला काव्य सुचले आणि काव्य मगती कविनेत अजरामर झाले.

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बहिणाबाई चौधरी यांच्या 'अरे संसार संमार ' ही कविता ग्रामीण कवितेच्या दृष्टिते माण्याले आहे.संसारीक मानसाला उपदेश करलांना माणतात

> अरे संसार संसार जसा तवा चुल्हायावर आधी हाताला चटके मग मियते आकर

संसार हा सुख दु.ख याचे मिश्रण आहे कोणतेही कार्य करनाना प्राप्त महत्व व्यापतं जशी पोटासाठी भाकर मिळविण्यासाठी काबाळ कप्ट करावाच लागतों अणा निमगांगील अनेक उदाहरण देवून काकडी,भिलवा,सागरगोटी,इत्यादीचे गुणधर्मही आणि महत्व याणिगलेलं आह त्याचप्रमाणे मनाची अवस्था मांडतांना बहिणाबाई चौधरी म्हणतात पृथ्वीवरणा माण्म हणार पृष्पांताल मानव आहे.परतू त्याचे मन किती चंचल आहे हे सांगतांना.

> मन पाखरू पाखरू त्याची काय सांगू मात आता वात भुईवर गेल गेल आभाषात

मानवी मन हे अतिशय चंचल आहे.उथ्या पिकात राहणाऱ्या ढोराप्रमाणे. एत्रा पुन्हा उम्र णित खाणाऱ्या खोडकर जनावरासारखे तर धोडयावेळापूर्वी जभिमीवर असणार मन कणात आणाज्यात्र ज्यात्र होतांना दिसते.

घर कसे असावे हे सांगतांना ' खोपा ' कवितेतुन माडलेले आहे

असे खोप्यामधी खोगा सुगरणीया बांगला पहा पिलासाठी तीत झोका झाडाला टांगला

सुगरण पक्षी हे आपल्या वास्तव्यासाठी एक छोटेसे घरटे वाधलेले आहे आणि पाळण्या ग्रमाणे झाडाला बांधलेला आहे.त्याची लहान लहान पिल्ली त्यावर असून डोके पेन आहे अणा सृदर निटनेटकी पराची अवस्था शेतकरी,कष्टकरी,मजूर यांच्या झोपडयांची धरानी अपने अणी ग्रामीण वातावरण बहिणाबाई चौधरी यांनी आपल्या कवितेतून मांडलो आहे.

धरीप्रीच्या कुशीमध्ये विथ वियाण मिजली पत्ने प्रसरली माती जशी शाल पाघरली

शेतात पेरणो झाल्यानंतर वियाण अमिनीत निजण्याची आणि मातीची शाल पापरव्याची कल्पना बहिणाबाईनी किती सुंदर मांडलेली आहे.

ससुरवासीन पोरीचा जिव्हाळयाचा विषय,माहेर,माहेरच्या गोप्टी , माहेरचा माणुम असी ज वस्तू तिला भारी आनंद आणि माहेरी जायचं म्हटल को डोळ्यासमोर उभ्या सारजान ना माहेर,माहेरची मानस,वाहणारी नदी,माहेरला जाणारी वाट,

लाभे पायाला चटके रस्ता तापी सानी लाल माइया माहेरनी वाट माले वाटे मखमल

आजच्या काळात लोकांची जिवनशैली बदलत चाललेली आहेमाणूस समाज्ञात वातरत असूनही एकाकी होत चाललेला आहे.सगळयांना सोबत घेउन पुढे म जाता एकटयांने हित स्वाभी बुली असलेल्या मानसाला बहिणाबाई चौधरी विचारतात

मानसा मानसा , कथि होशिल मानुस

लोभासाठी झाला , मानसाच रे कानुस

जीवन जगत असतांना आनंदी जिवन जगावे मानसाने करने असायला हवे ने माडतात.

विना कपाशीन उले,त्याले बोड म्हणू नही

हरी नामाईना बाले,ल्यारी नोड म्हणू नही

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अशा सहज बाक्य रचनेतुन त्यांनी ग्रामीण शीतकरी , खेडे गावातील मण, चालोगला उप्पण इत्यादी मधुन आपल्या कवितेतून सहज साकारत्या आहेत

शेतात काम करत असतांना उन,वारा,पाउरा,पशु-पश्ची अशा अनेक घटकाशा ज्यांचे नाने जळल्या गेले.आणि त्यातुनच त्यांना ओव्या,कविता,गाण्णे सुचु त्यागले व त्या आण्या,णणे, दलण दळतांना घरातील कामे करतांना,शेतातील कामे करताना म्हणून लागल्या तेव्हा त्यांचा मुल्लग मागण देव किंवा त्याचा मावसभाउ त्या लिहून ठेवत असत बहिणाबाई चौधरी याच्या गृत्यू त्रवा लग कवितेमी वही त्यांनी आचार्य अने यांना दाखविली त्या कविता जेव्हा आधार्य अने यांनी वागल्या तेव्हा त्यांना ''बावन कशी सोने आहे कुठे होता हा खाजिना ! '' सापडल्यासारखे वाटन आहे असे अमोल साहित्य/कविता महाराष्ट्रीय जनतेपासून लपवून देवणे बरे मच्हे त्यामुळे १९५२ मध्ये आनाग अत्रे यांच्या सहकार्यांने ('बहिणाबाईंची गाणी') या पुस्तकाली पहिल्ही आनुरनी प्रकाशित तण्डी समारोप -

बहिणाबाई चौधरी हया अशिक्षित होत्या तरी त्यांनी शीतात व घरवाम करताता उप ओख्या,गाणी गाईल्या त्या आजच्या प्रामीण जीवनातील जनतेयाठी आवश्यक आहेत अध्याप्राच्या दृष्टीने समाजोपयोगी दिसुन येतात त्यांच्या या प्रामीण काव्याचा आजहो त्याचा प्रभाव समाजानग दिसून येतो.

संदर्भ सुची -

पार्टील ए.वी - ''वहिणाबाई निसर्गकत्या नकी भुकल्याच '' (१८.०६.२०१८)

२.सर्वेण्यर फीलास - "मराठी ग्रामिण कविताचा इतिहास महता प्रकाशन" (००.०१ २०१०)

तिवारी सियाराम — "भारतीय साहित्याची ओळख— वाणी प्रकाशन" (२०१५)

४.डॉ.पवन मांडवकर-"बहिणाबाई गाणी,सौदर्य आणि समिक्षा" (१८०६-२०१८)

५ मालशे सं.ग.-शोधनिवंधाची खेखण पटधत्ती, प्रथमाकृती,सुविचार प्रकाशन महळ - पूर्ण -नागणः १९७५ पनःमुद्रण १९८८

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A REVIEW ON SUBSTITUTIONAL EFFECT OF DIVALENT IONS ON COBALT NICKEL FERRITE

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Abstract:

Ferrites belong to the class of materials which are best known for their wide range of application. Among ferrites, structurally Spinel Ferrite is simplest of them which crystallize into the spinel structure with excellent properties like high saturation magnetization, coercivity, and better thermal and electrical properties. Among spinel ferrites, Cobalt-Nickel ferrites find their space in a variety of applications because of their unique properties when compared to other ferrite family members. Co-Ni ferrites possess high magnetocrystalline anisotropy, unique magnetic structure and high correlation between the coercivity, crystallite sizes and sample preparation pressure due to their significant magnetostriction properties cobalt-based compositions are one of the most promising candidates for applications in magnetomechanical and magnetoelectric sensors. Co-Ni ferrites are the key electronic materials used highfrequency applications in the telecommunication field and also in high-density digital recording disks, audio/video tapes, high-quality filters, rod antenna radio frequency circuits, transformer cores, read/write heads for high-speed digital tape, operating device etc. This review work offered a versatile way in which the structural, electrical and magnetic properties of Cobalt Nickel nanoferrites can be influenced by the substitution of various divalent dopant ions. Keywords: Ferrites, Spinel Ferrite, Cobalt-Nickel ferrites, Saturation Magnetization, Coercivity, magnetocrystalline anisotropy.

1. INTRODUCTION:

The structural, magnetic and electrical properties of the spinel ferrites are typically determined by the nature, valency and amount of dopant, their site preference and the distribution of iron and metal ions in the octahedral and tetrahedral sites of the spinel lattice [1,2]. The aspects which regulate the distribution of cations in spinel ferrite are the cations ionic radii, site preference of ions, Madelung energy and crystal field effects [3,4].

CoFe2O4 is one of the most significant ferrites that find its place under the class of hard magnetic materials. It has reportedly illustrated very high value of saturation magnetization and coercive field along with its exceptional thermal stability and high anisotropy field [5–8]. However, NiFe2O4 belong to the class of soft magnetic material exhibiting low saturation magnetization and coercivity, low electrical conductivity and thus low eddy current losses

along with high electrochemical stability [9–12]. Nickel ferrite exhibits high corrosion resistivity, magnetostriction, magneto crystalline anisotropy and magneto-optic properties; which make this material beneficial in many applications like recording media with optical wave guide, magnetic static wave devices and surface acoustic wave transducers [13]. CoFe2O4 and NiFe2O4 are prominent materials for numerous applications such as microwave devices, recording media, gas sensors, drug delivery, computer memory cores, high density information storage, telecommunication, low energy inductors, medical instruments, catalysts, high frequency transformers, microwave and dye absorbers [14–18]. As a consequence, the substitution of Ni ions in CoFe2O4 ferrite results in a magnetic compound that would have the characteristic of both spinels and inspires its use in many other potential applications. Their physical properties can be modified by altering the chemical composition, grain size, morphology and lattice strain [19–22] According to the exchange-coupling theory, nanocomposites permanent material can possess the high coercivity of hard phase and the high remanence of soft phase at the same time [23]. Insertion of Co2+ in NiFe2O4 produces mixed CoNiFe2O4 ferrite, usually, with both Co2+ and Ni2+ cations in octahedral (B) sites, slightly changing the cell parameter of the cubic spinel NiFe2O4. On the other hand, doping of cobalt (Co) in NiFe2O4 makes improvements in (i) the magnetocrystalline anisotropy (and consequently the magnetization) and (ii) the coercivity (Hc) enhancing its application potential in magnetic recording [24].

Earlier studies established that embedded Ni-Co ferrites possess high magnetocrystalline anisotropy, unique magnetic structure and high correlation between the coercivity, crystallite sizes and sample preparation pressure [25]. Amongst all spinel ferrites, due to their significant magnetostriction properties cobalt-based compositions are one of the most promising candidates for applications in magnetomechanical and magnetoelectric sensors [26,27]. Moreover, Ni-Co ferrites are vital electronic materials employed in electronic devices suited for high-frequency applications in the telecommunication field [28] and also suitable for many practical applications such as high-density digital recording disks, audio/video tapes and so on. These materials are commercially used in high-quality filters, rod antenna radio frequency circuits, transformer cores, read/write heads for high-speed digital tape and operating devices [29,30].

In order to synthesis Cobalt Nickel ferrite nanoparticles, researchers used various techniques and methods like, Sol–gel [31], Micro-emulsion [32], Reverse emulsion-assisted hydrothermal process [33], Combustion synthesis [34], High energy ball milling [35] and Hydrothermal method [36]. In the present study we are going to review substitutional effect of divalent ions on structural, magnetic and electrical properties of Co-Ni Ferrite.

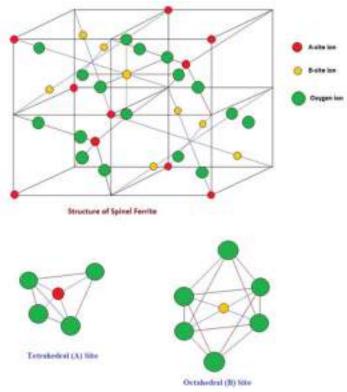


Figure 1: Structure of Spinel Ferrite

2. STRUCTURE OF SPINEL AND CO-NI FERRITE:

Ferrites are basically mixed metal oxides with iron (III) oxides as their principal component broadly crystallize in three crystalline structures; spinels (AB₂O₄), garnet (A₃Fe₅O₁₂) and magneto plumbite (AFe₁₂O₁₉) where A and B are metal ions. Structurally Spinel Ferrite is simplest of them which crystallize into the spinel structure and determined by the oxygen ion lattice. Spinel ferrites are oxides that have a cubic crystal structure, where the oxygen anions form a face-centered cubic (FCC) lattice. Spinel ferrites have a general formula AFe_2O_4 , where A represent divalent ions, such as Fe²⁺, Cu²⁺, Mg²⁺, Zn²⁺ etc. The crystal structure can be considered as a cubic close-packed arrangement of O²⁻ anions, with cations occupying the tetrahedral and octahedral sites. In normal spinels, divalent cations reside on one-eighth of the tetrahedral sites and one-half of the octahedral sites are occupied by Fe³⁺ ions. Whereas the Inverse spinel ferrites are better expressed as Fe^{3+} (AFe^{3+}) O^4 , indicating that half of the Fe³⁺ ions occupy tetrahedral sites and the remaining half, together with the A²⁺ ions, occupy the octahedral interstitials. Between these two structural models there exist spinel ferrites with a variable cation distribution and the stoichiometry of which can be represented by the general formula

$$(A^{2+}_{(1-\delta)}, Fe^{3+}_{\delta})^{tet} [A^{2+}_{\delta}, Fe^{3+}_{(2-\delta)}]^{oct} O^4,$$

where parentheses denote the tetrahedral interstitial sites; brackets signify the octahedral interstitial sites δ is the inversion degree of the spinel [37].

Normally, in AB₂O₄ structure divalent ion is bigger in size than that of trivalent ion. Former occupies octahedral site while latter occupies tetrahedral site with some exceptions. In nickel

and cobalt ferrite divalent metal ion (Co²⁺ and Ni²⁺) occupies octahedral site and Fe³⁺ ions occupy half at tetrahedral and octahedral each forms inverse spinel structure. The cation distribution between A- and B-site depends on the ionic radii, the type of bonding and the preparation method. This cation distribution decides the structural, electrical and magnetic properties for a particular ferrite system at and well above room temperature [38].

The Nickel ferrite is a well- known cubic spinel ferrite, which lies under the class of inverse spinel ferrite. The general formula of inverse nickel ferrite is $[Fe_{\delta}^{3+}]_A [Ni^{2+}Fe_{2-\delta}^{3+}]_B O_4^{2-}$ where ' δ ' is the degree of inversion. It is normal spinel if $\delta = 0$ and inverse spinel structure when $\delta = 1$. The Fe³⁺ cations are distributed between A-site and B-site but Ni²⁺ reside only at B-site. The ferric ions ratio $(Fe_A^{3+})/(Fe_B^{3+})$ indicates the degree of inversion [39]. CoFe₂O₄ has a partially inverse structure and it is a well-known hard magnetic material, with relatively high values of saturation magnetization and coercivity. NiFe₂O₄ is a completely inverse spinel and it behaves as a soft magnetic material (with high saturation magnetization and low coercivity) [40]. These properties make these ferrites very promising candidates for a variety of applications in biomedical, electronic as well as recording technology [41–43].

The unit cell of spinel cubic structures contains 32 oxygen atoms with 8 tetrahedral (A) and 16 octahedral (B) occupied sites [44]. Usually, Co and Fe ions accommodate both at A and B-sites while Ni ion occupy B sites. Hashim et al. [45] have reported synthesis of Co-Ni Ferrite and observed distribution of Co^{2+} and Fe^{3+} over both tetrahedral and octahedral site while Ni²⁺ preferentially occupying octahedral site. However, Kumar et al. [46] reported most of the octahedral site are occupied by Ni, Co and Fe ions and tetrahedral site are occupied by only Fe ion in $Co_{1-x}Ni_xFe_2O_4$.

3. DIFFERENT DIVALENT DOPINGS IN CO-NI FERRITE:

3.1 Copper

Many researchers have reported effect of Cu on structural, dielectric and magnetic properties of Co-Ni Ferrite. In 2011, Ghazi et al. [47] studied Ni-Co-Cu nanofilms grown on phosphordoped Si substrate by electrodeposition technique at different electrolyte temperatures. All the films with FCC structure show increasing grain size with raising electrolyte temperature. Saturation magnetization show significant upsurge at the electrolyte temperature of 65 °C and decrease in coercive field with increase in the electrolyte temperature. Babu et al. in 2018 [48] synthesized single phased Ni_{0.7} Co_{0.3-x} Cu_x Fe₂ O₄ (x = 0.0, 0.05, 0.1, 0.15 and 0.2) nanocrystalline ferrites using the sol-gel method. They observed that the difference in the ionic radii of Co^{2+} and Cu^{2+} led lattice constant to increase from 8.3442 to 8.3693 Å with increasing doping concentration. The average crystallite size found to be ranged from 10.92 to 12.61 nm with average grain size of approximately 10 µm. The cation distribution studies confirmed that copper ions occupied the octahedral site. The dielectric study confirms normal dielectric behaviour of spinel ferrite where dielectric constant and dielectric loss tangent and the initial permeability are found to decrease with increasing frequency attributed to hopping mechanism. They found increase in DC resistivity with the frequency up to 6 MHz and then decreased gradually, indicating a change in the magnetic ordering from ferrimagnetism to paramagnetism. The resistivity increased as the dopant concentration increased. The observed g-value

determined by ESR reduced linearly with increasing the magnetic field and dopant concentration. Balavijayalakshmi et al. (2014) [49] prepared $Co_{0.4}$ Ni_{0.4} $Cu_{0.2}$ Fe₂ O₄ nanoparticles co-precipitation method with different sintering temperatures and studied its structural and magnetic properties. FTIR studies confirm absorption bands at around 590 cm⁻¹ and 435–427 cm⁻¹ respectively. Their observation suggests enhanced crystallinity, increased particle size and shifting of absorption bands toward lower values with increasing sintering temperatures. It is observed that the saturation magnetization (Ms), remanent magnetization (Mr) and coercivity (Hc) values of samples are increasing the sintering temperature. A saturation magnetization of 48 emu/g and coercivity of 1151O_e are obtained for the samples sintered at 900 0 C.

Abdelmajid et al. [50] reported synthesis of single-phase $Cu_x Co_{0.5-x} Ni_{0.5} Fe_2 O_4$ with x= (0.1, 0.2, 0.3, 0.4) ferrites by the co- precipitation method. Both lattice constant and crystallite sizes are found to be decreasing with respect to Cu^{2+} doping content and lie in the range 8.294 to 8.346 Å and 38 to 21 nm respectively. The morphological study confirmed the presence of uniform and cubic-shaped and agglomerated samples. It is observed that increasing copper content enhance magnetic properties due to the increase in B-B exchange interaction induced anti-parallel spin coupling. Rajasekhar Babu et al. (2017) [51] reported study of single-phase Co $_{0.5}$ Ni $_{0.5-x}$ Cu x Fe 2 O 4 (x=0.0, 0.1, 0.2, 0.3 and 0.4) ferrite nanoparticles prepared through Sol-gel auto combustion method. The observed values of lattice constant show increasing trend with respect to Cu content, but no significant change on crystallite size. Grain size ranges from 0.391 µm to 2.752 µm. Grain size, Bulk density, X-ray density increases while the porosity decreases with the substitution of Cu concentration. Magnetic study reveals the increase in Saturation magnetization and the magnetic permeability with increase in doping concentration. In their study, it is seen that the magnetic coercivity (H_c) decreases from 885 to 191 Oe due to the reducing magnetocrystalline anisotropy with the copper incorporation. Dielectric study reflects semiconducting nature of ferrite with augmented DC resistivity and activation energy due to lowering of hopping of charge carriers between ferrous and ferric ions at octahedral B sites.

Ramakrishna et al. (2018) [52] fabricated $Co_{0.5}$ Ni_{0.1} Cu_{0.4} Fe₂ O₄ using the sol-gel auto combustion technique and found to have lattice constant 8.4773 Å and crystalline size of 43 nm. SEM study reveals smooth, well-arranged grains of polygonal structure having clear grain boundaries. Saturation magnetization and remanent magnetisation of the sample Co_{0.5} Ni_{0.1} Cu_{0.4} Fe₂ O₄ is found to be 59.55 emu/gm and 7.92 emu/gm respectively. While the Coercivity is recorded to be 197.5 O_e. Devan et al. [53] synthesized Ni_{0.93}Co_{0.02}Cu_{0.05}Fe₂O₄ as a ferrite phase and BaTiO3 as a ferroelectric phase by normal ceramic method and studied the effect of temperature on dielectric properties of the prepared sample. The observed improved dielectric properties and hysteresis behavior suggested its potential to be useful in making the memory devices more stable and reliable for spintronic application and magnetic sensors. Shakir et al. [54] investigated Cu²⁺ and Mg²⁺ co-substituted CoNiFe₂O₄ and found lattice constant and crystalline size to be improved with respect to doping concentration. Crystalline size ranged in 18.71-29.93 nm. They observed increase in electrical conductivity due to the replacement of less conductive transition metals (Co and Ni) with well conducting metals such as Mg²⁺ and Cu²⁺ ions making conductivity 2.6 times better than observed before doping. was obtained after the replacement of Co and Ni with Mg and Cu respectively.

3.2 Magnesium

In 2020, Bhandare et al. [55] synthesized Mg doped $Co_0 \, _5Ni_0 \,_5Fe_2O_4$, (x = 0, 0.1, 0.2, 0.3, 0.4) and reported Co^{2+} inhabits both the A and B sites in the ratio 2:3 while the rest of the A and B sites by Fe³⁺ cations and confirmed it with the Mossbauer spectroscopy studies. XRD analysis confirmed average crystallite size (D) in the range 30-38 nm. SEM studies confirms irregular shaped, agglomerated particles having porous structure due to release of gases during the combustion process. A small decrease in saturation magnetization and magnetic moment of the samples is observed when Mg-substitutes for Ni due to the substitution of non-magnetic Mg²⁺ cations at the tetrahedral site. The high value of coercivity is observed due to hard magnetic property possessed by cobalt that did not vary significantly with respect to doping concentration. Rosnan et al. [56] used co-precipitation method to synthesize Co-Ni-Mg ferrite powders with composition $Co_{0.5}$ Ni_{0.5-x} Mg_x Fe₂ O₄. It is observed that increase in doping concentration leads to shift 20 toward lower angle side and causes increase in lattice parameter, particle size and higher degree of crystallinity. It is seen that X-ray density and Bulk density is decreasing while the porosity increases with increasing Mg²⁺ substitution. Morphological studies revealed particles obtained have homogenous morphology, uniform size, but partially agglomerate due to interactions between magnetic particles. Magnetic studies showed that both saturation magnetization and coercivity first increases upto x=0.1 concentration and then decreases with further increase in Mg substitution. The values of squareness ratio confirm the single magnetic domain nature of the samples. They recommended the prepared samples to be useful in high density recording media for obtaining the suitable signal-to-noise ratio. Selmi et al (2017) [57] prepared single-phase Ni_{0.4}Co_{0.4}Mg_{0.2}Fe₂O₄ composition by sol-gel method having lattice constant 8.310 Å, average particle size of 0.47 µm and X-ray density of 5.265 g/cm³. Dielectric study confirms semiconducting nature of ferrite where dielectric constant increases with rising temperature since the hopping of charge carriers is thermally activated. Frequency dependent study exhibit decrease in dielectric constant, loss tangent and the real part of impedance (Z') with increase in frequency. Improvement in AC conductivity with temperature is attributed to increase in electron hopping between Fe²⁺ and Fe³⁺. Moreover, the study of spectra of Z'', characterized by the appearance of peaks which shift to higher frequencies with increasing temperature, point to the existence of relaxation phenomenon in prepared material.

Table 1- Various reported methods of synthesis of divalent ion doped Co-Ni Ferrite and relatedstructural, Magnetic andElectric Properties. Ms stands for Saturation Magnetization, Mr forRemanent Magnetization, Hc for Coercivity, ε for dielectric constant, ΔE for ActivationEnergy, σ_{AC} for AC Conductivity, ρ for resistivity, Tc= Curie Temperature

Composition	Synthesis	Sinteri	Crystall	Studied P	roperties	Referen
	Method	ng Temp. (⁰ C)	ite Size (nm)	Magneti c	Electric	ce
Ni _{0.8-} _x Co _{0.2} Cd _x Fe ₂ O ₄ (x=0.1, 0.2, 0.3)	Ceramic	1100 - 12h	18.49- 33.07 nm	-	$\begin{array}{l} \rho_{dc} \\ = 4.31 \\ 8.74x10 \\ {}^9 \Omega \text{-cm} \\ T_c = 710 \\ 730 \ {}^\circ\text{C} \\ \epsilon' = 3547 \\ -11368 \\ (1kHz) \\ \Delta E = 0.5 \\ 7 \text{-} 0.8 \\ eV \end{array}$	[58]
$\begin{array}{c} Ni_{0.17}Co_{0.35}Cu_{0.48}F\\ e_{2}O_{4}\\ Ni_{0.21}Co_{0.34}Cu_{0.45}F\\ e_{2}O_{4}\\ Ni_{0.25}Co_{0.33}Cu_{0.42}F\\ e_{2}O_{4} \end{array}$	Electrodeposit ion technique	-	47-103 nm	$\begin{array}{c} H_{c} = 29 \\ 42.5 \text{ O}_{e} \\ M_{s} = 0.002 \\ 9 \\ -0.126 \\ emu/cm^{2}, \\ M_{r} = \\ 0.0021 \\ 0.0095 \\ emu/cm^{2} \end{array}$	-	[47]
Co _{0.4} Ni _{0.4} Cu _{0.2} Fe ₂ O ₄	Co- precipitation	130, 600, 900	12-32 nm	$\begin{split} M_s &= 0.61, \\ 38.8, \\ 48.4 \\ emu/g, \\ M_r &= 0.022 \\ , 15.7, \\ 20.8 \\ emu/g \\ H_c &= \\ 421.4, \\ 1091, \\ 1151.3 \\ O_e \end{split}$	-	[49]

Ni0.93C00.02Cu0.05F	Ceramic	1250-	1.21-	M _s =5-15	ε'=6200	[53]
e ₂ O ₄		1250 12h	1.21 1.28 μm	emu/g,	-10400	[55]
			- •	M _r =1.5-	(1kHz)	
				5.5		
				emu/g.		
				Ũ		
Co _{0.5} Ni _{0.5} -	Sol-gel auto	1050-	53-95	M _s =40-	ΔE=0.5	[51]
$_{x}Cu_{x}Fe_{2}O_{4}$ (x	combustion	4h	nm	60	6-0.60	
=0.1, 0.2, 0.3				emu/g,	eV	
and0.4)				H _c = 196-		
				885 Oe		
	Coloral costa	1000	12	M		[52]
$Co_{0.5}Ni_{0.1}Cu_{0.4}Fe_2$	Sol-gel auto- combustion	1000-	43 nm	$M_s =$	-	[52]
O4	combustion	3h		59.55 emu/g,		
				$M_r=7.92$		
				$\frac{101}{m}$ emu/g		
				H _c =197.5		
				O_e		
				Ue		
Co _{0.5} Mg _x Ni _{0.5} .	Sol-gel auto	600-2h	30.4-	Ms= 33-	-	[55]
$_{x}Fe_{2}O_{4}$ (x =0, 0.1,	combustion		37.7 nm	41emu/g,		
0.2, 0.3, 0.4)				Mr=		
				27.19-		
				31.01		
				emu/g		
				Hc=		
				931.11-		
				1032.7		
				Oe		
				μ _B = 1.29-		
		000	22.6	1.68		[5(]
$Co_{0.5}Ni_{0.5-x}Mg_{x}Fe_{2}$	Co-	900-	32.6-	Ms=26.4	-	[56]
O_4 (x=0.1, 0.2,	precipitation	10h	35.8 nm	1-34.05		
0.3, 0.4 and 0.5)				emu/g		
				Mr=47.3		
				4-61.49		
				emu/g Hc=603.		
				нс-605. 26-		
				684.11		
				603.26		
				005.20		

Ni _{0.4} Co _{0.4} Mg _{0.2} Fe ₂	Sol-gel	1050-	-	-	ΔE=0.2	[57]
O ₄		48h			68 eV	
Ni _{0.2} Mn _x Co _{0.8-}	Sol-gel auto	950-3h	48.50-	M _s =	-	[59]
$_{x}Fe_{2}O_{4} (x = 0.0,$	combustion		52.13	63.39-		
0.1, 0.2, 0.3, 0.4)			nm	73.81		
				emu/g		
				M _r =		
				21.51-		
				35.23		
				emu/g		
				H _c =		
				441.07-		
				1116.89		
				Oe		
Ni _{0.5} Co _{0.5-}	Sol-gel	1200-	1.50-	-	$\sigma_{AC} =$	[60]
$_{x}Zn_{x}Fe_{2}O_{4}$ (x = 0,		5h	1.61 nm.		6.95x10	
0.02, 0.04 and					-9 -	
0.06)					8.22x10	
					⁻⁶ S/cm	
Ni _{0.8} Co _{0.2} -	Solution	700-2h	39-51	$M_s =$	$\rho_{dc} =$	[61]
$_{2x}Cu_{x}Mn_{x}$	Combustion		nm	50.97-	(2.10-	
Fe_2O_4 (with x =				145.3	4.16)	
0.01,0.03, 0.05,				emu/cc	x10 ¹³	
0.07 and 0.09)				$M_r = 21-$	Ω-cm	
				57.83	$\Delta E=$	
				emu/cc	0.14-	
				H _c =	0.27 eV	
				22.42-		
				365.94		
				Oe		

Zhao et al. [62] reported effects of Mg Substitution on the structural and magnetic properties of Ni_{0.2}Mg_xCo_{0.8-x}Fe₂O₄ (x = 0.0, 0.2, 0.4, and 0.6) nanoferrites. XRD study detected the samples with higher crystallinity with polycrystalline nature. Lattice constant, X-ray density, Bulk Density found to be decreasing with respect to doping concentration. Difference in ionic radii of Co²⁺ and Mg² cause lattice constant to decrease from 8.3681 Å to 8.3665 Å and crystallite size to increase from 48 to 50 nm. Magnetic studies reveal that saturation magnetization (Ms) and a residual magnetization (Mr) decreases from 70.16 to 39.77 emu/g and 36.40 to 20.20 emu/g respectively with the increasing of magnesium ion content since Mg ²⁺ preferentially occupy the B-site reducing the density of Co ²⁺ on the B-site. But most noteworthy change occurred in coercivity which reduced significantly from 1032.61 to 378.50 O_e. The squareness ratio (M_r/M_s) of above 0.50 designates a single magnetic domain formation. They have suggested samples above 600 O_e potentially useful in high-density recording medium.

3.3 Zinc

Ni-Co-Zn spinel ferrite is another variant of divalent substituted Co-Ni ferrites which is exploited by the researchers for their possible applications. Azhagushanmugam et al. [63] investigated effect of cation distribution on Structural and Magnetic properties of Nickel Cobalt Zinc Ferrites synthesized by chemical Coprecipitation method. It is observed that lattice parameter increases while the particle size and X-ray density decreases with the increase in zinc concentration. This increase of lattice parameter can attributed be to the greater ionic radius of Zn^{2+} (0.83 Å) ions compared to Ni ²⁺ (0.78 Å), against which it is substituted. TEM investigation indicates the nanostructured nature and spherical morphology having particle size 17 nm of the prepared samples with uniform size.

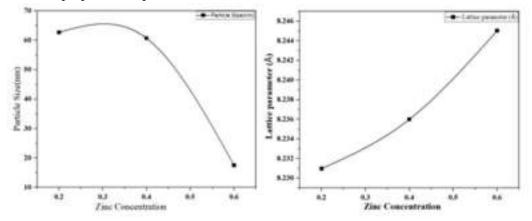
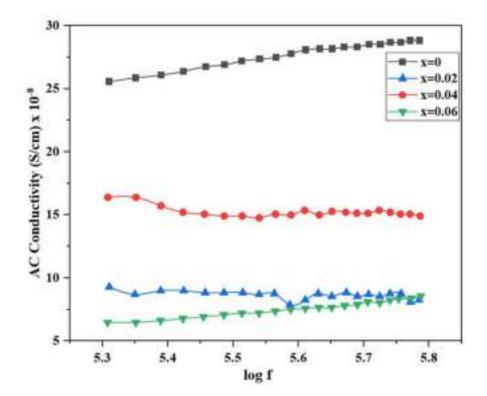


Figure 2. Variation of particle size and Lattice parameter with Zn in Ni-Co Ferrite as reported by Azhagushanmugam et al. [63]

Zhao et al. [64] prepared and investigated Ni_{0.2}Zn_xCo_{0.8-x}Fe₂O₄ (x = 0.0, 0.2, 0.4, 0.6 and 0.8) using sol-gel method for the better understanding of zinc doping on the structural and magnetic properties. The larger Zn²⁺ (0.74Å) ionic size led to the increase in the lattice constant of the Ni-Co Ferrite from 8.3761 Å to 8.4222 Å. Porosity and X-ray density also increased with Zn content. The average crystallite size found to be within the range 103-130 nm with nonlinear behaviour with respect to Zn²⁺ concentration. The results of morphological study confirmed forming of spherical agglomerated very fine particles. As the zinc ion content increases, Ms and Mr increase first upto x = 0.02 and then decrease thereafter upto concentration x=0.1. Sample with doping concentration of x=0.02 exhibited best magnetic properties. Observed values of coercivity decreases from 1003.96 O_e to 0.64 O_e due to replacement of Cobalt with high coercive value by Zn²⁺ ion. The low value of Mr/Ms ratio confirmed the superparamagnetic nature of the prepared samples. In 2018, Vijaya Babu et al. [60] investigated the structural, electrical and magnetic properties of nano-structured Ni _{0.5} Co _{0.5-x} Zn_x Fe ₂ O ₄ (x = 0, 0.02, 0.04 and 0.06) ferrites prepared by sol-gel method. Crystallite size was found to increase with increase in Zn attributed to the increased pore mobility due to the

creation of excess cation vacancies. However, the lattice constant decreases from 8.3485 Å to 8.3323 Å due to slight variances in the ionic radii of Co^{2+} (0.745 Å) and Zn ²⁺ (0.74 Å) ions. Morphological studies confirmed spherical shaped but agglomerated grains to some extent with an average grain size 5-10 nm. Their dielectric study reported decreasing dielectric constant and dielectric loss tangent with increase in frequency approaching a constant value at higher frequencies. This typical dielectric behaviour of the ferrites is the consequence of hopping mechanism between Fe ³⁺-Fe ²⁺ ions which decrease with increasing frequency since the hopping frequency of charge carriers cannot follow the changes to the externally applied electric field at higher frequencies. AC conductivity is also seen increasing with rising frequency since hopping frequency increases with applied frequency. Studies also reported substitutional effect on dielectric properties where zinc substitution concentration causes dielectric constant to decrease in the low frequency range. This is due to migration of Fe ³⁺ ions from B- site to A- site which decreases the hopping between Fe ³⁺-Fe ²⁺ ions in B site causing lower polarization and hence lower dielectric constant. It is also observed that the initial permeability and the g-value reducing with increasing Zn ²⁺ dopant concentration.



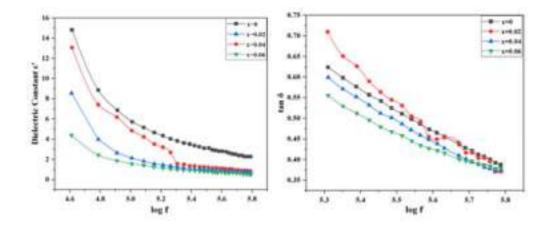


Figure 3. Variation of (a) AC conductivity, (b) Dielectric constant and (c) Dielectric loss tangent with frequency for Ni 65 Co 65 x Zn x Fe 2 O 4 (x = 0, 0.02, 0.04 and 0.06) reported by <u>Vijavababu</u> et al. [60]

Synthesis of Zn 0.35 Ni 0.57 Co 0.03 Fe 2.05 O 4 was reported by Ghodake et al. (2015) [65] using a chemical combustion route and reported increase in crystallite size with increasing temperature. The real part of initial permeability was also seen surging and loss factor decreasing with increasing sintering attributed to increase in grain size with increasing sintering temperature. Their study indicates the shifting of material from ferrimagnetic to paramagnetic state at Curie temperature. In 2012, Bhise et al. (2012) [66] reported synthesis of Ni-Co-Zn ferrite by Sol-gel Auto-Combustion Method and observed increase in lattice parameter, grain size, porosity but decreased densification with increase in temperature. Substitutional effects of Zn on structural and magnetic properties of Co-Ni Ferrite were investigated by Raju et al. (2014) [67]. Rietveld refined XRD study revealed sample with cubic structure, Fd-3m space group and the lattice constant which increases linearly with surging Zn concentration obeying Vegard's law. In this investigation, for low doping concentrations of Zn with $x \leq 0.3$, M_s increased from 57.12 to 76.78 emu/g and decreased thereafter to a value 64.89 emu/g when x was increased further up to x = 0.5. This increase of M_s up to x = 0.3 with the Zn concentration is in accordance with Neel's Sublattice model; however, the decrease in M_s after x > 0.3 is attributed to the three-sub-lattice model suggested by Yafet and Kittel. Remanent magnetization (M_r) , Squareness ratio (M_r/M_s) , Coercivity (H_c) and magnetic anisotropy are found to be decreasing with increasing Zn concentration and lowering Co²⁺ ions. The observed high coercivity is driven by the large anisotropy of the cobalt ions due to spin orbit coupling. Rani et al. [68] employed co-precipitation method for synthesis and investigation of physicochemical properties of zinc substituted Co-Ni mixed ferrites. They observed appreciable increase in lattice constant with Zn substitution. The average crystallite size of the samples found in the range 11.59-21.20 nm. The SEM image of the product reveals rock like particle morphology with agglomeration in 2 µm scale. Thakur et al. (2012) [69] studied superparamagnetic behavior of Ni_{0.4} Zn_{0.6} Co_{0.1} Fe_{1.9} O₄ nanoferrites, synthesized by a coprecipitation method. Magnetic studies done by them found almost zero coercivity, which proposes a superparamagnetic behavior at 300 K. Tian et al. (2009) [70] fabricated Ni _{0.11} Zn $_{\rm x}$ Co $_{0.03}$ Fe $_{2.86-x}$ O $_4$ spinel ferrite films using wet chemical method to study structural and

magnetic properties. They found no significant effect on grain size but increase in lattice constant due to doping. Average grain size observed to be 40 ± 2 nm and lattice constant in the range 0.8383 to 0.8425 nm attributed to the larger ionic radius of Zn ²⁺ (0.074 nm) as compared to Fe ³⁺ (0.067 nm). Magnetic studies revealed nonlinear change in saturation magnetization which increased upto x=0.35 due to addition of non-magnetic Zn decreasing magnetic moment of tetrahedral site M_A thereby increasing overall magnetization and then decreases with further increase of Zn due to spin canting effect. It is observed that Coercivity and magnetocrystalline anisotropy declines monotonically with the growing Zn content x from 0 to 0.51.

It has been seen that very limited work has been reported on Manganese substituted Co-Ni Ferrite. Zhang et al. [59] reported structural, morphological and magnetic properties of Ni-Co ferrites substituted by the Manganese ions. Structural distortion and strain due to Mn substitution caused lattice expansion. It was observed that the lattice constant first decreased from \$.3798 to \$.3738 Å when Mn2+ content reaches x=0.1 and then increased with the increase of Mn2+ content. The average size of the experimental microcrystals reduces first and then grows with the Increase of Mn content. Reported particle size of the prepared samples ranged from 80 to 90 nm. VSM measurements confirmed ferromagnetic behavior and observed that the magnetic properties Ms, Mr are decreasing with the increase of manganese ion content, The decrease in magnetic moment and Squareness ratio is signifying that, the presence of non-conducting domain particles is: in accordance with the doping concentration The prepared ferrite has high coercivity, and the coercivity decreases with the further substitution of Mn content suggesting that manganese-doped nanoferrites have low magnetic properties. Lee et al. [71] investigated of dynamic magnetic properties and thermal magnetic stability of Ni-Co-Mn Ferrite and reported enhanced magnetic properties along with higher thermal stability factor compared to Ni-Co ferrites.

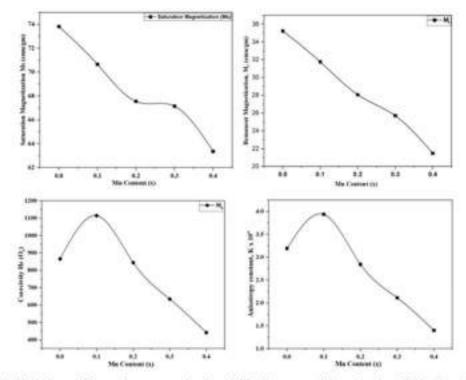


Figure 4: Variation of Saturation magnetization (Ms), Remanent Magnetization (Mr), Coercivity and Anisotropy constant with respect to Mn concentration reported by Zhang et al. [59]

3.4 Cadmium

Aldar et al. [58] prepared Ni 0.8-x Co 0.2 Cd x Fe 2 O 4 (x=0.1, 0.2 and 0.3) by standard double sintering ceramic method and confirmed single phase samples with the Fd-3m space group. Lattice parameter and grain size are found to be increased with increase in Cd doping due to larger ionic radius of Cd ion (0.97Å). Temperature dependent dielectric study confirmed the semiconducting behaviour and increase in dielectric constant and then declining signifying phase transition from ferromagnetic to paramagnetic state. Activation energy and curie temperature showed declining nature with respect to increasing Cd content. Frequency dependent studies indicate AC conductivity increases with increasing frequency and dielectric constant show dielectric dispersion at lower frequencies. Alahmari et al.[72] investigated $Ni_{0.5}Co_{0.5-x}Cd_xFe_2O_4$ (x < 0.20) to study its structural and magnetic properties and reported the enhanced value of saturation magnetization (Ms) ascribed to the effects of surface spins, the cations distribution, the evolution of magneto-crystalline anisotropy, and the variation of magnetic moment (n_B) . The greatest Ms of about 38.5 emu/g was obtained for x = 0.20 NFs. All prepared samples with squareness ratio below 0.5 show the single-magnetic domain structure. Kulkarni et al. [73] reported structural properties of cadmium doped cobalt nickel ferrite $(Co_{0.5}Ni_{0.5}CdxFe_{2-x}O_4)$ (x = 0, 0.1, 0.2, 0.3, 0.4, 0.5) and found the single-phase cubic spinel structure with lattice parameter in the range 8.39 to 8.33 Å that showed shrinkage with increase in doping. The crystallite size is confirmed by Debye Scherrer method, WH and SS plots are to be varying in the range of 35–160 nm. SEM study confirmed granular and flower structured grains. The FTIR study found the absorption bands in the range of $580-600 \text{ cm}^{-1}$ and another below 400 cm⁻¹ corresponding to octahedral and tetrahedral sites.

3.5 Other (Mixed)

In 2015, Jadhav et al. [61] reported preparation of Ni 0.8 Co 0.2-2x Cu x Mn x Fe 2 O 4 ferrites (with x = 0.01, 0.03, 0.05, 0.07 and 0.09) through solution combustion route. Crystallite size follow unusual trend as a function of doping concentration and found to increase up to 0.03 doping concentration and then reduce thereafter. However, the lattice constant was found unaffected with doping concentration and remains constant at around 8.34 Å for all the samples. SEM study confirmed formation of porous structured agglomerates with submicron sized grains. Observed values of saturation magnetization showing non-linear increase with respect to Cu and Mn doping concentration due surface spin disorder of the grains. Reported results indicate sample with x=0.7 composition yields improved magnetic as well as magnetomechanical properties signifying its potential use in transducer application. Jadhav et al. (2016) [74] reported structural, electrical and magnetic properties Mn and Cu Co-substituted Ni-Co ferrite thick films for screen printing technique. Magnetic observations display no substantial change in saturation magnetization with doping concentration. Dielectric study show reduction in DC resistivity with increase in temperature which confirms the semiconducting nature of prepared samples. The reported resistivity values of the thick films are of the order of $10^{13} \Omega$ -cm at room temperature. Resistivity values are observed to be almost 3 orders greater than its bulk counterpart.

4. CONCLUSION:

In a nutshell, this review work presented a versatile way in which Cobalt Nickel nanoferrites can be fabricated and the influence of the various divalent dopant ions on the structural, electrical and magnetic properties of the materials. Different parameters that contribute to structural, electric and magnetic properties are clearly summarised in tabular form which gave more insight to the researchers about the effect of divalent ions on Co-Ni ferrites. The particle size of spinel ferrites is found to be a function of the selected synthesis method and the associated metal nature. In present overview, we have found Divalent metal ion doped Co-Ni ferrite particles possess different sizes, from ultrasmall 2 nm to 100 nm. They can be fabricated mostly by sol-gel auto combustion and co-precipitation methods however other methods like the Electrodeposition technique and even combination of these methods with high-temperature calcination are also frequently employed. A series of diverse shapes for ferrite nanoparticles have been observed, from spherical to nanorods or nanotubes which are considerably affected by the type of doping atoms, level of impurity, specific surface area, etc.

Different divalent dopants have been added to the CoNiFe2O4 nanoparticles with the aim of modification in its saturation magnetization (Ms). Increase or decrease of Ms largely decided by the nature and concentration of doped ion as well as cation distribution and surface spin effects. Furthermore, it was clear that the magnetic properties are strongly dependent on the microstructure of the samples where the porosity and density also play crucial roles on the magnetic properties. Cobalt Nickel ferrites with divalent doping of elements have excellent electrical and magnetic properties which result in a wide range of applications such as high-density recording media for obtaining the suitable signal-to-noise ratio, transducer application,

gas sensors, drug delivery, computer memory cores, high frequency transformers, stable memory devices, spintronics, magnetic sensors etc.

References:

[1] M. Kurian, D.S. Nair, Effect of preparation conditions on Nickel Zinc Ferrite nanoparticles: A comparison between sol-gel auto combustion and co-precipitation methods, Journal of Saudi Chemical Society. 20 (2016) S517–S522. https://doi.org/10.1016/J.JSCS.2013.03.003.

[2] S. Thankachan, M. Kurian, D.S. Nair, S. Xavier, E.M. Mohammed, Effect of rare earth doping on structural, magnetic, electrical properties of magnesium ferrite and its catalytic activity, (2014). https://www.researchgate.net/publication/264623012 (accessed September 10, 2022).

[3] B.P. Jacob, S. Thankachan, S. Xavier, E.M. Mohammed, Effect of Tb3+ substitution on structural, electrical and magnetic properties of sol–gel synthesized nanocrystalline nickel ferrite, J Alloys Compd. 578 (2013) 314–319. https://doi.org/10.1016/J.JALLCOM.2013.04.147.

[4] M. Kurian, D.S. Nair, A.M. Rahnamol, Influence of the synthesis conditions on the catalytic efficiency of NiFe2O4 and ZnFe2O4 nanoparticles towards the wet peroxide oxidation of 4-chlorophenol, Reaction Kinetics, Mechanisms and Catalysis 2013 111:2. 111 (2013) 591–604. https://doi.org/10.1007/S11144-013-0667-X.

[5] R.S. Melo, F.C. Silva, K.R.M. Moura, A.S. de Menezes, F.S.M. Sinfrônio, Magnetic ferrites synthesised using the microwave-hydrothermal method, J Magn Magn Mater. 381 (2015) 109–115. https://doi.org/10.1016/J.JMMM.2014.12.040.

[6] A. Raghavender, Synthesis and Characterization of Cobalt Ferrite Nanoparticles, Science, Technology and Arts Research Journal. 2 (2014) 01–04. https://doi.org/10.4314/star.v2i4.1.

[7] Q. Song, Z.J. Zhang, Shape Control and Associated Magnetic Properties of Spinel Cobalt Ferrite Nanocrystals, J Am Chem Soc. 126 (2004) 6164–6168. https://doi.org/10.1021/JA049931R/ASSET/IMAGES/MEDIUM/JA049931RN00001.GIF.

[8] S. Han, J. Li, R. Gao, T. Zhang, B. Wen, The modification effect in magnetization behaviors for CoFe2O4–p-NiFe2O4 binary ferrofluids, Applied Physics A 2009 98:1. 98 (2009) 179–186. https://doi.org/10.1007/S00339-009-5447-0.

[9] V. Šepelák, I. Bergmann, A. Feldhoff, P. Heitjans, F. Krumeich, D. Menzel, F.J. Litterst, S.J. Campbell, K.D. Becker, Nanocrystalline Nickel Ferrite, NiFe2O4: Mechanosynthesis, Nonequilibrium Cation Distribution, Canted Spin Arrangement, and Magnetic Behavior, Journal of Physical Chemistry C. 111 (2007) 5026–5033. https://doi.org/10.1021/JP067620S.

[10] K. Nejati, R. Zabihi, Preparation and magnetic properties of nano size nickel ferrite particles using hydrothermal method, Chem Cent J. 6 (2012) 1–6. https://doi.org/10.1186/1752-153X-6-23/TABLES/2.

[11] F. Genc, B. Ünal, A. Baykal, H. Sözeri, Electrical Properties of Mn-Doped Ni x Zn0.9–x Fe2O4 Particles, Journal of Superconductivity and Novel Magnetism 2014 28:3. 28 (2014) 1055–1064. https://doi.org/10.1007/S10948-014-2833-4.

[12] A.T. Nelson, J.T. White, D.A. Andersson, J.A. Aguiar, K.J. McClellan, D.D. Byler, M.P. Short, C.R. Stanek, Thermal Expansion, Heat Capacity, and Thermal Conductivity of Nickel Ferrite (NiFe2O4), Journal of the American Ceramic Society. 97 (2014) 1559–1565. https://doi.org/10.1111/JACE.12901.

[13] R. Radhakrishnan, S. Gollapudi, B. Murty, STRUCTURAL, ELECTRICAL AND MAGNETIC PROPERTIES OF NANOSIZED NI-CO FERRITE PREPARED BY HIGH ENERGY BALL MILLING, TRANSACTIONS OF POWDER METALLURGY ASSOCIATION OF INDIA. 34 (2008) 49–2008.

[14] A. Singh, J. Singh, H.S. Dosanjh, Synthesis of pure and mixed Nickel-Cobalt ferrites (Ni 1-X Co X Fe 2 O 4) by combustion method and characterization, J. Chem. Pharmaceut. Res. . 7 (2015) 612–617.

[15] M.A. Ati, H. Khudhair, S. Dabagh, R.M. Rosnan, A.A. Ati, Synthesis and Characterization of Cobalt doped Nickel - Ferrites Nanocrystalline by Co-precipitation Method, Int J Sci Eng Res. 5 (2014). http://www.ijser.org (accessed September 10, 2022).

[16] K. Pubby, S.S. Meena, S.M. Yusuf, S. Bindra Narang, Cobalt substituted nickel ferrites via Pechini's sol-gel citrate route: X-band electromagnetic characterization, J Magn Magn Mater. 466 (2018) 430–445. https://doi.org/10.1016/J.JMMM.2018.07.038.

[17] U.B. Sontu, N.R. G, F.C. Chou, V.R.R. M, Temperature dependent and applied field strength dependent magnetic study of cobalt nickel ferrite nano particles: Synthesized by an environmentally benign method, J Magn Magn Mater. 452 (2018) 398–406. https://doi.org/10.1016/J.JMMM.2018.01.003.

[18] A.A. Ati, Z. Othaman, A. Samavati, Influence of cobalt on structural and magnetic properties of nickel ferrite nanoparticles, J Mol Struct. 1052 (2013) 177–182. https://doi.org/10.1016/J.MOLSTRUC.2013.08.040.

[19] Y. Zhou, W. Chen, Y. Shen, X. Wu, W. Wu, J. Wu, Lattice strains and magnetic properties evolution of copper-magnesium ferrite with lithium substitution, J Magn Magn Mater. 396 (2015) 198–203. https://doi.org/10.1016/J.JMMM.2015.08.046.

[20] Cvejić, E. Durdić, G. Ivković Ivandekić, B. Bajac, P. Postolache, L. Mitoseriu, V. v. Srdić, S. Rakić, The effect of annealing on microstructure and cation distribution of NiFe2O4, J Alloys Compd. 649 (2015) 1231–1238. https://doi.org/10.1016/J.JALLCOM.2015.07.238.

[21] V.C. Nguyen, T.K.N. Huynh, Reusable nanocomposite of CoFe 2 O 4 /chitosan- graft -poly(acrylic acid) for removal of Ni(II) from aqueous solution, Advances in Natural Sciences: Nanoscience and Nanotechnology. 5 (2014) 025007. https://doi.org/10.1088/2043-6262/5/2/025007.

[22] R. Bujakiewicz-Korońska, Ł. Hetmańczyk, B. Garbarz-Glos, A. Budziak, A. Kalvane,
K. Bormanis, K. Drużbicki, Low temperature measurements by infrared spectroscopy in CoFe
2 O 4 ceramic, Central European Journal of Physics. 10 (2012) 1137–1143.
https://doi.org/10.2478/S11534-012-0101-4/MACHINEREADABLECITATION/RIS.

[23] J. Zou, R. Gao, C. Fu, W. Cai, G. Chen, X. Deng, Influence of Co ion doping on the microstructure, magnetic and dielectric properties of Ni1-xCoxFe2O4 ceramics, Processing and Application of Ceramics. 12 (2018) 335–341. https://doi.org/10.2298/PAC1804335Z.

[24] J.-L. Ortiz-Quiñ Onez, U. Pal, M. Salazar Villanueva, Structural, Magnetic, and Catalytic Evaluation of Spinel Co, Ni, and Co-Ni Ferrite Nanoparticles Fabricated by Low-

TemperatureSolutionCombustionProcess,(2018).https://doi.org/10.1021/acsomega.8b02229.

[25] B. Ndlovu, J.Z. Msomi, T. Moyo, Mössbauer and electrical studies of NixCo1-xFe2O4nanoparticles,JAlloysCompd.745(2018)187–195.https://doi.org/10.1016/J.JALLCOM.2018.02.122.

[26] N. Somaiah, T. v. Jayaraman, P.A. Joy, D. Das, Magnetic and magnetoelastic properties of Zn-doped cobalt-ferrites—CoFe2–xZnxO4 (x=0, 0.1, 0.2, and 0.3), J Magn Magn Mater.
324 (2012) 2286–2291. https://doi.org/10.1016/J.JMMM.2012.02.116.

[27] V.L.O. de Brito, S.A. Cunha, L.V. Lemos, C.B. Nunes, Magnetic Properties of Liquid-Phase Sintered CoFe2O4 for Application in Magnetoelastic and Magnetoelectric Transducers, Sensors. 12 (2012) 10086–10096. https://doi.org/10.3390/s120810086.

[28] A. Goldman, Modern Ferrite Technology, Modern Ferrite Technology. (2006). https://doi.org/10.1007/978-0-387-29413-1.

[29]V.L. Mathe, R.B. Kamble, Electrical and dielectric properties of nano crystalline Ni–Cospinelferrites,MaterResBull.48(2013)1415–1419.https://doi.org/10.1016/J.MATERRESBULL.2012.12.019.

[30] C. Stergiou, Magnetic, dielectric and microwave absorption properties of rare earth doped Ni–Co and Ni–Co–Zn spinel ferrites, J Magn Magn Mater. 426 (2017) 629–635. https://doi.org/10.1016/J.JMMM.2016.11.001.

[31] M. Atif, M. Nadeem, R. Grössinger, R.S. Turtelli, Studies on the magnetic, magnetostrictive and electrical properties of sol–gel synthesized Zn doped nickel ferrite, J Alloys Compd. 509 (2011) 5720–5724. https://doi.org/10.1016/J.JALLCOM.2011.02.163.

[32] X. Gao, Y. Du, X. Liu, P. Xu, X. Han, Synthesis and characterization of Co–Sn substituted barium ferrite particles by a reverse microemulsion technique, Mater Res Bull. 46 (2011) 643–648. https://doi.org/10.1016/J.MATERRESBULL.2011.02.002.

[33] J. Zhang, J. Shi, M. Gong, Synthesis of magnetic nickel spinel ferrite nanospheres by a reverse emulsion-assisted hydrothermal process, J Solid State Chem. 182 (2009) 2135–2140. https://doi.org/10.1016/J.JSSC.2009.05.032.

[34] M.H. Yousefi, S. Manouchehri, A. Arab, M. Mozaffari, G.R. Amiri, J. Amighian, Preparation of cobalt–zinc ferrite (Co0.8Zn0.2Fe2O4) nanopowder via combustion method and investigation of its magnetic properties, Mater Res Bull. 45 (2010) 1792–1795. https://doi.org/10.1016/J.MATERRESBULL.2010.09.018.

[35] S.K. Pradhan, S. Bid, M. Gateshki, V. Petkov, Microstructure characterization and cation distribution of nanocrystalline magnesium ferrite prepared by ball milling, Mater Chem Phys. 93 (2005) 224–230. https://doi.org/10.1016/J.MATCHEMPHYS.2005.03.017.

[36] I. Zalite, G. Heidemane, L. Kuznetsova, M. Maiorov, Hydrothermal Synthesis of Cobalt Ferrite Nanosized Powders, IOP Conf Ser Mater Sci Eng. 77 (2015) 012011. https://doi.org/10.1088/1757-899X/77/1/012011.

[37] M. Sugimoto, The Past, Present, and Future of Ferrites, Journal of the American Ceramic Society. 82 (1999) 269–280. https://doi.org/10.1111/J.1551-2916.1999.TB20058.X.

[38] M.W. Barsoum, Fundamentals of Ceramics, CRC Press, 2019. https://doi.org/10.1201/9781498708166.

[39] S. Das, C. Manoharan, M. Venkateshwarlu, P. Dhamodharan, Structural, optical, morphological and magnetic properties of nickel doped cobalt ferrite nanoparticles synthesized

by hydrothermal method, Journal of Materials Science: Materials in Electronics 2019 30:22. 30 (2019) 19880–19893. https://doi.org/10.1007/S10854-019-02355-0.

[40] J. Smit, H.P.J. Wijn, Ferrites, John Wiley & Sons Inc., New York, 1959.

[41] S.Y. Srinivasan, K.M. Paknikar, D. Bodas, V. Gajbhiye, Applications of cobalt ferrite nanoparticles in biomedical nanotechnology, Https://Doi.Org/10.2217/Nnm-2017-0379. 13 (2018) 1221–1238. https://doi.org/10.2217/NNM-2017-0379.

[42] T. Zhou, T. Zhang, Y. Zeng, R. Zhang, Z. Lou, J. Deng, L. Wang, Structure-driven efficient NiFe2O4 materials for ultra-fast response electronic sensing platform, Sens Actuators B Chem. 255 (2018) 1436–1444. https://doi.org/10.1016/J.SNB.2017.08.139.

[43] Q. Dai, D. Berman, K. Virwani, J. Frommer, P.O. Jubert, M. Lam, T. Topuria, W. Imaino, A. Nelson, Self-assembled ferrimagnet-polymer composites for magnetic recording media, Nano Lett. 10 (2010) 3216–3221. https://doi.org/10.1021/NL1022749/SUPPL FILE/NL1022749 SI 001.PDF.

[44] J. Philip, G. Gnanaprakash, G. Panneerselvam, M.P. Antony, T. Jayakumar, B. Raj, Effect of thermal annealing under vacuum on the crystal structure, size, and magnetic properties of ZnFe2O4 nanoparticles, J Appl Phys. 102 (2007) 054305. https://doi.org/10.1063/1.2777168.

[45] M. Hashim, Alimuddin, S. Kumar, S.E. Shirsath, R.K. Kotnala, J. Shah, R. Kumar, Synthesis and characterizations of Ni2+ substituted cobalt ferrite nanoparticles, Mater Chem Phys. 139 (2013) 364–374. https://doi.org/10.1016/J.MATCHEMPHYS.2012.09.019.

[46] A. Kumar, P. Sharma, D. Varshney, Structural, vibrational and dielectric study of Ni doped spinel Co ferrites: Co1–xNixFe2O4 (x=0.0, 0.5, 1.0), Ceram Int. 40 (2014) 12855–12860. https://doi.org/10.1016/J.CERAMINT.2014.04.140.

[47] M.E. Ghazi, M. Izadifard, M. Bagherzadeh, EFFECT OF ELECTROLYTE TEMPERATURE ON MAGNETIC PROPERTIES OF Ni-Co-Cu ALLOY NANOFILMS GROWN ON SI SUBSTRATE BY ELECTRODEPOSITION METHOD, Dig J Nanomater Biostruct. 6 (2011) 1167–1172.

[48] K.V. Babu, G.V.S. Kumar, K. Jalaiah, P.T. Shibeshi, Effects of copper substitution on the microstructural, electrical and magnetic properties of Ni0.7Co0.3-xCuxFe2O4 ferrites, Journal of Physics and Chemistry of Solids. 118 (2018) 172–185. https://doi.org/10.1016/J.JPCS.2018.02.051.

[49] J. Balavijayalakshmi, N. Suriyanarayanan, R. Jayaprakash, Effects of sintering on structural and magnetic properties of Cu substituted cobalt–nickel mixed ferrite nano particles, J Magn Magn Mater. 362 (2014) 135–140. https://doi.org/10.1016/J.JMMM.2014.03.005.

[50] A. Lassoued, M.S. Lassoued, B. Dkhil, S. Ammar, A. Gadri, Improved photocatalytic activities of CuxCo0.5-xNi0.5Fe2O4 nanoparticles through co-precipitation method in degrading methylene blue, Physica E Low Dimens Syst Nanostruct. 101 (2018) 29–37. https://doi.org/10.1016/J.PHYSE.2018.03.015.

[51] K. Rajasekhar Babu, K.R. Rao, B. Rajesh Babu, Cu2+-modified physical properties of Cobalt-Nickel ferrite, J Magn Magn Mater. 434 (2017) 118–125. https://doi.org/10.1016/J.JMMM.2017.03.044.

[52] A. Ramakrishna, N. Murali, S.J. Margarette, K. Samatha, V. Veeraiah, Comparative study of synthesis, structural and magnetic properties of Cu2+ substituted Co-Ni, Co-Zn and

Co-Mg nano ferrites, Physica B Condens Matter. 530 (2018) 251–257. https://doi.org/10.1016/J.PHYSB.2017.11.063.

[53] R.S. Devan, Y.R. Ma, B.K. Chougule, Effective dielectric and magnetic properties of (Ni–Co–Cu)ferrite/BTO composites, Mater Chem Phys. 115 (2009) 263–268. https://doi.org/10.1016/J.MATCHEMPHYS.2008.11.059.

[54] I. Shakir, A. Rasheed, S. Haider, M.F. Aly Aboud, The Impact of Cu2+ and Mg2+ onto the electrochemical energy storage properties of Nanocrystalline Co0.8Ni0.2Fe2O4 particles and their hybrids with graphene, Ceram Int. 45 (2019) 18099–18105. https://doi.org/10.1016/J.CERAMINT.2019.05.066.

[55] S. v. Bhandare, R. Kumar, A. v. Anupama, M. Mishra, R.V. Kumar, V.M. Jali, B. Sahoo, Effect of Mg-substitution in Co–Ni-Ferrites: Cation distribution and magnetic properties, Mater Chem Phys. 251 (2020) 123081. https://doi.org/10.1016/J.MATCHEMPHYS.2020.123081.

[56] R.M. Rosnan, Z. Othaman, R. Hussin, A.A. Ati, A. Samavati, S. Dabagh, S. Zare, Effects of Mg substitution on the structural and magnetic properties of Co 0.5 Ni 0.5- x Mg x Fe 2 O 4 nanoparticle ferrites, Chinese Physics B. 25 (2016) 047501. https://doi.org/10.1088/1674-1056/25/4/047501.

[57] A. Selmi, S. Hcini, H. Rahmouni, A. Omri, M.L. Bouazizi, A. Dhahri, Synthesis,
structural and complex impedance spectroscopy studies of Ni0.4Co0.4Mg0.2Fe2O4 spinel
ferrite,
Phase Transitions.90 (2017) 942–954.
942–954.
https://doi.org/10.1080/01411594.2017.1309403.

[58] B.A. Aldar, R.K. Pinjari, N.M. Burange, Electric and Dielectric behavior of Ni-Co-Cd Ferrite, n.d. www.iosrjournals.org.

[59] W. Zhang, A. Sun, X. Pan, Y. Han, X. Zhao, L. Yu, Z. Zuo, N. Suo, Structural, morphological and magnetic properties of Ni–Co ferrites by the Mn2+ ions substitution, Journal of Materials Science: Materials in Electronics 2019 30:20. 30 (2019) 18729–18743. https://doi.org/10.1007/S10854-019-02226-8.

[60] K.V. Babu, B. Sailaja, K. Jalaiah, P.T. Shibeshi, M. Ravi, Effect of zinc substitution on the structural, electrical and magnetic properties of nano-structured Ni0.5Co0.5Fe2O4 ferrites, Physica B Condens Matter. 534 (2018) 83-89. https://doi.org/10.1016/J.PHYSB.2018.01.022. P. Jadhav, K. Patankar, V. Mathe, N.L. Tarwal, J.H. Jang, V. Puri, Structural and [61] magnetic properties of Ni0.8Co0.2-2xCuxMnxFe2O4 spinel ferrites prepared via solution combustion route. J Magn Magn Mater. 385 (2015)160-165. https://doi.org/10.1016/J.JMMM.2015.03.020.

[62] X. Zhao, A. Sun, W. Zhang, Y. Han, X. Pan, Effects of Mg Substitution on the Structural and Magnetic Properties of Ni0.2MgxCo0.8–xFe2O4 Nanoparticle Ferrites, Journal of Superconductivity and Novel Magnetism 2019 32:8. 32 (2019) 2589–2598. https://doi.org/10.1007/S10948-018-4993-0.

[63] S.J. Azhagushanmugam, N. Suriyanarayanan, R. Jayaprakash, Effect of Cation Distribution on Structural and Magnetic Properties of Nickel Cobalt Zinc Ferrites, Advances in Materials Science and Engineering. 2013 (2013). https://doi.org/10.1155/2013/713684.

[64] X. Zhao, A. Sun, W. Zhang, L. Yu, Z. Zuo, N. Suo, X. Pan, Y. Han, Magnetic transformation of Zn substituted Ni–Co ferrite nanoparticles, Journal of Materials Science:

Materials in Electronics 2019 31:1. 31 (2019) 526–541. https://doi.org/10.1007/S10854-019-02557-6.

[65] J.S. Ghodake, T.J. Shinde, R.P. Patil, S.B. Patil, S.S. Suryavanshi, Initial permeability of Zn–Ni–Co ferrite, J Magn Magn Mater. 378 (2015) 436–439. https://doi.org/10.1016/J.JMMM.2014.11.041.

[66] R.B. Bhise, S.M. Rathod, A.K. Supekar, Synthesis and Characterization of nanocrystalline Ni-Co-Zn ferrite by Sol-gel Auto-Combustion method SOL GEL SYNTHESIS OF NiCuZn ferrite View project synthesis of Ni-Co-Zn ferrites nanoparticles by sol-gel method and their characterization View project Synthesis and Characterization of nanocrystalline Ni-Co-Zn ferrite by Sol-gel Auto-Combustion method, Int J Sci Eng Res. 3 (2012). http://www.ijser.org (accessed September 11, 2022).

[67] K. Raju, G. Venkataiah, D.H. Yoon, Effect of Zn substitution on the structural and magnetic properties of Ni–Co ferrites, Ceram Int. 40 (2014) 9337–9344. https://doi.org/10.1016/J.CERAMINT.2014.01.157.

[68] B.J. Rani, R. Mageswari, G. Ravi, V. Ganesh, R. Yuvakkumar, Physico-chemical properties of pure and zinc incorporated cobalt nickel mixed ferrite (ZnxCo0.005-xNi0.005Fe2O4), where x = 0, 0.002, 0.004 M) nanoparticles, Journal of Materials Science: Materials in Electronics 2017 28:21. 28 (2017) 16450–16458. https://doi.org/10.1007/S10854-017-7556-4.

[69] A. Thakur, P. Thakur, J.H. Hsu, Magnetic behaviour of Ni0.4Zn0.6Co0.1Fe1.9O4 spinel nano-ferrite, J Appl Phys. 111 (2012) 07A305. https://doi.org/10.1063/1.3670606.

[70] Q. Tian, J. Li, Q. Wang, S. Wang, X. Zhang, Structure and magnetic properties of Ni0.11ZnxCo0.03Fe2.86-xO4 ferrite films deposited on Ag-coated glass substrates by wet chemical method, Thin Solid Films. 518 (2009) 313–318. https://doi.org/10.1016/J.TSF.2009.06.042.

[71] J.J. Lee, S. Bae, Y.K. Hong, J. Jalli, G.S. Abo, W.M. Seong, S.H. Park, C.J. Choi, J.G. Lee, Novel Ni–Mn–Co ferrite for gigahertz chip devices, J Appl Phys. 105 (2009) 07A514. https://doi.org/10.1063/1.3068023.

[72] F. Alahmari, Y. Slimani, M. Almessiere, M. Sertkol, A. Manikandan, A. Baykal, Electrospinning synthesis of Cd-substituted Ni–Co spinel ferrite nanofibers: an investigation into their structural and magnetic features, Applied Physics A 2021 127:10. 127 (2021) 1–9. https://doi.org/10.1007/S00339-021-04936-5.

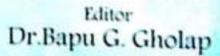
[73] A.B. Kulkarni, N.D. Hegde, S. Gowda H., S.N. Mathad, Influence of Cadmium Substitution on Structural and Mechanical Properties of Co-Ni Nano Ferrite Synthesized by Co-Precipitation Method, Macromol Symp. 393 (2020) 1900213. https://doi.org/10.1002/MASY.201900213.

[74] P.S. Jadhav, K.K. Patankar, V. Puri, Structural, electrical and magnetic properties of Ni–Co–Cu–Mn ferrite thick films, Mater Res Bull. 75 (2016) 162–166. https://doi.org/10.1016/J.MATERRESBULL.2015.11.034.





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MAH MUL/03051/2012 ISSN: 2319 9318 Peer-Reviewed Inter होता त्यामधे क्रांतीसिंह नानाचा सहभाग घेतरला होता. त्यांचे वकृत्य

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समाज सुधारक महात्मा जोतीराव फुले

प्रा. भोजराज व्ही. बोदेले यशवंतराव चव्हाण कला, वाणिज्य व विज्ञान महाविद्यालय लाखांदूर, जि. भंडारा

प्रस्तावना

आजच्या बदलत्या सामाजिक व सांस्कर्शतक समाज वास्तवात महात्मा फुल्यांच्या प्रज्ञा व प्रतिभावंत विचार साहित्याचा अभ्यास व चिकित्सा आज अनेकार्थांनी अनिवार्य ठरली आहे. जोतोंवांच्या विचार-आचार, उक्ती-करती, वाणी-लेखणीत प्रचंड सामर्थ्य आहे. जोतीवा फुले यांचे कार्य भारतांय समाजामध्ये हिमालयापेक्षा उतुंग व महासागरापेक्ष अर्थाग आहे. वास्तविक पाहता देशप्रांत, जातपात, धर्मप्रंथ, पक्षविपक्ष, भाषासंस्कृति इत्यादी मानवनिर्मित कृत्रिम भेदाभेद बाजूला सारून निखळ वस्तूनिष्ठ व व्यक्तिनिरपेक्ष दृष्टीने महात्मा फुल्यांच्या कार्यांकडे तत्कालीन संदर्भात बंघावे म्हणजे जोतीवांच्या देदीप्यमान कार्यामुळे आपले डोळे दिपून जातील. यात कार्हा रांका नाही.

एकोणिसाव्या शतकातील सामाजिक-सांस्कृतिक प्रबोधनाची समस्त उर्जांच जोतीराव फुल्यांच्या सामाजिक व वाड्मयीन कर्तृत्वात एकवटलेली आहे. मूलगामी समाजक्रांतीचे तत्वात, स्वी—शुद्रातिशुद्र बहुजनांचा कैवारी, आधुनिक इहवादी निष्ठा, विवेक निष्ठ मूर्तिभंजन, सर्वधर्मी समभाव प्रखर समध्टिभाव आणि विशाल मानवतावादी दृष्टिकोण ही जोतोराव फुल्यांच्या युगंधर व्यक्तिमत्वाची प्रमुख वैशिष्ट्ये आहेत. त्यांची प्रखर कृतिशीलता हा तर त्यांच्या व्यक्मित्वाचा अनन्य विशेष होतो.

भारतात शांती—सुव्यवस्था नांदार्थी आणि देशातील सर्व समाजाची सर्वांगीण उन्नती होऊन, देश

विद्यावाती : Interdisciplinary Multilingual Refereed Journal Impact Factor 8.14 (ILIF)

संदर्भ ग्रंथ :-

निधन झाले.

१) महाराष्ट्रातील समाजसुधारक, संत, साहित्यिक आणि बोर भारतीय विचारवंत :- व्ही.एन.स्वामी, विद्याभारती प्रकाशन लातूर.

अत्यंत प्रभावी होते. ग्रामीण समाजात लोकजागृतीचे कार्य त्यांनी अतीशय प्रभावीपणे केले अनेक जनआंदोलनात भाग घेऊन कारवासही

भोगला होता. भारताच्या लोकसभेवर इ.स. १९५७ व इ.स १९६७ मध्ये अशो दोन वेळा निवड झाली होती. इ.स १९७६ मध्ये नानांचे

 २) अर्वाचीन भारताचा आणि चीनचा इतिहास :- डॉ. जबसिंगराव पथार, मंजूश्री प्रकाशन, कोल्हाूर.

३) आधुनिक भारताचा इतिहास :- डॉ. प्र.न.देशपांडे विद्या बूक्स पब्लिशर्स औरंगपूरा, औरंगाबाद.



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महान बनाता याकरिता महात्मा जोतीबाच्या सामाजिक ब बाड्मयीन कर्तृत्वापासून प्रेरणा घेऊन त्यावर अमरुबजावणी करणे काठ्यची गरज आहे. बीजशब्द— स्त्रीया, अस्पृश्यता, शिक्षण, शेती, शेतकरी, धर्म, मानवता, समता, बभुभाव इत्यादी.

जोतीया फुले यांचा जन्म ११ एप्रिल १८२७ मध्ये पुण्यात झाला. सावतामाळी समाजातील गोविदयव शेटिबा फुले आणि निमणाबाई या दांपत्याचे जोतीराव दसरे अपत्य होते. मूळने गोन्हे हे उपनाव वदत्रुन फुलांच्या भंद्यामुळे फुले हे नाव पडले. त्यांचे लग्न वयाच्या १३ व्या वर्षी ९ वर्षाच्या सावित्रीबाई खंडोजी नेवसे पाटील यांच्या कन्येशी झाले. ने वयाच्या १४ व्या वर्षी स्कॉटिश मिशनच्या इंग्रजी शाळेन दाखल झाले. अमेरिकन विचारवंत धॉमन पेन यांच्या 'रॉइटस् ऑफ मॅन' या ग्रंथाचा जोतीबाच्या मनावर फार मोठा प्रभाव पडला. पेनच्या व्यक्तिमत्त्त्वातील क्रांतिप्रवणता जोतीरावांच्याही ठिकाणी आहे. कबिराच्या बीज प्रथातील 'विप्रमती' या प्रकरणाचा त्यांच्या विचारसरणीवर प्रभाव पडला. जोतीबांनी स्वतःचा 'कवीर साधूच्या पंषाचा' असा निर्देश केला आहे. जोतीरावांवर खिश्चन मिशनरीचा अधिक परिणाम झाला. त्यामुळे त्यांनी समतेचे तत्व स्वीकारले आहे. इंग्रजी शिक्षणामुळे व इंग्रजी प्रंथ वायल्यामुळे जागृत झालेल्या जोतीबाच्या मनावर एक गोष्ट लक्षात आली तो म्हणजे पाश्चात्त्य देशातील लोकांनी आधुनिक काळात जो नेत्रदीपक प्रगती केली आहे तिचे मूळ त्यांच्या ज्ञानोपासनेतच आहे, शिक्षणात आहे.

जोतीबांचा संघर्ष हा ब्राम्हणाविद्ध नसून त्यांच्या ब्राम्हण्यवादी विचाराविरूद्धी होता. ते म्हणतात, 'सर्व दु:खाचे व समस्येचे मूळ कारण अज्ञान आहे. हे जोतीबांनी ओळखले आणि हजारो वर्षांपासून समग्र भारतीय खियांना अज्ञानाच्या खाईत ज्यांनी लोळत देवल, अशा सनातनी लोकांविरूद्ध क्रांतीचे पहिले पाऊल म्हणून इ. स. १८४८ मध्ये पुण्यात मुलींची पहिली शाळा सुरू केली.

जोतीरावांची अस्पृश्यांबदलची आपुलको त्यांच्या विशाल जीवनटृष्टीची द्योतक आहे. त्यांनी अंधश्रदा निर्मुलनाचे, जातीभेद व विषमता दूर करून सामाजिक परिवर्तनाचे रवी—पुरूप समतेचे महान कार्य केले. अशा अनेक लोकोपयोगी कर्नुत्वामुळे जनतेनी इ. स. १८८८ मध्ये 'महात्मा' ही पदवी बाहाल केली. आधुनिक भारताचा पहिला महात्मा उरले. जात, वर्ण, लिंग, भाषा, देश यांच्या पलीकडे जाऊन सर्व गोष्टीचा विचार केला आहे. एकूणन विश्वकुटुंबांनान त्यांनी सदासर्वकाळ विचार केल्याचे दिसते. मानवधर्म हाच खरा धर्म आहे. ही त्यांची धारणा होती.फुले म्हणतात, आजचे युग हे विज्ञानाचे आहे. त्यामुळे वैज्ञानिक दर्शध्टकोन प्रत्येकांनी अंगीकारला पाहिजे. परंतु भारतीय समाज जीवनात पारंपरिक दैववादी. अंधश्रदावादी दृष्टिकोन अधिक दिसून येतो. अंधदेमुळे समाज जीवनाचा न्हास होतो. समाजाचा उत्कर्य होत नाही. म्हणून जोतीग्रवांनी वैज्ञानिक दृष्टिाकोणाचा अंगीकार केला तसेच त्याचा प्रसार–प्रचार केला. दैव आहे की नाही या गणपतग्रवांथ्या प्रश्नाला उत्तर देतांना जोतीग्रव म्हणतात, ''दैव हे कल्पित धोरणानें मानलेले कर्म आहे. त्यास मुळोच कर्ता नसतो. नशीच, प्रारब्ध आणि संचित या सर्वांचा कर्ता अनुमानानें आपण सर्वांचा निर्माणकर्ता मानीला आहे. रती, सुकश्त ही पूर्वजन्मी आपण केलेल्या कर्माची फळे होत, अशी कल्पना आहे. लल्लाटरेषा व ब्रम्हलिखित हे आमच्या पूर्व जन्मींच्या पाप—पुण्यावरून जन्मास धालतेवेळी ब्रम्हाजीने आपल्या कपाळावर सर्व लिहून ठेवले असते, त्याप्रमाणे ते सर्व धडून येते. या सर्वावरून असे सिद्ध होते की, उद्योग आणि आळस याविषयी परिणामाचे अनुमान सर्व लोकांस कळत नाही, यास्तव ते त्यास अनुमानाने दैव म्हणतात.'' दैव हे कल्पित असल्यामुळे वैज्ञानिक ज्ञानाची, सत्यज्ञानाची, वस्तुनिष्ठज्ञानाची, भौतिक ज्ञानाची कास माणसांनी धरली तरच नवा समाज अस्तित्वात येईल, हे सांगताना जोतींगव म्हणतात.

'भानवपदाची जरा लाज धरा ।। बिद्रान तो ।। मुलीमुलें।। गिर्वाणी शिकता कळेल तुम्हाला।। आठवाल ।। माइया तुम्ही ।।

3 पा प ऐकू दिले नाही एकहि शब्दाला ।। वेदबखरीला ।। लपविले ।।

त्रिजकूट तुम्ही आणावे मैदानी ।। आली ही पर्वणी ।। जोती सांगे''

धश्रदा निर्मुलनाच, जाताभद व विषमता दूर करने जाता जाता जाता (Impact Factor 8.14 (IIJIF) दिखादाता : Interdisciplinary Multilingual Refereed Journal Impact Factor 8.14 (IIJIF)

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(''जो. फु., १९९१ : ५७९) मानवाचे नैसर्गिक अधिकार हा महात्मा फुले यांच्या सामाजिक विचारांचा केंद्रबिंदू आहे. आपले विचार व्यक्त करण्याचे स्वतंत्र अधिकार लोकांना पटवून देण्याचे कार्य फुले यांनी केलेले आहे. समाजाच्या कोणत्याही एका बलिण्ठ घटकाने दुसऱ्या दुर्थल घटकावर

कामा नये असे त्यांचे विचार होते. अस्पृश्यांवर होणाऱ्या धार्मिक व सामाजिक जुॡमांचे हदयभेदी 'करूण' असे चित्रण त्यांनी उभे केले आहे. महारमांगासाठी शिक्षण संस्था काढणे, त्यांना हौद खुला करून देणे ह्या त्याकाळी क्रांतीकारक घटना होत्या. तत्कालीन विद्वान हे सनातनी प्रवश्त्तीने होते. त्यांना वर्णव्यवस्थाची चौकट बळकट करावयाची होती. वर्णव्यवस्था ही ईश्वरनिर्मित नसून ती आर्याची निर्मिती आहे. हे फुले यांनी स्पष्ट केले.

जुलूम जबरदस्ती करून त्यांचे स्वातंत्र्य हिरावून घेता

त्याकाळची राणी होने महार व मांग यांनी विनंती केल्याप्रमाणे त्यांच्या वस्तीला आपल्या लवाजम्यासह त्या भेट देत, त्या वस्तीच्या हलाकीचे चित्र ती पाहते ते असे. त्याबद्दल जोतीबा फुले लिहितात, ''गवताची लहान-लहान खोपटी त्यामध्ये कौलारू लहानसे एखादे घर, प्रत्येक खोपटीच्या पुढे अगर घराच्या ओसरीवर बसून काम करणारे महार-मांग व त्यांची पोरे, महारणी, मांगणी व त्यांची अज्ञानी इकडून तिकडन फिरणारी बालके, काही पंख फडफडीत करून मौजेकरिता फिरणारी व काही भक्ष्य शोधार्ध फिरणारी कोंबडी, धन्याच्या धरापढे बसलेली व इकडे–तिकडे फिरणाऱ्या धन्याच्या स्थितीचे वाटेकरी व तद्दर्शक अशी रोड झालेली विश्वासू कुत्री, एखादी म्हैस, एखादी गाय, इकडे—तिकडे पडलेल्या कातड्यांचे तुकडे, वाळत घातलेल्या शिंदीची पाने, काही तयार केलेल्या केरसन्या इत्यादी गोष्टी वस्तुपासून ह्या भागवत राहणारे लोक अगदी दरिदी असूनही उद्योग करणारे असावेत, असा भास सहजच होकणार आहे''(जो. फु., १९९१ : 598)

स्त्री व पुरूष ही समाज रथाची दोन चाके आहेत. ती सनातन असली पाहिजेत. लहान व मोठन्ना आकाराची चाके लावून रथ चालविता येत नाही. तसेच स्त्रो व पुरूप यांच्यात समानता असल्याशिवय समाजरथ चालू शकत नाही. समाजाचे भले खो~पुरूष समतेतच आहे. त्यासाठी स्वींयाना सर्व प्रकारच्या संग्रं पुरूषांच्या बरोबरीने मिळाल्या पाहिजेत. असा त्यांच आग्रह होता.पुरूषांना एका बाजूला अनेक संबल्धो देत असतांना सिवयांना मात्र अनेक बंधनांनी जखडून टाकले होत. याविषयी महात्मा फुले यांचे तत्वन्नन मोलाचे आहे.समाजाकडून युगानुयुगे दाबल्या, दडपत्या गेलेल्या शुद्रादीशुद्राच्यांचेश्रेणीत हिंदु स्त्रीचे स्थान होते. असे म्हणण्यात यत्किचितही अतिशयोक्ती नाही.

जोतीराव फुले स्वीविषयक विचार मांडतांन लिहितात, 'काही लोभी पुरूष आपल्यास जास्तो सुख व्हावे अववा आपल्या मनोकामना पूर्ण व्हाव्या यासार्ठ एका घरात दोन--दोन, तिन--तिन लग्नाच्या वायका करून नांदतात. व त्याविषयी आपण काही हेक्ड पुरूषांनी केलेल्या धर्मग्रंघांचा आधारही दाखवितात. त्याचप्रमाणे जर काही स्विंयानी आपल्या मनोकामना तरण्त करण्याकरिता दोन--दोन, तिन--तिन लग्नाचे नवरे करूण एका घरात नांदू लागल्यास आपणा सर्व पुरूषास याविषयी काही विधिनिषेघ वाटणार नाही का ? (जो. फु., १९९१: ४५०)

स्त्री मुक्तीचे तत्वज्ञान आणि स्त्रीमुक्तीचो चळवळ उभारली, कोणताच मनुष्य गुन्हेगार म्हणूर जन्माला येत नाही. भोवतालची परिस्थिती आणि यधोवित शिक्षण व संस्कार यांचा अभाव यामुळे बरेवसे लेक चुकीच्या मार्गाकडे वळतात. स्त्री, शुद्ध आणि अतिशुद्ध यांच्या सामाजिक गुलामगिरीविरूद्ध बंड पुकारणाग पहिल पुरूष आहे. सार्वजनिक सत्यधर्माची स्थापना त्यांनी केला. ईश्वराला जोतीरावांनी 'निर्मिक' म्हटले आहे 'सर्वसाक्षी जगत्पती। त्याला नको मध्यस्थी' हे जोतीरावांच्या धर्मविचारातील एक प्रमुख सूत्रवचन आहे सार्वजनिक सत्यधर्मात स्वयांनिर्णयांचे स्वतत्र आणि बंधूता यांचे महात्त्वाचे स्थान मांडलेले आहे.

'सार्वजनिक सत्यधर्म पुस्तक' हा जोतीगवांग शेवटचा ग्रंध त्यांच्या मृत्यूनंतर सन १८९१ प्रसिद झाला. हिंदूधर्म संस्थेवर जरी जोतीगवांनी वारंवार हत्या उपसले होते. तरी मनुष्यमात्राच्या जिवित साफल्यासाठे धर्मभावनेची आवश्यकता आहे. अशी त्यांची दूध

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सारणा होती. धर्म जीवनातील भाबडेपणा, दंभ व मिथ्याचार यांची त्यांना मनापासून चिड होती. हे खरे पण नास्तिकता, धर्मपराङ् मुखत: यांनाही त्यांचा सक्त हिरोध होता. म्हणून सत्यशोधक समाजातील आपल्या अनुयायांच्या मार्गदर्शनासाठी त्यांनी आपला उजवा हात पश्चाघाताने निकामी झाला असतांना धीर न सोडता डाव्या हाताने हा ग्रंथ लिहून काढला. ''या आपल्या अमर्याद विस्तीर्ण पोकळीमध्ये निर्मिकाने अनंत सूर्यमंडळासह त्यांच्या प्रहोपग्रहांसहित तत्संबंधी एकंदर सर्व प्राणीमात्रांस उत्पन्न केले आहे. त्यांपैकी आपन सर्व मानव स्त्रीपुरूषांनी त्याचे स्मरण मनी जागृत ठेवून एकमेकांशी कोणत्या तन्हेचे आचरण केल्यामुळे त्यास आनंद होणार आहे; यास्तव मी त्याच्या कृपेने एकंदर सर्व मानव स्त्रीपुरूषांच्या हितासाठी हा लहानसा ग्रंथ रचिला आहे.''(जो. फु. १९९१ : ४३५)

हिंदूधर्म, बौद्धधम्म, खिश्चनधर्म, इस्लामधर्म आणि सार्वजनिक सत्यधर्माचा पुरस्कार केला. पूर्वीच्या सामाजिक बौकटीत ज्या प्रकारची धार्मिक पिळवणूक, सामाजिक विषमता नि अन्याय ही अंगभूत होती. तशी ती इंग्रजी राजवटीत नव्हती. नव्या राजवटीत समान संधीला वाव होता. इंग्रजी राजवटीने भारतीय स्वीशूदादी शुद्रांना भटशाहीच्या तुरूंगातून सोडवण्याच्या कामी आधीच्या कोणत्याही राज्यकर्त्यांपेक्षा अधिक मजल मारली असल्याचे कृतज्ञतापूर्वक जोतीराव फुले नमूद करतात.

स्वी, शुद्र व अतिशुद्र यांच्या शिक्षणाला ब्राम्हणांचा विरोध होता. ह्या कार्याला विरोध करण्यासाठी फुले दांपत्यांनी कंबर कसली आणि ह्या कार्याला समोर नेण्याचे काम त्यांनी केला. 'हे समाज विरोधी काम करित आहेत' हा समज ठेवून जोतीबांच्या वडीलांना न पटल्यामुळे त्यांनी ह्या दांपत्याला घराबाहेर काढले. फुलेना शिक्षण देतांना अनेक अडचणी सहन कराव्या लागल्या, तरी त्यांनी न जुमानता हे उदात्त कार्य अंगीकारले. फुल्यांनी आपल्या इहवादी शैक्षणिक विचार सरणीत मानची मूल्यांना व मानवी अंत:सत्वाला विशेष महत्त्व दिले. फुल्यांचा शिक्षणविषयक दृष्टिकोन भूतदयावादी आणि मानवताबादी होता. प्रामीण शिक्षणावर त्यांनी जास्त भर दिला. Jan. To March 2023 Issue-45, Vol-07 059

विविध धार्मिक सणातून, उत्सवातून, भट कामगाराच्या अन्यायी वृत्तीतून तसेच इंग्रजी राजवट व सावकारशाहीच्या माध्यमातून होते, हे गद्याप्रमाणे पद्यातही अतिशय सेडेतोडपणे सागितले आहे. श्रमिकांचे शोपण नष्ट झाल्याशिवाय सामाजिक समानता प्रस्वापित होणे दुरापास्त आहे. शुद्रातिशुद्र यांच्या संपूर्ण अवनतीच्या परिस्थितीवर महात्मा फुले यांनी केवळ चिंतन केले असे नाही, तर कतीही केली.

मूळातच फुल्यांची वृत्ती ही चिंतनशील आणि शोधक होती. त्यामुळे त्यांच्यात कृतिप्रवणता निर्माण झाली होती. या उर्मीतून त्यांनी सुधारणेला वाहून पेतले होते. विचारवंत फुल्यांची वैचारिक दिशा, त्यांच्या लेखनाची विविधता, शैली व त्यांची विवेकनिष्ठा यातून ते धोर वैचारिक निंबधकार होते असे दिसते.

'तृतीयरत्न' हे नाटक जोतीरावांनी सन १८५५ मध्ये लिहिले. हे त्यांचे पहिले लेख अंधश्रद्धेविरूद्ध होते. तसेच अज्ञानाचा गैरफायदा घेऊन भोळगा शुद्रास धूर्त आर्यभटाने ठकविण्याविरोधात पहिला कठोर प्रवाह या नाटकात घेतला आहे. इ. स. १८६९ मध्ये जोतीरावांनी 'खम्हणांची कसब' नावाचा पद्य ग्रंथ लिहिला. या ग्रंथाद्वारे भटजी, अंडाणी व गरीब शुद्राला धर्माच्या नावाखाली भूलथापा देऊन कसे राजरोस लुबाउतात ते दाखवून दिले आहे. इ. स. १८७३ मध्ये जोतीरावांनी 'गुलामगिरी' नावाचा ग्रंथ लिहिला. बहुजन समाज शैक्षणिक, आर्थिक, सामाजिक, सांस्कृतिक व जीवनाच्या हरेक क्षेत्रामध्ये उच्चभ्रू लोकांचे कसे गुलाम आहेत हे जोतीरावांनी या प्रंथातून सिद्ध केले आहे. 'गुलामगिरी' या ग्रंथाच्या अर्पणपत्रिकेमध्ये जोतीराव म्हणतात, ''युनायटेड स्टेट्मधील सदाचारी लोकांनी गुलामास दास्यत्वापासून मुक्त करण्याच्या कामांत औदार्य, निरपेक्षता व परोपकार बुद्धी दाखविली यास्तव त्यांच्या सन्मानार्थ हे पुस्तक त्यास परमप्रीतीने नजर करितो, माझे देशबांधव त्यांचा, त्या स्तुत्य कृत्याचा कित्ता, आपले शूद्रबांधवांस ब्राम्हणलोकांच्या दास्यत्वापासून मुक्त करण्याच्या कामात घेतील अशी आशा बाळगतो'' यावरून त्यांची साहित्यातिल सामाजिक दृष्टी भारतातील सामाजिक गुलामगिरी संपविण्याची होती.

तामाजिक गुलामागर्थ सभय जोतीरावांनी 'शेतकऱ्याचा इ. स. १८८३ मध्ये जोतीरावांनी 'शेतकऱ्याचा

जोतीरावांनी शुद्रातिशुद्रांचे आर्थिक शायण ह इ. स. १८८३ मध्य आर्थायवाना स्थान विद्यादाती: Interdisciplinary Multilingual Refereed Journal ImpactFactor 8.14(IIJIF)

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असूड' नावाचा ग्रंथ लिहिला या ग्रंथात शेतकऱ्यांचे दु:ख, दु:खाची कारणे आणि दु:ख निवारण्यासाठी उपाय जोतीरावांनी सांगितली अरहेत. शेतकरी हा देशाचा पोशिंदा असताना देखिल अंत्यत हलाकीची परिस्थिती त्यांच्या वाट्याला आलेली आहे. हे वयून जोतीरावांना दुःख वाटे. शेतकऱ्यांच्या दुःखाला धर्म व राज्य दोन्ही जवाबदार आहेत. असे जोतीराव म्हणतात. अडाणी शेतकऱ्यांची उच्चभ्रु व सावकार फसवणूक करतात. तेव्हा सरकारने शेतकऱ्यांच्या हिताचे रक्षण करावे. तसेच पाणी म्हणजे शेतकऱ्यांचे जीवन. तेव्हा सरकारने मोठमाठी धरणे वांधून कालव्याहारे शेतकऱ्यांच्या शेतीला पाणी उपलब्ध करून द्यावे. जेणेकरून शेतकरी शेतातून हमखास उत्पादन घेउ शकेल. अशी मागणीही जोतीरावांनी केली. शेतकऱ्यांची दुर्दशा त्यांच्या अज्ञानामुळे झाली म्हणून जोतोराव शेतकऱ्यांना विद्येचे महत्व सांगतांना म्हणतात, ''विद्येविना मती गेली, मतीबिना निती गेली, नितीबिना गती गेली, गतीबिना वित्त गेले, वित्ताविना शुद्र खचले, इतके अनर्थ एका अविद्येने केले.''

इ.स. १८८५ मध्ये जोतीगवांनी 'इशाग' नावाचा ग्रंथ प्रसिद्ध केला. या ग्रंथात शेनकऱ्याची सद्य: स्थिती चांगली आहे. या न्यायमुर्ती रानडे यांच्या मताचे खंडन केले आहे. तसेच जातीभेद प्रगतीच्या आड येत नाही याही मताचे खंडन केले आहे. जोगोंगवांनी इ. स. १८८५ मध्ये 'सत्सार' हे नियतकालीक सूरू केले. 'सत्सार'च्या पहिल्या अंकात व्राम्होसमाज व प्रार्थनासमाज यांच्या वरवरच्या सुधारकी भूमीकेचे खंडन जोतीगवांनी केले. ब्राम्होसमाज व प्रार्थनासमाज विश्वधर्माचे प्रतिपादन करतात, वधुंभावाची शिकवण देतात, पण मग प्रत्यश्च कृतीच्या बेळी मात्र कचखाऊपणा करतात. आजनागायन अन्यायाने व निर्दयपणे अस्पृश्य म्हणून दूर त्रीटलेल्या आपल्या धर्मवांधवांना तेदैनंदिन व्यवहारात वरोवरोच्या नात्याने वागवत नाही. आपल्या धार्मिक व सामाजिक कार्यात सामील करून घेत नाहीत. असा त्यांचा आक्षेप होता.

जोतीरावांची कविता राजकीय, आर्थिक, सामाजिक व सांस्कृतिक आशय मूलभूत परिवर्तनासाठी समतेच्या, बंधुतेच्या, न्यायाच्या स्थापनेकरिता सार्वजनिक सत्यासाठी कशो आवश्यक आहे. तसेच पोवाई, पत्रवद पत्रे, पद, मंगलाप्टके, आरत्या अशा विविधांगे पद्धतीने मांडली आहे.

निष्कर्ष :--

१. महात्मा फुले हे थौर समाज सुधारक आहेत.

 शुद्रादीशुद्र व स्त्रियासाठी शिक्षणाचे द्वार मोकठे करून टेणारे ते प्रथम व्यक्ती होत.

 शेतकच्यासाठी त्यांनी इंप्रज सरकारसमौर मोठेमोठे धरणे याधण्याचे सांगितले होते.

४. 'तृतीय रत्न' या नाटकातून अंधश्रदेवर कडाडून प्रहार केला होता.

५. त्यांनी 'सत्सार' हे नियतकालीकातूव समाजसूधारणा विषयक विचार मांडले आहेत.

संदर्भ -

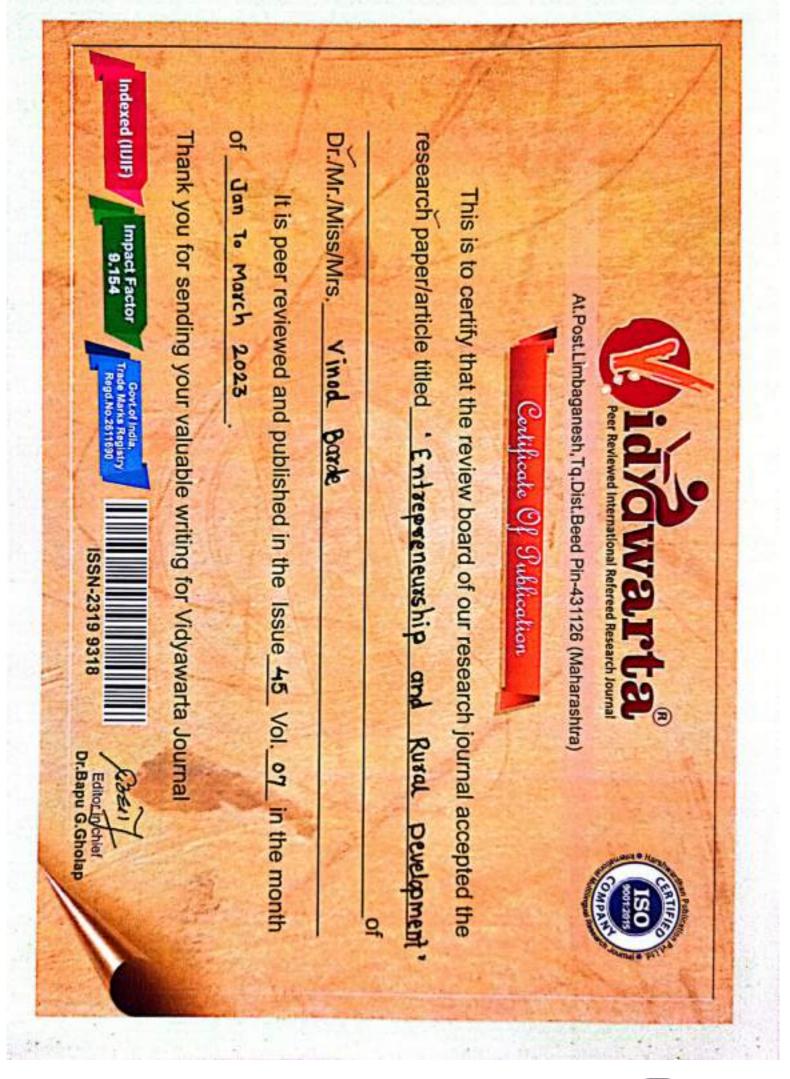
१.अग्निहोत्री ट. ह. : महाराष्ट्र संस्कृतीचे तात्विक अधिष्ठान, सूबिचार प्रकाशन, नागपुर, १९७७ २. फुले जोतीराव गोंविदराव : महात्मा फुले समग्र वाड्मय, संपा. डॉ. य. टी. फडके, महाराष्ट्र राज्य साहित्य संस्कृति मंडळ, मुंवई, १९९१.

३. यावर संयोजिनी : स्वी शिक्षणाची वाटचाल, महाराष्ट्र शासन, शिक्षण संचालनालय, मुंबई, १९६८.

४. भोळे भ. ल. : भारतीय साहित्याचे निर्माते : महात्मा जोतीराव फुले, साहित्य अकाडमो, न्य दिल्ली, २००७.

५. लक्ष्मणशास्त्री जोशी : महात्मा फुले समग्र बाइमय, उनि, प्रस्तावना.

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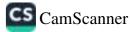






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02

Entrepreneurship and Rural Development

Dr. Vinod Barde Asstistant Professor, Dept. of Commerce, Y.C.College Lakhadur, Dist-Bhandara

Abstract: India is the Village Nation. More than 70 percent population residence in the village. Rural economy depends on the agricultural sectors. Agriculture produce contributes of nearby 20 percent of gross domestic product (GDP) in India. To rise our agriculture productivity & our economy we must to develop rural areas. Agriculture sectors have insufficient of employment. That's reason people are suffering the unemployment, poverty, migration.Rural entrepreneurship play the importance role in the creation of the employment and reduced level of poverty. Government also promotes and motivates to new entrepreneur to start self-employment through the Start-up scheme, MUDRA scheme, and Skill Development program etc. Rural entrepreneurship development facing many problems because unviability of capital, lack of literacy, lack of technical education. In this research study to attempt to know the importance and problems of the rural entrepreneurship.

Keywords: Rural Area, entrepreneurship, youth, village, unemployment.

Objectives of the Study:

To know the meaning of entrepreneurship.

To know the importance of the rural entrepreneurship.

To study the problems of rural entrepreneurship.

Research Methodology: The present study is based on the secondary data in the descriptive nature. The data were collected from articles, Jan. To March 2023 Issue-45, Vol-07 013

books, journals, websites and government publications.

Introduction: India is a nation of villages. Nearby 75 percent of India's population are living in rural areas out of which % of the labour force is still earning its source of revenue from agriculture and its allied activities. Land being inadequate is incapable to engage the labour force in agriculture. Long time before rural region was create many employment through subsidiary industry of agriculture. But now that industry breakdown after new era of globalisation. Due to the absence of traditional industries in rural areas, the population here is completely dependent on agriculture. But due to the burden of additional population on agriculture, the rural economy seems to have collapsed. Earlier in the rural areas real income increased due to agriculture based industries and all family members working in agriculture. The result of the change over time is that unemployment and poverty have increased to a great extent. As a result, population migrates to rural areas in search of employment. The visible result of this is that many people have returned to the villages during the corona period, so tobe seen that there is a real need to provide new employment in the rural areas.Start-up scheme, Mudra loan, entrepreneurship training and mentoring as well as help to the budding youth are being provide through the government. Therefore, many young people are creating selfemployment by creating new industries without going back to work. The Prime Minister of India has announced start-up India Scheme in theindependence programme speech, in order to promote the Entrepreneurship. The action plan of this initiative is focusing on three areas viz. simplification and handholding, funding support and incentives, industry-academia partnership and incubation. In an effort to support rural entrepreneurs of India, the Centre would think of giving low interest rate loans under the Micro Units Development through MUDRA

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scheme.

Importance of Rural Entrepreneurship: Rural entrepreneurship can be considered one of the solutions to reduce poverty, to reduce migration, employment generation, and to develop rural areas. Rural entrepreneurs may rise the standard of living and purchasing power of the rural people and bottom of pyramid by proposing employment opportunity to the rural areas people.

 To reduce poverty: Rural entrepreneurship generate new work for the rural people. Rural entrepreneurship will increase the rate of literacy and self-employment. Thus improving their standard of living.

2. To reduce Migration: Rural population travels toward urban for work, searching good job etc. rural entrepreneurship develops infrastructural in rural areas. It's reduce the gap between urban and rural areas. Rural entrepreneurship can avoid the migration of people from rural to urban areas in search of job and employment.

 Employment generation: Rural entrepreneurship is labour intensive and generates large number of employment opportunities for the rural people. Rural entrepreneurship provides a clear solution to the growing problem of large number of unemployment.

4. Developed rural areas: Rural entrepreneurship generates source of income for the rural areas people in the local level. Hereby developed rural areas about increasing income through the rural entrepreneurship.

5.Improves standard of living: Rural entrepreneurship will also increase the literacy rate of people. Their education, source of income and self-employment will prosper the society, thus improving their standard of living.

Problems of Rural Entrepreneurship: Developing entrepreneurship particularly rural entrepreneurship is not so easy. It is constrained by various problems. Some of the problems faced by rural entrepreneurs are as follows: 1. Shortage of finance: Finance is the blood of the business. Maximum of the rural entrepreneurs are mainly struggling to increase the finance for their businesses. Lack of availability of adequate collateral security often mars the chances of rural youth in procurement adequate funds in time to set up their own venture. Due to this, the entrepreneurs are forced to take credit from village money lenders who charge excessive rates of interest.

 Absence of technical education: Reason of the defective education system rural youth lack decision-making, skilled, technical knowledge which is adisablement in developing the life force of enterprise, therefore not many people come forward to create self-employment units.
 Insufficient infrastructural facilities: Rural areas haven't well build infrastructural facilities viz, Transportation, water, market, electricity, street lighting, where house and communication etc. which obstruct the smooth movement of various industrial activities.

4. Lack of professional knowledge: Due to the lack of business environment in the rural areas, there is a lack of knowledge required for business creation. Due to lack of new business ideas, capital formation, as well as insufficient knowledge, the rate of new business creation is seen to be lower than in urban areas.

5. Skilled labours unviability: In rural areas, skilled labours cannot be found easily as compared to urban areas by the entrepreneurs. Skilled labourers prefer to work in big cities due to high salary than rural areas.

6. Fear to invest in the business: Rural entrepreneurs have low risk bearing ability due to lack of economic resources and external funding. So, they restrict to invest in their businesses in rural areas.

7. Competition: Rural entrepreneurs are facing cut through competition from urban entrepreneurs and reputable organizations. They cannot compete with the urban entrepreneurs due to lack of calibration and branding of the products.

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8. Lack of awareness of business ideas: Lack 89-93. of vocational skill among rural youth. The rural 6. I.Sa entrepreneur lacks knowledge about creating India" Resea

of vocational skill among rural youth. The rural entrepreneur lacks knowledge about creating industries based on modern technology apart from traditional business.

9. Risk: Rural entrepreneurship faces many kind of risks. Similar technical risks, economic risk, social risk, and environmental risk.Due to these reason, there are obstacles in the creation of industries in rural areas.

Conclusion: Contribution of rural industry is more important in the national economy. Mainly in the rural economy. Rural entrepreneurship is generating employment opportunities in the rural areas with low capital cost and increasing the real income of the people. It's contribution to the development of agriculture and urban industries. To solve the problem of unemployment in rural areas, it is necessary to create industries in rural areas. It is necessary to develop rural areas to solve the problems of poverty, migration, unemployment etc. for that, it is necessary to create new industries in rural areas. References:

 A Policy Brief from the Policy Learning Platform on SME competitiveness, European Union/European Regional Development Fund, April 2020.

 Dr.Shamitha Pillai, "Entrepreneurship as a Key for Rural EconmicDeveloment", Department of Commerce Bhopal School of Social Seiences, April 2021.

 Dr.Shubhada Mohan Kulkarni and Dr.ParagArunNarkhede, "Entrepreneurship and Rural Development", Research Gate publication, January 2016.

 Dr.Sunita Sharma, "Rural Development through Entrepreneurship", International Journal of Social Impact, Volume 1, Issue 4, Oct-Dec.2016, pg.183-186

 E.Sangeetha and N. Vivek, "Rural Entrepreneurship Development Programs-Performance Appraisal", Shanlax International Journal of Commerce, Volume 4, Issue 3, July 2016, pg. Jan. To March 2023 Issue-45, Vol-07 015

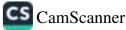
 I.Sathya, "Rural Entrepreneurship in India", Research Explorer-A Blind Review & Quarterly International Journal, Volume V, Issue 22, March 2019, Pg.7-12

 Kushalakshi, Dr. A. Raghurama, "Rural Entrepreneurship: A Catalyst for Rural Development", International Journal of Science and Research, pg. 51-54, August, 2012.

8. Monika Sharma, Vandana Chaudhary, RajniBala and Ranchan Chauhan, "Rural Entrepreneurship in Developing Countries: Challenges, Problems and Performance Appraisal", Global Journal of Management and Business Studies, volume3, Nov. 2013, pg. 1035-1039.

 Mr.Abhihith L.J., "Role of Entrepreneurship in Rural Development-An Analysis", Journal of Emerging Technology and Innovative Research, volume 8, Issue 5, pg. 720-724, May 2021.

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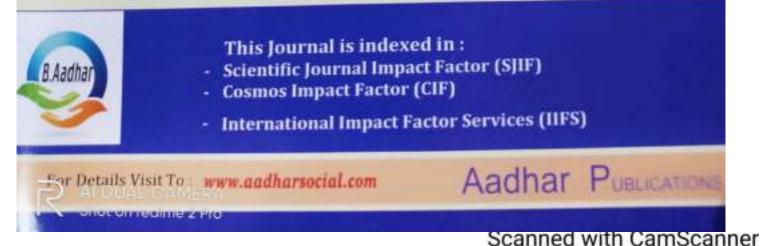
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भारतात सार्वत्रिक निवडणूकीत मतदार वर्तनाला प्रभावित करणारे महत्वाचे घटक प्रा.पी.एम.ठाकरे, यशवंतराव चव्दाम महाविद्यालय लाखांदूर,जि.भंडारा.,मो.क. – ९४२३३८४६३६

प्रस्तावणाः :---

''सार्वजनिक निवडणूका काटेकोरपणे आणि कार्यधमतेने पारपाडल्या नातीत तर नुसल्या सार्वजनिक यंत्रणाञ् कुचकामी वरत नाही तर संपूर्ण लोकशाही व्यवस्था संकटात सापडते'' असे पोलॉक नामक विवारवंत म्हणतो. त्यावरून लोकशाहीसाठी निवडणुकाचे असलेले महत्व स्पष्ट होते.

भारतात निर्वाचनाच्या माध्यमातुन प्रतिनिधी निवडण्याची मागणी भारतीय राष्ट्रीय सभेने १८८५ मध्ये केली. ब्रिटिश संसदेने १८९२ च्या कायद्यात नेमणुकीचे तत्व भारतासाठी स्वीकारले. त्या नोमणुका त्या काळातील जमिनदार संघटना चेंबर ऑफ कॉमर्स, नगरपालिका व विद्यापीठे यासारख्या संस्थाच्या शिफारशीव्दारे होत असत. १९०९ च्या इडियन कौन्सिल ऑक्टने मतदारसंघाची निर्मिती केली. या निबडणूकीत मतदानाचे तत्व प्रथमच स्विकारण्यात आले. मतदानाचा अधिकार, मंपत्ती कर, श्रेतसारा भरणारे शेतकरी पुरूषा याच्यापुरतान सिमीत होता. मतदानाचा हा सिमीत अधिकार नष्ट करून सार्वत्रिक प्रौढ मतदानाचे तत्व स्विकारावे अशो मागणी स्वातंत्र्यवळवळीच्या वेगवेगळया पीठावरून होत होती. पण या तत्वास मान्यता मिळत नव्हती. १९३५ च्या भारत प्रशासन कायग्राने १९४५ मध्ये निवडणूका झाल्या तथापि मतदानाया अधिकार, संपत्नी कर भरणास व शेतसास भरणास पुरूषा एवद्यापुरताच मयादित होता. स्वातविनंतर भारतीय सवियानावे निर्वाचनाच्या तत्वाची अधिक व्यापक पायावर उभागणी केली

सार्वत्रिक प्रौड मताधिकाराचे तत्व आणि स्वतंत्र आयोग यांचा समावेश भारताच्या राज्यघटनेत १९४९ मध्येच करण्यात आला.

स्वातंत्र्यानंतर १९५२ मध्ये पहिली निवडणुक झाली. या निवडणुकीसाठी सार्वविक प्रौड मताधिकाराचे तत्त्व प्रथमन प्रत्यक्षात आहे. त्यामुळे १७ कोटी ३० लाख नागरीकांना मताधिकार प्राप्त झाला. निर्वाचनाचे तत्व प्रत्यश्च व्यवहारात आणण्यासाठी भारतीय संसदेत अनेक कायदे पास केले. लोकप्रतिनिधील्व कायदा १९५० लोकप्रतिनिधील्व कायदा १९५१. परिसीमन आयोग कायदा १९५२, संबद्धती व उपराष्ट्रपती निर्वाचन कायदा १९५२, मतदार नोंदणी कायदा १९६० असे महत्वपूर्ण कायदे आहेत. याशिवाय निवडणुक आयोगाने वेळोवेळी काव्हलेले आदेश व निर्देश निर्वाचन पच्दती अधिक नि पक्षपाती होण्यास कारणीभूत उरले आहेत.

१) मतदारांच्या राजकीय जाणीवांचा शोध पेणे.

मतरारांच्या सामाजिक, आर्थिक व शौधणिक पार्श्वभूमीचा शोध धेणे

मनदाराच्या राजकीय सहभाषाचा अध्यास करणे.

४) उमेदवाराच्या राजकॉय नेतृत्वाचे अध्ययन करणे.

शोध निवंधाची गृहितके :

गतदारांच्या राजकीय सहभागाचे प्रमाण बाहत आहे.

२) मतदारांच्या मतदान प्रवृत्लोवर संकुचित निष्ठांचा प्रभाव पडलेला आहे.

मनदारांच्या राजकीय जाणीवांचा स्तर वाढला आहे.

> मतदान वर्तन म्हणजे काय ?

- प्लॅनो आणि रिग्ज यांच्या मते, " सार्वत्रिक निवडणुकोमध्ये लोक कसे मतदान करतात आणि तसे मतदान करण्याची कारणे समजवून घेणे म्हणजे मतदान वर्तन होय''

> मतदार वर्तनाला प्रभावित करणारे घटक :-

१) जातीयता (Castism) :-- भारतीय समाज एक परंपरागत समाज असल्याने जातीयता समाजामध्ये खालच्या स्तरापर्यंत रूख झालेली आहे. त्यामुळे जातीचा प्रभाव मतदार वर्तनावर सर्वांत जास्त पडत असती. जात ही समाजाला जोडणाग आणि समाजाला विभक्त करणाग घटक माणून कार्य करतो. एका जातीच्या लोकांना ऐक्याच्या सुवामध्ये बांधण्याचे कार्य केवळ जात करते. तर दुसरीकडे एका जातीच्या लोकांना दुसऱ्या जातीच्या लोकांपासून पृथक करण्याचे कामही जात करते. भारतात एकबीकरणापेश्वा समाजात्व्र विभाजित करणांग घटक मरणून जातीया प्रभाव दिसून येतो.

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र) वर्ष (Religion): भारत एक बहुवभाय राज्य असून या देशामध्ये हिंदू, मुस्लोम, शिख, खिएचन, पारमी 2) वर्ष (Religion): भारत एका एकव राहतात, जातीप्रमाणेच प्रमालाही समाजाला जोडणाय आणि सम 3) वर्वज व्यवज्ञ भानला आहे. एका धर्माच्या लोकांना एकव आणण्याचे कार्य गर्म करती प्रणव भर्म जात	. भीदा, जैन जापे विपाटन

2) 174 आत अ पटक मानल्या जातोः काना दुसऱ्या धर्माच्या लोकांपासून पूर करण्याचे कार्यशी धर्म कथी करती करण प्रानत्था जागा। पटक प्रानत्था वाया विघटन करणारा घटक मानला जातो. भारतात एकडीकरण करणयाथे कार्यसी धर्म कथी करों। हर्गन धर्म प्रमाजाची भूमिका राहिली आहे. ब्रिटिश काळात भारतीयांमध्ये फट प्रात्मायांचेवा विभाजन करणारा घटक वर्ष अर्म प्रभाजन भूमिका राहिली आहे. ब्रिटिश काळात भारतीयांमध्ये फुट पाडण्यायांचेवा विभाजन करणाय घटक इपूनि या बटकांची भूमिका राहिली आहे. ब्रिटिश काळात भारतीयांमध्ये फुट पाडण्यासाठी मुसलमानाजा आणि शिखांजा इपूने ज्यामध्ये वेगळे प्रतिनिधित्व देण्यात आले होते तेव्हापासूनच हिंदु आणि प्ररित्या वर्णने या महत्य संगळे प्रतिनिधित्व देण्यात आले होते तेव्हापासूनच हिंदू आणि मुस्लिम यांव्यातील दुरावा वाढत वाललेला विद्यमङ्ग्रीमध्ये वंगळे प्रतिनिधित्व देण्यात आले होते तेव्हापासूनच हिंदू आणि मुस्लिम यांव्यातील दुरावा वाढत वाललेला विद्यमंडळ्याना नावांवर मते मागितली जातात, धर्माच्या नावांवर प्रचार केल्या जातो. मंत्रिमंडळातती विविध धर्माना बाहे धर्माच्या जाते. धर्माच्या आधारावर अनेक निवडणुका छढविल्या जाता. मंत्रिमंडळातती विविध धर्माना भारते वर्गाच्या जाते. धर्माच्या आधारावर अनेक निवडणुका रुदविल्या गल्या जातो. मंत्रिमहळतती विविध धर्मांग होतीत्र्यात्व दिल्या जाते. धर्माच्या मुद्दा होता धर्माच्या प्रभावायुळेच कविंसचा प्रत्यात्र जाते. १९८९ मध्ये झालेल्या इति^{हर्वान्व} भर्म हा महत्त्वाचा मुद्दा होता धर्माच्या प्रभावामुळेच कांग्रेसचा पराभव झाला, तत्कालिन प्रधानमंत्री श्री. रजीव विड[ा]कीमान्ये धर्म हा महत्त्वाचा मुद्दा होता धर्माच्या प्रभावामुळेच कांग्रेसचा पराभव झाला, तत्कालिन प्रधानमंत्री श्री. राजीव वि⁵¹्र⁵¹⁴¹⁰⁴ व¹⁵¹ अयोध्या येथील राम मदिराचा शिलान्यास केल्यानंतर मुसलमान नाराज झाला तर शिलान्यास केल्यानंतर मदीर तभी मानग तभी महणून हिंदू नाराज झाले. अशा प्रकारे दोन धर्माचे लोक नाराज झाल्यामुळे उत्तर प्रदेशसारख्या मोठ्या राज्यात ब^{हले नाही} महणून हिंदू नाराज धर्माच्या आधारावर अनेक राज्यदीय गण्डली ब^{हरू नाल} प्राभव झाला. धर्माच्या आधारावर अनेक राजकीय पश्चाची स्थापना करण्यात आत्मे. स्वातंत्र्यपूर्व काळत इप्रि^{हती} टाम्हा प्रमाच्या हितसंरथणासाठी 'मुस्लीम लीहती' राषणाव देने इप्रित्धा अपूर्णने धर्माच्या हितसंरखणासाठी 'मुस्लोम लीवची' स्थापना केली तर त्याला मह देण्यासाठी हिंदू महासभा गुरितमान अलगे रिखिधर्माच्या हितसंबंधाच्या रक्षणासाठी 'अकाली दलावी' स्वापन करण्यात आलो, पत्रिवम बंगालमध्ये इग्रि^{त्वात} आली, शिखधर्माच्या हितसंबंधाच्या रक्षणासाठी 'अकाली दलावी' स्वापन करण्यात आलो, पत्रिवम बंगालमध्ये बोरा जा स्थापण करण्यात आली, केरळमच्ये खिरचन धर्माच्या हितसंबधाच्या संरथणासाठी 'केरळ कांग्रेसची' सापना करण्यात आरठी.

भाषत 3) माण (Language) : जाती आणि धर्माप्रमाणे भाषा हा ही घटक समाजाला जोडणाग आणि समाजाचे विभाजन नगाग एक पटक आहे. समान भाषा बोलण्पान्या लोकांना एकप्रित आणणे सोंपे असते १९५६ साली भाषिक आधायवर नगाने पुनर्गवन करण्यात आले तेव्हा पासून या भाषिक राज्यामध्ये भाषिक अल्पसंख्यकांची समस्या निर्माण झाली आहे. नजामे पुनर्गवन करण्यात आले तेव्हा पासून या भाषिक राज्यामध्ये भाषिक अल्पसंख्यकांची समस्या निर्माण झाली आहे. नजामे पुनर्गवन करण्यात आले तेव्हा पासून या भाषिक राज्यामध्ये भाषिक अल्पसंख्यकांची समस्या निर्माण झाली आहे. वामुद्धे भाषिक अल्पसंख्यकांना असुरधित वाटते आणि म्हणून ते अशाच उमेदवारांना मतदान करतात जे त्यांच्या वामुद्धे भाषिक अल्पसंख्यकांना असुरधित वाटते आणि म्हणून ते अशाच उमेदवारांना मतदान करतात जे त्यांच्या वामुद्धे भाषिक अल्पसंख्यकांना आसुरधित वाटते आणि म्हणून ते अशाच उमेदवारांना मतदान करतात जे त्यांच्या विहानवंचात्या रखणाची हमी घेतात भाषिक आधायवर आज अनेक पक्ष सत्तेत आलेत. हिन्दी विरोधी पक्ष म्हणून 'डीएमके' विहान आला मराठी भाषिक हितसंबंधाचा रखक म्हणून महाराष्ट्रात शिवसेनेला ' महत्व प्राल झाले आसाममध्ये 'आसाम गा परिषद' अस्तित्वात आले, तेल्गु भाषिकांचा रक्षक म्हणून आधमध्ये 'तेलगु देसम पक्ष' अस्तित्वात आला. हे भाषिक व हादेशक पक्ष लोकाच्या भाषिक भावना भडकावून आपले राजकीय स्वार्थ साध्य करतात.

प्रदेशक प्र 1) उपसण्टवाद (Sub Nationalism) : १९५६ नंतर राष्ट्रवादाची भावना कमी होत मेली आणि अनेक संकुधित निष्ठा ट्रोड़े वर काउंद्रयला लगल्या ल्यामध्ये प्रादेशिकतावाद, आदिवासीवाद, भूमिपुत्राची संकल्पना, अशा संकुधित निष्ठा ट्राइरणाचे आधार बनल्या. या संकुधित निष्ठेच्या आधारावर अनेक राजकीय पश्च अस्तित्वात आले. प्रादेशिक भावनेव्या ट्राइरणाचे आधार बनल्या. या संकुधित निष्ठेच्या आधारावर अनेक राजकीय पश्च अस्तित्वात आले. प्रादेशिक भावनेव्या ट्राइरणाचे आधार बनल्या. या संकुधित निष्ठेच्या आधारावर अनेक राजकीय पश्च अस्तित्वात आले. प्रादेशिक भावनेव्या ट्राइरणाचे त्राचार तेलगु देसम पश्च, आसाम गण परिषद, नेंशनल फ्रंट, नागा नेंशनल ऑर्गनायझेशन, मॉणपूर पीपल्स पार्टी प्राचाद तेलगु देसम पश्च, आसाम गण परिषद, नेंशनल फ्रंट, नागा नेंशनल ऑर्गनायझेशन, मॉणपूर पीपल्स पार्टी हागाट नवनिर्माण सेना सारखे पश्च अस्तित्वात आले. आदिवासोच्या रक्षणासाठी झारखंड पश्च, ऑल पार्टी होल लोडर्स हागाट वर्जनिर्माण सेना सारखे पश्च अस्तित्वात आले. आशादाहोर संकुधित निष्ठेच्या आधारावर प्रचार केल्या जातो. लोकांनाही ते हायनाव

पश्च जवाहव पाटनान. ५) राजकीय वित्यारसरणी (Political Ideology): राजकीय विचारसरणीवाही मतदार वर्तनावर प्रभाव पडत असतो. करण ६) राजकीय विद्यारसरणीशो प्रतिबध्द असतात. त्या विचारसरणीचे प्रतिनिधित्व करणाऱ्या राजकीय पक्षाला ते मत हता अनेक मतदार डाळ्या विचारसरणीने प्रभावित असतात. विशेष करून केरळ, पश्चिम बंगाल आणि हिपुरा या रेतत अनेक मतदार डाळ्या विचारसरणीने प्रभावित असतात. विशेष करून केरळ, पश्चिम बंगाल आणि हिपुरा या रेत्रामध्ये अनेक मतदार डाळ्या विचारसरणीशो कटिबध्द आहे. त्यामुळे ते नेहमो भारतीय कम्युनिस्ट पक्ष, मार्क्सवादी राज्यामध्ये अनेक मतदार डाळ्या विचारसरणीशो कटिबध्द आहे. त्यामुळे ते नेहमो भारतीय कम्युनिस्ट पक्ष, मार्क्सवादी राज्यामध्ये अनेक मतदार डाळ्या विचारसरणीशो कटिबध्द आहे. त्यामुळे ते नेहमो भारतीय कम्युनिस्ट पक्ष, मार्क्सवादी राज्यामध्ये अनेक मतदार डाव्या विचारसरणीशो कटिबध्द आहे. त्यामुळे ते नेहमो भारतीय कम्युनिस्ट पक्ष, मार्क्सवादी राष्ट्राय स्वयसेवक संपाल्या विचारसरणीला कटिबध्द आहेत. असे लोक त्या त्या विचारसरणीच्या पक्षालाव नेहमी मतदान गटीय स्वयसेवक संपाल्या विचारसरणीला कटिबध्द आहेत. असे लोक त्या त्या विचारसरणीच्या पक्षाला ने देना मत्यात १९७७ पूर्वा राष्ट्रीय स्वयसेवक संपाची शाखा जनसंघ मानल्या जात होती मणून हे लोक जनसंघाला मत देत कातत १९७७ मुर्वे राष्ट्रीय स्वयसेवक संघाची शाखा जनसंघ मानल्या जात होती मणून हे लोक जनसंघाला मत देत होते १९७३ मध्ये 'जनसंघ' जनता पक्षात विलीन झाला त्यामुळे हे लोक जनता पक्षाला मत दावला लागले. १९८० नंतर होते १९७३ मध्ये 'जनसंघ' जनता पक्षात विलीन झाला त्यामुळे हे लोक जनता पक्षाला मत दावला विद्यत येतात.

त पत्र भारतीय जनता पद्यात विल्वेन झाला. माणून हे लोक भारतीय जनता पक्षाला मतरान करतांना दिसून येतात. ६) व्यक्तिपूजक नेतृत्व (Charismatic Leadership) : मतदार वर्तनावर पक्षनेता किंवा उमेदवाराच्या दिव्यवलयो ६) व्यक्तिपूजक नेतृत्व (Charismatic Leadership) : मतदार वर्तनावर पक्षनेता किंवा उमेदवाराच्या दिव्यवलयो व्यक्तिमत्त्वाचा प्रभाव पडतो. १९४७ ते १९६४ सालापर्यंत पंडित नेहरुच्या व्यक्तिमत्त्वाच्या प्रभावामुळे लोक कॉंग्रेस पक्षाल मरंड बहुमताने निवाहून देत होते. १९७५ ते १९८४ पर्यंत श्रीमती इंदिरा गांधीच्या व्यक्तिमत्त्वाच्या प्रभावामुळे लोक इंदिरा भोग्रिसला प्रचंड बहुमताने निवाहून देत होते.

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महाराष्ट्रात शरद प्रवम, बिहासमध्ये नितीशकुमार, तामीळनाडू मध्ये जयललिता, पश्चिम बगाल्यच्ये तृणमूल कांग्रेस ममता बनजी, तर २०१५ व्या दिल्ली विश्वाससभा निवडणुकोमध्ये अरविंद केजरोवाल यांच्या व्यक्तिपुजक नेतृत्वावर जनतेने विश्वास दाखविला २०१४ च्या १६ व्या तसेच २०१९ च्या १७ व्या लोकसभा निवडणुकोत भारतीय जनता पद्याला नरेंद्र विश्वास दाखविला २०१४ च्या १६ व्या तसेच २०१९ च्या १७ व्या लोकसभा निवडणुकोत भारतीय जनता पद्याला नरेंद्र मोदोच्या नेतृत्वाने लोकसभेत बहुमत प्राप्त करून दिले अशाफकोर व्यक्तिपुजक नेतृत्व मतदारात्ला प्रभावित करीत असतात मोदोच्या नेतृत्वाने लोकसभेत बहुमत प्राप्त करून दिले अशाफकोर व्यक्तिपुजक नेतृत्व मतदारात्ला प्रभावित करीत असतात ७) सताभारी पद्याची कामगिरी (Roll of Rulling Party) सताधारी पद्याने केलेल्या कामगिरीचारी मतदारवर्तनावर प्रभाव ७) सताभारी पद्याची कामगिरी (Roll of Rulling Party) सताधारी पद्याने केलेल्या कामगिरीचारी मतदारवर्तनावर प्रभाव ७३ असतात. पा आश्वासनाची पूर्वता सत्ताचारी पक्षाने किती केलेली आहे यावरून यांचा प्रभाव मतदार वर्तनावर पढतो. १९७७ व्या निवडणुकीत लोकांनी जनता पक्षाला निवडून दिले व जनता पद्याने जी आश्वासने दिली ती पूर्ण न केल्यामुळे १९८० व्या निवडणुकीत जनता पक्षाल परामव पत्करावा लगारल आणि कांग्रेसला लोकोनी निवडून दिले १९८० च्या निवडणुकीत व्या निवडणुकीत जनता पक्षाल परामव पत्करावा लगारल आणि कांग्रेसला लोकोनी निवडून दिले १९८० च्या निवडणुकीत व्या निवडणुकीत जनता पक्षाल परामव पत्करावा लगारल आणि कांग्रेसला लोकोनी निवडून दिले १९८० च्या निवडणुकीत कांग्रेसने आंग्रप्रदेशमध्ये जो आल्वासने दिली होती तो पूर्ण न केल्याने तेचे तेलनु देशम पक्ष विजवी झाला अग्राप्रकाने कांग्रेसने आंग्रप्रदेशमध्ये जो आल्वासन पूर्ण केले तर लोक त्यांच्या बाजूने मतदान करतात, त्यांनी जर आश्वासन पूर्ण केले नाही तर लोक विरोधात मतदान करतात.

८) आर्थिक आणि राजकीय प्रश्न (Economical & Political Issues) निवडणुकीव्या केळी आर्थिक आणि राजकीय प्रश्न जवलंत असतात. त्यांचाही प्रभाव मतदारांवर होत असतो. १९७१ च्या निवडणुकीत इंदिरा गांधी यानी 'गरिबी हटाव'चा नारा दिला होता. राजकीय पक्षांनी 'इंदिरा बचाव'चा नारा दिला होता. अशावेळी तत्कालीन परिस्थितीत 'गरिबी हटाव'चा नारा प्रभावी ठरला आणि लोकांनी इंदिरा गांधीना निवडून दिले. १९७७ च्या निवडणुकीच्या केळी 'स्वातत्र्य की गुलामी' हा प्रश्न लोकापुढे मांडण्यात आला. लोकांनी स्वातंत्र्याची बाजू घेतलो आणि जनता प्रक्षाला निवडून दिले. १९८० च्या केळी आसाममच्ये परकीय नागरिकांचा प्रश्न गंभीर होता. म्हणून आसाम गण परिषद पश्च निवडून देले. १९८० च्या केळी आसाममच्ये परकीय नागरिकांचा प्रश्न गंभीर होता. म्हणून आसाम गण परिषद पश्च निवडून देले. १९८० च्या केळी राजकीय प्रश्न आणि आर्थिक प्रश्न मतदार वर्तनाला प्रभावित करतात.

(९) पैशाची ताकद (Money Power)। ज्येष्ठ पत्रकार व राज्यसभेचे माजी सदस्य कुलदोप नायर यानी, देशाचे पहिले शिक्षणमंत्री मौलाना अबुल कलाम आझाद हे मंत्री असताना एक रुपयावेही त्यांचे बॅक बॅलन्स नव्हते, पण आज आपल्या देशात सर्व करोडपती राज्यसभेत आणि लोकसभेत भेटतील अशो स्थितों आहे. अशी टीका २७ सप्टेंबर २०१२ मध्ये नागपूर येथे श्रमिक पत्रकार संघात केली होती. तर १३ जुलै २०१२ च्या The Times of India सर्वोश्वणानुसार देशातल्या एकूण २,३२२ MPs आणि MLA पैको ४८% करोडपती जनप्रतिनिधी आहेत. त्यामधील उत्तरप्रदेशमध्ये सर्वति जास्त श्रीमंत उमेदवार असून महाराष्ट्र मंतर आध्रप्रदेशाचा क्रमांक लागतो. आधुनिक युगात निवडणूक अतिशय खर्चिक झाली आहे. त्यामुळे ज्या पक्षाजवळ पैसा अधिक असती तो पंच निवडून येण्याची शक्यता जास्त असते. भारतामध्ये शासकीय आकडेवारी नुसार ३०% लोक दारिदयरेषेच्या खाली आहेत. त्यामुळे अशा लोकांच्या मतदार वर्तनावर पैशाचा प्रभाव पडतो राजकीय पश्च लोकाना पैसे वाटतात किंवा निवडणूकीच्या वेळी घोतर, साडी, व्लॅकेट वाटतात.

१०) लाटीचा प्रभाव (Influence of Addiction) यासंदर्भात पॉल ब्रॉस यांच्या मते, जेव्हा मतदारामध्ये स्पष्टपणे एकाच दिशेने किंवा एकाच राष्ट्रीय पक्षाकडे व त्यांच्या नेत्याकडे कल बनू लागतो तिला लाट असलेली निवडणूक म्हणता येईल. ही लाट येणे एखाद्या मुद्दावर किंवा मुद्दाच्या संचावर आधारित असते. स्थानिक गणिती आणि युती यांच्या पलिकडे जाऊन जसा जसा खेड्यापाड्यात व टपरीवर लाटेचा प्रवास होत जातो तसेतसे विशिष्ट बॉधिलकी नसलेले व निर्णय न चेतलेले बहुतेक मतदार त्या दिशेने जाऊ लागतात. (पॉल आर ब्रॉस, द १९८४ पार्लमेंटरी इलेक्शन इन उत्तरप्रदेश, एशियन सर्व्ह, जुन १९८६)

११) गुंडगिरीची ताकद (Muscular Power) : १९८९ नंतरच्या निवडणुकीत गुंडगिरीचा प्रभाव मोठ्या प्रमाणात पडला आहे. विशेष करून उत्तर प्रदेश आणि विहार सारख्या राज्यात राज्यकर्त्याजवळ पाळलेले गुंड असतात. ते शस्त्र दाखवून लोकांना भयभीत करतात. विशिष्ट उमेदवाराला मते द्या नाहींतर तुम्हाला मारण्यात येईल अशा चमक्या देतात. त्यांच्या धाकामुळे लोक मतदान करायला जात नाहीत. ही परिस्थिती कमी—अधिक प्रमाणात २०१५ पर्यंत सर्वय राज्यात निर्माण झाली आहे. ही योष्ट सकारता येत नाही. अशारितीने शारीरिक ताकद किंवा गुडगिरीची ताकद मतदान वर्तनाला प्रभावित करणारा घटक बनला आहे.

१२) परंपरा (Tradition) : भारतात अनेक मतदार परंपरेच्या प्रभावाने विशिष्ट पक्षाला मतदान करतात. काही लोक पितनानपिडवा एफाच पक्षाला मतदान करतात, कांग्रेस पक्षाला पिड्यानपिड्या मतदार करणारे अनेक लोक आहेत. जनसंघाला मतदान करणारे अनेक परंपरागत मतदाता आहेत. अशा लोकांसमोर कोणताही आर्थिक प्रश्न नसतो. ते पित्रज्ञानपिडवा विशिष्ट पद्याला परंपरेनुसार मतदान करतात.

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(३) अल्पसंख्यांकांची असुरश्चितता (Insecurity of Minority) । भागतात धार्मिक, भाषिक, जातीय अल्पसंख्यांकांचे गट हत्र) अल्पसंख्यांकांच्या मनात नेहमी बहुमख्यांकाद्वारे अत्याचार होण्याची, असुर्गधततेची भोती असते. त्यामुळे ते आहेत. या अल्पसंख्यांकांच्या मनात नेहमी बहुमख्यांकाद्वारे अत्याचार होण्याची, असुर्गधततेची भोती असते. त्यामुळे ते आहत. या महतात आणि नियमितपणे त्याच्या नेत्यांच्या मतानुसार संघटितपणे मतदान करनात. त्यामुळे सर्व राजकीय पश्च हामाटतपा प्राप्त करण्यासाठी अत्यसंख्याकाना खुश ठेवण्याचा प्रयत्न करतात. उदा भूस्लिम, बीघ्ट इत्यादी.

रह) निवडणूक प्रचार (Election Campaign) निवडणूक प्रचाराचाही मतदार व्यवहारावर मोठ्या प्रमाणन प्रचाव पडतो. र्थः गित्रवे व्यवहारावर माठक प्रायं अतिहाय प्रभावी झाली आहेत. आणि ज्या पश्चाचा प्रचार प्रभावी होती त्या पश्चाची आजच्या काळात जनप्रसारमाध्यमे अतिहाय प्रभावी झाली आहेत. आणि ज्या पश्चाचा प्रचार प्रभावी होती त्या पश्चाची आजन्म विवडणूक जिंकण्याची संधी वाढते त्यामुळे ब्रापत्र, रेडिओ, टेलोकिजन द्वारा निवडणूक संघाहारे सर्व पश्च प्रवार करतात. १९८९ च्या निवडणुकीनंतरच्या प्रचारामध्ये कॅसेटचा वापर अधिक केल्या जात होता आता परंतु २०१४ व्या १६ व्या लोकसभा निवडणुकीत भाजपासारख्या राजकीय पश्चाने इलेक्ट्रानिक्स मिडीयाच्या माध्यमातून लोकाच्या मनामध्ये बोहोचण्यासाठी 'अच्छे दिन आने वाले है', 'सबका साथ सबका विकास', कुठे नेऊन ठेवला महाएण्ट्र माझा' अणा रहोगनच्या माध्यमातून मतदाराला प्रभावित केले आहे. आणि त्याच्या प्रभावाने मतदारांनी आपले मतदान केले आहे

१५) प्रसार माध्यमांची भूमिका (Roll of Media) : आधुनिक युगामध्ये इलेक्ट्रीक मिडोया व प्रिंट मिडीया यांच्या माध्यमातून गोंडस अशी आण्वासने व आकर्षक सुभाषिते प्रसारित करून मतदारांना आकर्षित करण्यांचे काम प्रसार माध्यमे करतांना दिसून येतात. उदा. अच्छे दिन आनेवाले हैं, अबको बार मोदी सरकार, कुठे नेऊन टेक्ला महागण्ड माझा, डिजीटल इंडिया शायनिंग इंडिया, गरिवी हटाव अशा स्वरुपाचे नरे सतत इलेक्ट्रॉनिवम मिडीयाच्या मार्फत मतदारांसमोर देवले जातात

१६) सोशल मीडीयाचा प्रभाव

भारतीय राजकारणावर सोशल मीडियाचा प्रमाव २०१४ पासून सण्डपणे दिस् लागला. मध्य प्रदेश, राजस्थान आणि छत्तीसगडच्या निवडणुका वगळता सोशल मीडियानं प्रत्येक राज्यात किमान एक वेळ निवडणुकीच राजकारण क् तिशोल केलं आहे. तेव्यापासून आजपर्यंत सोशल मोडियानं राजकारणातली जवळपास एक फेरी पूर्ण केलो. सध्या या तीन राज्यांत सोशल मीडिया निवडणुकीच राजकारण धडवण्यात गुंतला आहे. जयपुर शहरात भाजपच्या आयटी सेलची कार्यशाळा झाली. या आधाहीवर अमित शहा आणि अमित मालवीय सातत्यान काम करत आहेत सन २०१९ थ्या लोकसभा निवडणुकीपासून सोशल मीडियाची दुसरी निवडणुकीय फेरो सुरू होईल सामाजिक यळवळीचा अवकारा डिजिटल कृतिशोलतेन व्यापला आहे, तसेच ऑन लाईन राजकीय संघटनही केले जात आहे. सोशल मीडियाची ही कर्य नवीन समाजिक चळवळीशों साम्य असलेलों आहेत. या चळवळीचा फेल्या पांच वर्षात प्रत्येक राज्यात प्रमाव पडलेला दिसतो.

• निष्कर्ष -

सार्वत्रिक भौड मताधिकारावर आधारित मुक्त व न्याय निवडणुकाव्योरे सर्व महत्वाच्या प्रश्नाची निर्णायक उन्तरे मिळण्यासाठी मतदारांचा राजकीय सहभाग बाढणे गरजेचे आहे. सोबतच मतदारांनी सांपदायकता, जात, धर्म,भाण, राजकोच मुन्हेगाराचा सहभाग या संकुचित प्रवृत्तीपासून सुटका करण्यासाठी स्थानिक स्वयंसेवकानी निवडणूक आयोगाच्या पूर्वसमतीने मतदाराची राजकीय शिक्षण संसूचन माध्यमांचा वापर करून राजकीय जाणीव जागृती पडवून आणणे आवश्यक आहे.

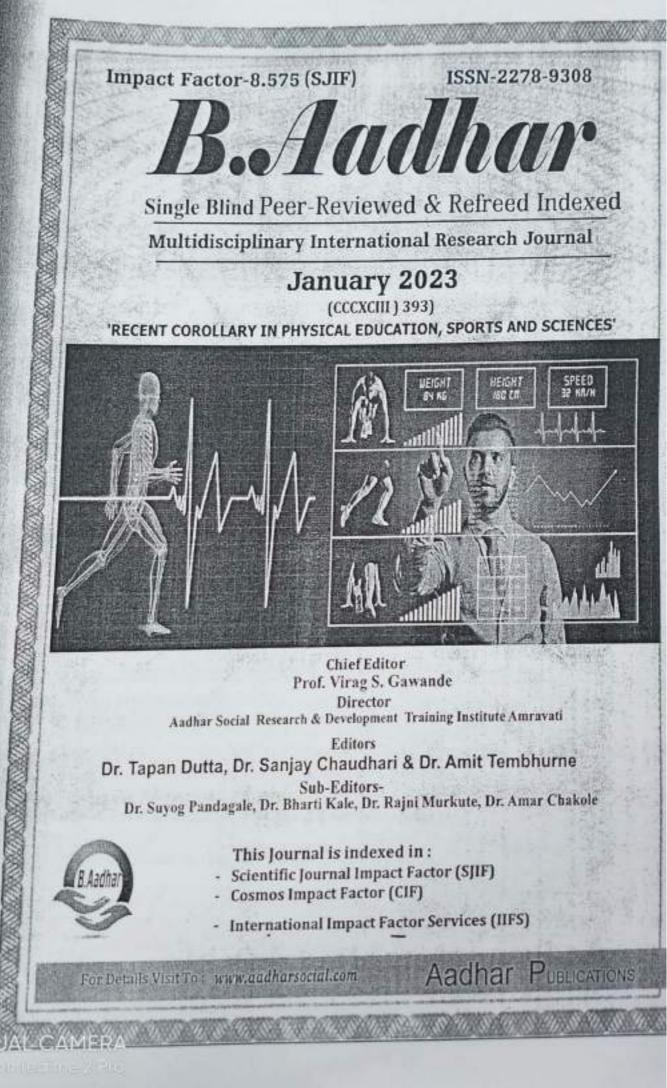
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डॉ. विघे प्रशांत—'मॉडर्न इंडियन पॉलिटी'''धारतीय संविधान व भारतीय राजकारण-ऑक्टोबर-२०२०''साईनाथ

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Impact Of Physical Activities And Sports For Boosting Immunity And Wellness

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Abstract

Physical activity is essentially the development of the use of energy generated by skeletal muscles. The concept of real work is associated with many types, forces and areas of development. There are many types of real work, including exercise, sports, play, dance, and dynamic lifestyles such as walking, housekeeping, and farming. Active work or exercise can improve your well-being and reduce the risk of several infections, such as type 2 diabetes, malignant growths and cardiovascular disease. In particular, ordinary activities can improve your personal satisfaction. Being fit improves your character. This allows you to perform proactive tasks without feeling tired or anxious. Being in good shape also guarantees that you are intellectually fit and calm. So this is the perfect opportunity to play some games, engage in proactive tasks, encounter joy, harmony and appreciate a fiery and energetic lifestyle.

Physical work can be characterized as any development of the body that requires the use of energy. This includes all movement during that time, except standing or resting. Active work can be seen, for example, in going to class, climbing the stairs, mowing the lawn and, in any case, cleaning the house. Exercise is active work, but not all real work is exercise. Exercise is an organized, organized and monotonous activity to improve or maintain true well-being. The possibility that active work is a prerequisite for well-being is not new. Ancient scientists and doctors relied on it, and Hippocrates (60-357 BC) explained it. Perhaps instinctively, said Russell Pate, extraordinary pioneers have always understood the connection between active work and well-being, but as previously noted, the science of active work and physical activity did not begin to be applied until the 20th century. European exercise physiologists - 1920 Nobel laureate August Krogh (187-199) and 1922 Nobel laureate A. V. Slope (1866-1977) - were quick on the field. Noting that the field has not produced a Nobel since then, Pate said, "We are overdue." In the United States, the Harvard Fatigue Laboratory was dynamic around the same time, until the end of World War II (1927-1919 7). According to Pate, it spawned a significant number of scientists who conducted applied science research projects across the country that still exist today. At the beginning of the 20th century, most of the science of active work and movement focused on understanding the physiological responses important to exercise. Near the middle of the century, some exceptionally famous experts on the spread of disease, such as Jeremy Morris (1910-2009) and Ralph Paffenbarger (1922-2007), were inspired by the effects of active work on well-being. Pate said: "I think you could probably argue that we are here today because of Jeremy Morris in the UK and Ralph Paffenbarger's scheme in the US." As he would like to think, the field benefited enormously from the credibility these early disease experts brought to their work. Morris is best known for his work in the mid-1950s. Different social outcomes for dynamic multilevel bus drivers compared to static drivers. Paffenbarger continued this work in verbal encounters between dynamic house builders (i.e., drivers) and static housewives, and conducted an important study of Harvard graduate classes with multiple realworld job levels (Paffenbarger et al., 1978). He also produced what many people call the Paffenbarger curve, which represents the relationship between active work and coronary outcomes. The lower end of the mobility continuum is associated with significantly increased fatal and nonfatal respiratory failure (Paffenbarger et al., 1978). The Paffenbarger curve has been used to describe the relationship between active work and many other persistent contagion effects, and well-being has been used here and there as a proxy for actual work (Blair et al., 1989). Pate said the key message of the curve is that "you don't want to be still." To be honest, active work and movement are important for everyone. Young people, teenagers and adults of all ages need regular, real work. Real work promotes great well-being and you should remain dynamic in all phases of your life, paying little attention to your body type or BMI.Understanding the advantages of actual wellness and realizing how dynamic you ought to be can assist you with keeping up wellbeing and improve your general personal satisfaction. Here are a couple of unfountages of nonrol actual work that exhibit the significance of actual wellness.

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Set aside cash

As indicated by the Centers for Disease Control and Prevention, persistent illnesses cause 7 out of ssings in the U.S. 10 passings in the U.S., and treating constant infections represents 86% of U.S. medical care costs. While a few illing While a few illnesses can't be forestalled, you can lessen your danger for certain sickness - like coronary illness and dich as a first and the forestalled. illness and diabetes - through diminishing dangerous practices and carrying on with a solid way of life. Settling on sound decisions, like taking part in standard active work, can lessen your danger for some, medical problems and complexities that can bring about costly clinical consideration.

Various investigations have shown that standard actual work builds future and lessens the danger of untimely mortality. There's not an enchantment recipe that deciphers long stretches of actual work

into long periods of life acquired.

Reduce your risk of injury

Standard exercise and active work increment muscle strength, bone thickness, adaptability, and security. Physical wellness can decrease your danger for and versatility to unintentional wounds,

particularly as you get more established.

Improve your personal satisfaction

Actual inertia is related with an expanded danger for particular sorts of malignancy, various persistent infections, and psychological well-being issues. Exercise, notwithstanding, has been appeared to improve disposition and emotional wellness, and gives various medical advantages. Obviously actual wellness additionally permits you to do things that you may not in any case have the option to do.

Stay dynamic

Remaining dynamic and sound permits you to do exercises that require a specific degree of actual wellness. For instance, climbing to the highest point of a mountain is a remunerating experience that ingrains a feeling of achievement and gives tremendous landscape, however there are individuals who can't encounter this because of wellness limits. Yet, in any event, strolling around the zoo with your family or playing on the jungle gym with your youngsters can be trying for the individuals who disregard active work for expanded timeframes. Being dynamic implies that it's simpler to remain dynamic as you

get more seasoned.

There are various wellbeing benefits to actual wellness. Normal exercise and active work Improve your wellbeing advances solid muscles and bones. Remaining dynamic can likewise assist you with keeping a sound weight, lessen your danger for type 2 diabetes, coronary illness, and diminish your danger for certain malignant growths. All in all, remaining dynamic is a critical piece of keeping up great wellbeing and

health.

That doesn't mean you can lift really heavy loads or even run a long distance run, despite the fact Significance of physical fitness that people who can are undeniably fit. For the average person, wellness in a meeting health office helps count every second count and involves three essential parts of our being; physical, mental and emotional well-being. Experts are gradually realizing that the three parts of an individual generally affect our real well-being. For example, if someone is very excited or mentally stressed, it can make them sick. This pressure can lead to ulcers, cardiovascular problems, strokes, stomach problems, and the sky is the limit. In any case, when the body is in order, a person generally feels better and is ready to avoid many real diseases. But when we think of wellness or fitness, we usually mean actual wellness, and this is

important for a number of reasons. 1. Being in great shape assists with monitoring circulatory strain. The heart is a muscle and in the event that it isn't practiced it won't be solid. At the point when you are fit, your heart is less inclined to build up the numerous heart illnesses found in such countless individuals today. Strolling is supposed to be a definitive method to stay fit, with 2000 stages each day incredible for practicing the heart and keeping those joints flexible.

2. Talking of joints, work out - wellness - is useful for anybody with joint inflammation or firm muscles. Delicate exercise from strolling or swimming assists with fortifying the muscles, joints and tendons so the scope of movement is kept up or even expanded.

3. Being fit is brought about by active work, yet such exercise likewise makes us better inwardly. It gives a feeling of direction and lessens sensations of dormancy and gloom. At the point when you get

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making the rounds on your walk you will see or meet others and this social communication is additionally important to keep you having a positive outlook on yourself and your life. 4. Being fit methods you won't be overweight - or if nothing else, not as much as those individuals who won't ever work out. Being overweight causes a great deal of issues, from worn joints to coronary illness and numerous issues in the middle, just as causing you to feel terrible about your self-perception. So what's the principal intention for begin getting fit? Take a walk. Every day go somewhat further. Before long you will actually want to walk two kilometers without feeling short of breath. In any case, consistently counsel your medical care proficient prior to beginning any wellness system.

Being physically active and in good shape is extremely important, especially among today's younger The significance of Physical Fitness in a Student's life people who anxiously appreciate the luxury of laptops, personal computers and televisions and are not always dynamic and lively. Dealing with electronics is not terrible as long as it is not temporarily used as a distraction. To appreciate the magnificence of life and face it fully, you should start engaging in proactive tasks or sports. Because students are young, they have a lot of potential to develop a side

interest that will keep their well-being in check throughout their lives. Being in great shape doesn't really need a thorough timetable of exercise. The variety of advantages that

· Prevents Chronic illnesses - Being Physically fit assists lower with blooding sugar levels and checks pulse. It additionally keeps a mind your wellbeing and you are less inclined to endure strokes or heart

· Controls Weight - The momentum age is inclined to infections inferable from additional body weight and expanded cholesterol levels. Being fit permits you to dispose of fat which thus upholds a sound way

· Ensures solid bone, muscle and joint turn of events - Adolescence is the ideal time when you can put

resources into your body and the outcomes will keep going forever. · Reduces stress - Stress is perhaps the most ruling wellbeing risk in the more youthful age. Being unsuitable causes you to lose your certainty and is perhaps the most conspicuous factor of causing pressure. Being fit makes you actually keen and betters your between close to home connections. In this

· Increases energy levels and certainty - Laziness is a partner of an unsuitable body. Being fit makes you dynamic, lively and vigorous constantly. Subsequently making you more skillful and brief in your work and results. This at last reflects in your certainty level which gets helped.

Conclusion

Being in great shape upgrades your character. It allows you to perform proactive tasks without being drained or anxious. Being in great shape additionally guarantees you being intellectually fit and tranquil. So it's the ideal opportunity for you to play a few games, engage in proactive tasks to encounter joy, harmony and to appreciate fiery and energetic way of life.

References

1. "President's Council on Physical Fitness and Sports Definitions for Health, Fitness, and Physical

Activity". fitness.gov. Documented from the first on 12 July 2012.

2. "Merriam-Webster Dictionary".

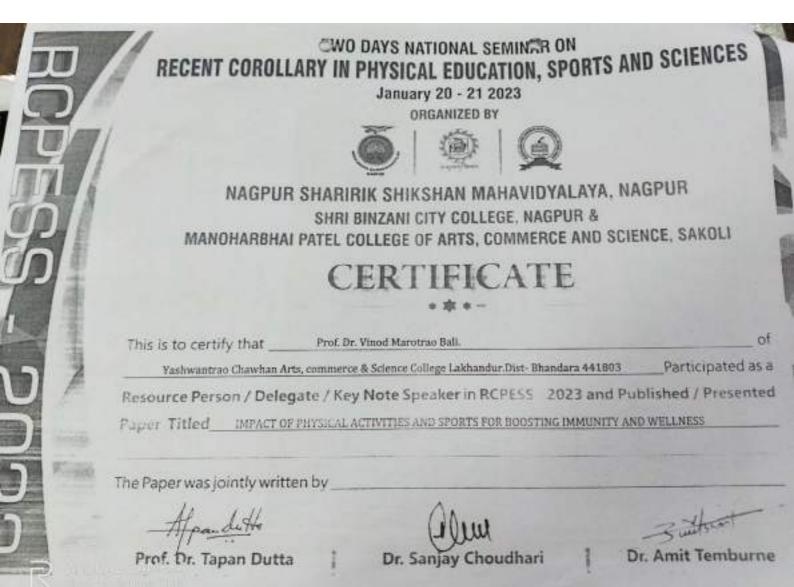
3. "Google Ngram Viewer". Google.

4. Nied RJ, Franklin B (February 2002). "Advancing and recommending exercise for the old". American Family Physician. 65 (3): 419-26. PMID 11858624.

5. "Exercise for Your Bone Health", nih.gov.

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The Role Physical Education And Sport Achieving The Sustainable Development Goals

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Abstract

Following 15 years of progress towards the remarkable sustainable Development Goals (MDGs), the world has directed its concentration toward the replacement Sustainable Development Goals (SDGs) in a time of change to the recently took on 2030 Agenda for Sustainable Development. In investigating accomplishments and forthcoming business encompassing the eight MDGs, the worldwide local area, driven by the United Nations, attempted an exhaustive conference measure with partners from all circles of society and concurred on 17 SDGs to be sought after over the course of the following 15 years. With the overall desire of bringing individuals and the planet closer together and abandoning nobody, the 2030 Agenda is an exceptional chance to rouse worldwide activity for advancement around the world, remembering for the field of Sport for Development and Peace.

Keywords: Sustainable development, goals, agenda, sport

Introduction

65

Game has shown to be a practical and adaptable apparatus for advancing harmony and improvement targets. Since the origin of the MDGs in 2000, sport has assumed an indispensable part in improving every one of the eight Goals, a reality that has been perceived in various goals of the General Assembly. In goal 70/1, named "Changing our reality: the 2030 Agenda for Sustainable Development", took on in 2015, game's part advancement 18 propelling social in additionally recognized: Game is likewise a influence of empowering significant economical turn of events. We perceive the developing commitment of game to the acknowledgment of improvement and harmony in its advancement of resilience and regard and the commitments it makes to the strengthening of ladies and of youngsters, people and networks just as to wellbeing, instruction and social incorporation goals.

Game adds to prosperity paying little heed to age, sex or identity. It is appreciated by all, and its scope is unparalleled. For example, the World Taekwondo Federation set up the Taekwondo Humanitarian Foundation to advance the military craftsmanship in outcast camps all throughout the planet. Such drives bring issues to light with regards to the situation of youthful outcasts and are completely in agreement with the SDGs, especially concerning wellbeing (Goal 3; Ensure solid lives and advance prosperity for all at all ages). Youngsters and youngsters advantage hugely from active work. Joined with a school educational plan, proactive tasks and game are fundamental for exhaustive instruction (Goal 4: Ensure comprehensive and quality training for all and advance deep rooted learning).

2030 plan and schooling

The developing worldwide worry for securing the earth and guaranteeing success for all implies that by 2015, the United Nations will define a progression of worldwide objectives. These objectives are partitioned into 17 supportable improvement objectives (SDOs), which are additionally isolated into 169 explicit objectives, which determine and indicate each SDO. This proposition on worldwide maintainability is advanced inside the structure of "2030 plan", and underlines that all areas of society, regardless of whether group or individual, should add to reasonable acknowledgment of the improvement objectives. As well as being eco driven, these objectives incorporate different issues, like round creation, squander age, destitution or wellbeing and prosperity,

metropolitan turn of events or social value. This will cover numerous spaces of mediation, in the climate, yet in addition in the financial, moral and sociological fields, with clear goals, like finding some kind of harmony between current turn of events and future advancement. Nonetheless, albeit the SDG is a recommendation that will be accomplished in 15 years (2015-2030), a few examinations accentuate that the speed of accomplishing the SDG isn't pretty much as quick true to form. In this manner, all legislative and non-administrative associations should cooperate to advance the acknowledgment of these objectives

In these establishments, training ought to be viewed as a vital factor in merging the economical propensities for people in the future. The United Nations Decade of training for supportable turn of events (2005-2014) has accentuated the significance of coordinating reasonable improvement activities into all parts of schooling to advance the difference in mindfulness and mentality towards maintainability. In this way, at the institutional level, thorough training is one of the fundamental ways of building supportability. Lauder et al. stressed the significance of instruction in managing the world's social and ecological issues. Sachs perceived this significance and underlined that training is a vital factor in accomplishing the drawn out objectives of the thousand years improvement objectives.

Sports exercises and key instruments for accomplishing supportable improvement objectives

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The examination on Sports under the objective of supportable improvement is basically completed by three foundations. To begin with, the Sixth International Conference of pastors and senior authorities accountable for sports and Sports Affairs (mineps VI) . The gathering distinguished three expansive spaces of intercession focused on (I) fostering a comprehensive vision for admittance to don, actual training and game for all; (II) boosting the commitment of game to manageable turn of events and harmony; and (III) ensuring the uprightness of game. This paper audits diverse SDOs to feature SDOs identified with AF and Sport. Notwithstanding, the job of joint endeavors in the 2030 plan isn't determined. Simultaneously as mineps VI, the Commonwealth gave a report explaining the commitment of sports to economical

improvement objectives. The identity of the record lies in the detailing of a progression of markers and accomplishments, which will all the more equitably measure the commitment of various games related fields to the definition of maintainable advancement objectives. Simultaneously, along with the directions in mineps VI, it gave another report itemizing that the particular targets of each manageable advancement objective can be accomplished through sports, however didn't determine the particular qualities of EF.

At last, in 2019, the Ibero American Sports Council and the Ibero American General Secretariat mutually gave a report recognizing sport as an apparatus for accomplishing maintainable improvement. For this situation, they picked manageable improvement objectives that could be accomplished through EF, sports practice or game as an organization, They have made a thorough examination of how such a relationship will occur (single direction or two-way), and set forward a progression of methodologies and associations to advance feasible turn of events. The fundamental discoveries of this report are that not all objectives designated at explicit objectives have a similar directionality and effect as game, but instead accentuate direct significance to 8 of 17 feasible advancement objectives and 19 of 169. One more illustration of the connection among game and AF and SDO is reflected in the account remarks of day and menas. Notwithstanding, indeed, these creators can't recognize EF and the particular targets proposed by UNESCO. At long last, different organizations, for example, who affirmed these connections and showed the wellbeing, social and monetary advantages of adding to 13 of 17 reasonable improvement objectives, yet didn't indicate explicit goals for which work could be done. All things considered, these frameworks recommend that a brought together examination of the ideas of game, actual exercise and AF be accentuated, and mineps vi initial considers the idea evaluation that the expression "Game" is utilized as an overall term, including public games, sporting events, recreation, dance and association, Different types of impromptu creation, rivalry, custom and native games and games. All things being equal, the Commonwealth subtleties the wording contrasts between sport, coordinated games,

AF, actual exercise, EF, and quality EF Notwithstanding, in spite of the acknowledgment of these distinctions, the objective determination of each practical improvement objective is seen according to the general viewpoint of sports. Conclusion

So, it is an assortment point specifically noteworthy and need to build up a multidisciplinary way to deal with address the difficulties of things to come. This is the principle reason for this review is to set up the conceivable connection between EF, as a discipline, in other educational program targets Based on the survey, examination and correlation of different explicit destinations, the supportable improvement objectives are advanced. It especially suggests that the possible connection between the new schooling model and the objectives set out in plan 2030 be broke down, as a main impetus for methodological change, and establish the framework for future business related examination in instructive organizations.

References

- 1. United Nations. Goal Adopted by the General As-sembly on 25 September Session; United Nations: 2015, 70th New York, NY, USA, 2015.
- 2. Organizaciones de las Naciones Unidas. Los 17 Objetivos de Desarrollo Sostenible. web: the Accessible on https://www.un.org/sustainabledevelopme nt/es/objetivos-de-desarrollosostenible/(got to on 17 March 2020).

3. United Nations. 17 Goals to Transform Our World. 2015. Accessible on the web:

- https://www.un.org/sustainabledevelopme nt/(got to on 25 April 2020).
- 4. Zamora-Polo, F.; Sánchez-Martín, J. superior world. Educating for a practical and Maintainability the in objectives advancement development of a change-creator college. 11. 2019, Manageability doi:10.3390/su11154224.

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यशवंतराव चव्हाण कला, वाणिज्य व विज्ञान महाविद्यालय लाखांदूर, जि. भंडारा bhojrajbodele@gmail.com ,मो. नं. ९४०३२३७८३१

प्रस्तावना

भारताच्या वैचारीक, सामाजिक व शैक्षणिक बांधणीत महाराजा सयाजीराव गायकवाड हवा दरदृष्टी राजाने सर्वार्थाने लक्षणीस काम केले. देशभरातील सर्व युगपुरूपांना उदा. दादाभाई नौरोजी, ता, गोखले, म. गांधी, लो. टिळक, पं. मदन मोहन मालवीय, स्वा. सावरकर, डॉ. बाबासाहेब आंबेडकर, म. फुले, छत्रपती शाहूया आणि अनेकांना या राजाने मदत केली. ते एक प्रकारवे सर्वांचे पाठीराखे होते. एवढेच नाही तर महाराजा गायकवाड यांनी स्वतंत्र भारताचे स्वप्न पाहत लोककल्याणकारी राज्याचा आदर्श निर्माण केला. आयुष्यभर प्रजाहित जपत त्यांनी आपले स्वप्न वास्तवात उतरविले, मात्र भारतातील अशा एकमेव उत्तुंग व्यक्तिमत्त्वाकडे स्वातंत्र्याच्या सयोंदयानंतर कोणाचे फारसे लक्षच गेले नाही, हे मात्र घडून गेले. भारतातील पाऊणशे वर्षांचा कालखंड सयाजीरावांच्या कर्तृत्वाने भरलेला आहे, असे रियासतकार गोंविद सखाराम सरदेसाई यांनी लिहन ठेवले. त्याहून महत्त्वाचे भाकीत जगदीश चंद्र बोस यांनी केले. ते म्हणतात, 'भारतासाठी आता सुवर्णकाळ फार दूर नाही. सर्वांच्या एकत्र प्रयत्नातून तो सुदिन लवकरच येणार आहे. आणि या देशाच्या जनकल्याणासाठी जे प्रयत्न करतात, त्यांचे उद्याचे नायक आहेत सयाजीराव. हा सुदिन म्हणजे स्वातंत्र्याची पहाट होती, पण नियतीचे वेळापत्रक वेगळेच होते. स्वातंत्र्यसूर्योदयाच्या दर्शनाअगोदरच सयाजीराव हे जग सोडून निघून गेले आणि जे घडावे असे वाटत होते, ते घडून शकले नाही. स्वातंत्र्यानंतर पंच्याहत्तर वर्षे होत आलीत, पण भारताच्या स्वातंत्र्यलढ्यात सर्व क्रांतिवीराच्या पाठीमागे आयुष्यभर हिमतीने उभे राहून, सार्वभौम सत्तेशी संघर्ष केलेल्या महाराजा सयाजीराव गायकवाड यांच्याकडे आमच्या इतिहासकारांनी, राज्यशास्त्रप्रशासनातील मान्यवरांनी सामाजिक सुधारणांच्या पताका खांद्यावर घेऊन आपापल्या नेत्यांच्या नावाचे आयुष्यभर भांडवल करणाऱ्या कोणाही मंडळींना काळापूर्वी दूरदूष्टी असलेल्या या युगद्रप्ट्यासंबंधीचा खरा इतिहास सांगावा वाटला नाही. हे का घडले ह्याचा शोध घेण्यापेक्षा, घडून मात्र गेले आहे.

सागावा वाटला नाहा. ह का पंडल हवावा राग प्राय प्राय गर्दू इतिहासकार वि. का. राजवाडे यांनी महाराष्ट्रातील शंभर वर्षांतील कर्तृत्ववान व्यक्तींची मोजदाद करणारा एक बहुमोल लेख लिहिला आहे. त्या लेखात पहिले नाव लिहिले आहे महाराजा सयाजीराव गायकवाड यांचे. सयाजीराव महाराज जाऊन पाऊण शतक उलटले. स्वातंत्र्यपूर्व काळात सयाजीराव गायकवाड यांचे. सयाजीराव महाराज जाऊन पाऊण शतक उलटले. स्वातंत्र्यपूर्व काळात ह्याच युगपुरूषाच्या कर्तृत्वाने पाऊण शतकाचा इतिहास विविध घटनांनी भरलेला होता. आणि जाजचे समाजजीवन वेगवेगळ्या कारणांनी—घटनांनी ढवळून निधत असताना सगळ्यांना बरोबर घेऊन समामिलकीच्या भूमिकेतून सर्वक्षेत्रात उत्तुंग काम केलेले सयाजीराव प्रसिद्धीच्या प्रांगणातून बाजूला

गहिले असले तरी, येत्या काळात सर्वांना प्रेरणा देऊ शकतील असे एकमेव व्यक्ती आहेत. महाराजा सयाजीराव गायकवाड यांच्या कालखंडातील चार टप्पे पाडता येतील जसे १. अनुभव

काळ, २. अभ्यास काळ, ३. विचार काळ व ४. प्रगतीकाळ. १.अनुभव काळ (१८८१ ते १८८७) :---महाराजा सयाजीगव गायकवाडयांची १८७५ साली दत्तक ९.अनुभव काळ (१८८१ ते १८८७) :---महाराजा सयाजीगव गायकवाडयांची १८७५ साली दत्तक म्हणून राजमाताजमनाबाईने बडोदा राज्याचा राजगादीवर निवड केली. १२ वर्षाच्या अशिक्षित अशा म्हणून राजमाताजमनाबाईने बडोदा राज्याचा राजगादीवर निवड केली. १२ वर्षाच्या अशिक्षित अशा गोपाळरांवाना खऱ्या अर्थाने १८८१ पर्यंत सहा वर्षे स्वतःचे शिक्षण आणि राज्यप्रशासनाचे शिक्षण गोपाळरांवाना खऱ्या अर्थाने १८८१ पर्यंत सहा वर्षे स्वतःचे शिक्षण आणि राज्यप्रशासनाचे शिक्षण गेपाळरांवाना खऱ्या अर्थाने १८८१ पर्यंत सहा वर्षे स्वतःचे शिक्षण आणि राज्यप्रशासनाचे शिक्षण गुरू म्हणून ब्रिटोश संस्थानातील आयसीएस अधिकारी एफ.ए.एच. मि. इलियट यांनी सयाजीरावांची गुरू म्हणून ब्रिटोश संस्थानातील आयसीएस अधिकारी एफ.ए.एच. मि. इलियट यांनी स्वयाजीरावांची उत्तंम तयारी करून घेतली. दिवान सर टी. माधवराय केशव भाऊराव पंडित आणि व्यकंटराव उत्तंम तयारी करून घेतली. दिवान सर टी. माधवराय केशव भाऊराव पंडित आणि व्यकंटराव कोशी उर्फ भाऊ-मास्तर या मंडळीनी सयाजीरांना शिकविण्याचे काम केले. सुरूवातीला प्राथभिक जोशी उर्फ भाऊ-मास्तर या मंडळीनी सयाजीरांना शिकविण्याचे काळानंतर त्यांचे अभ्यासाचे विषय माहिती पूरवत राहुन त्यांचे विषयज्ञान वाढवले च काही काळानंतर त्यांचे अभ्यासाचे विषय वाढविण्यात आले. त्यांचा अभ्यासक्रमही विस्तारीत करण्यात आला. या तरूण राज्याच्या अंगचे गुण, नवे शिकण्याची यिकाटी, अन चोयिस तास एखाद्र्या गोण्टीचा ध्यास पेवून त्याचा पाठपूरावा

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करण्याची जिद्द त्यांनी ओळखली. स्वतःच्या मुलावर करावे तसे शिक्षण, प्रशासन, कृत्व प्रमुखाप्रमाणे राज्याची जबाबदारी या मुलभूत कर्तव्याचे संस्कार सयाजीरावावर या गुरूवयांनी कंठ ''शाळेची राजवाढ्यातील जागा बदलुन मोतीबागेत नेण्यात आली. सकाळी सहा वाजल्यापामुन ने संध्यांकाळपर्यंत महाराजांचे इतर विध्यांबरोबर शिक्षण होऊ लागले मराठीच्या जोडीला इंग्रज़े. गुजराती व उर्दु हे नवीन भाषाविषय समाविष्ठ झाले. ही सहा वर्षे त्यांच्या दृष्टीने परिवर्तनाचा हेली. अठराव्या वर्षी १८८१ ला प्रत्यक्ष राज्यकारभार त्यांच्या हाती आला. १८८१ ते १८८७ हवा अनुभव काळात राज्यपद्धती समजून घेणे, त्यात योग्य ते बदल करणे आणि या बदलांची अंमलयजावर्ण करताना विविध प्रकारच्या अनुभवांना त्यांना सामोरे जावे लागले.

करताना विवय प्रकारच्या अनुपना से स्वा २.अभ्यास काळ(१८८७ ते १८९५) :- पहिल्या राणी धिमणाबाई यांच्या अकाली मृत्युच्छे संयाजीराव यांना निद्रानाशाचा आजार जडला. निद्रानाश उद्भवताच गो. स. सरदेसाई महारांजांचे रिडर यांच्या कडून वाचन करवून घेत. सरदेसाई कधी इंग्रजी गोप्टीचे पुस्तक, तुकारामाचे अभंग अन्न रिडर यांच्या कडून वाचन करवून घेत. सरदेसाई कधी इंग्रजी गोप्टीचे पुस्तक, तुकारामाचे अभंग अन्न रिडर यांच्या कडून वाचन करवून घेत. सरदेसाई कधी इंग्रजी गोप्टीचे पुस्तक, तुकारामाचे अभंग अन्न रिडर यांच्या कडून वाचन करवून घेत. सरदेसाई कधी इंग्रजी गोप्टीचे पुस्तक, तुकारामाचे अभंग अन्न रायवाचनाचे जणू वेसनच जडले. इतिहास, तत्वज्ञान, नितिशास्त्र हे महाराजांचे आवडीचे विषय होते. या विषयाचरच्या ग्रंथवाचनाचा व्यासंग त्यांनी अत्यंत चिकित्सकपणे वाढविला. एखादी संकल्पना व समजल्यास ते चर्चा करून संकल्पना समजावून घेण्याचा प्रयत्न करीत. त्यांची ज्ञानाभिलायो वृत्तांच या घटनेवरून सुस्पष्ट निदर्शनास येते. हिंदूस्थानातील अनेक विद्वानांना, पंडितांना आणि शास्त्रज्ञंत या घटनेवरून सुस्पष्ट निदर्शनास येते. हिंदूस्थानातील अनेक विद्वानांना, पंडितांना आणि शास्त्रज्ञंत महाराजांनी बडोद्यास बोलावून विद्वान तज्जांची व्याख्याने त्यांनी आयोजित केली होती. यामच्चे डां. रवींद्रनाथ टागोर, पं. मदन मोहन मालविय, सी. व्ही. रमन, जगदिश चंद्र बोस, डॉ. जयस्वाल, डॉ. राधाकृष्ण, सरोजनी नायडू, वि. दा. सावरकर, मार्क ट्वेन, रूडियार्ड किप्ली, हंस स्वरूप स्वानं, डॉ. रामचंद्र भांडारकर, डॉ. किर्तीकर, जदूनाथ सरकार, न. चि. केळकर, म. जोतीवा फुले, विहल रामजी शिंदे, अन्नासाहेब कर्वे, अहिताग्री राजवाडे, प्रा. पांगारकर, ई. एम. फॉस्टर अशा विद्वांना समावेश होता. इत्यादी विद्वांन पंडितांचे व्याख्यान ऐकूण महाराज सयाजीराव गायकवाड यांच्या मनावर वैचारीकता वृद्धींगत होत असे. तेथूनच प्रग्लभतेचा पांयडा त्यांच्यावर पडत होता.

महारांजाच्या प्रकृतिच्या कारणाने भारतातील उपचारासोबत परदेश पर्यटन व उपचारासाठं १८८७ ला बिलायतेचा पहिला प्रवास घडला. यातून जगातील चांगल्या गोष्टी या जिज्ञासू विद्याय्यनि न्याहाळल्या. त्याचा अभ्यास केला. यांचा उपयोग बडोद्यासाठी कसा करता येईल, ह्याचा विद्यार करून जगभरातील चांगल्या तज्ज्ञांना बडोद्यात आणणे सुरू केले.त्यामध्ये अमेरिकेतील बिल्यम बार्डन यांना ग्रंथालय उभारण्यासाठी आपल्या संस्थानात आणून ग्रंथालयाचे डायरेक्टर म्हणून नेमणूक केली. बार्डन साहेबांनी बडोद्यास आल्याबरोबर पाश्चात्य ग्रंथालयाची डायरेक्टर म्हणून नेमणूक केली. बार्डन साहेबांनी बडोद्यास आल्याबरोबर पाश्चात्य ग्रंथालयातील कामाच्या धरतीवर बडोद्याच्या सेंट्रल लॉयब्ररीचे निर्मिती केली, सोबंतच संस्थानात सरकारच्या मदतीने चालणारी सार्वजनिक मोफ्त ग्रंधालये व वाचनालये संस्थानाच्या निरनिराळ्या भागात उघडली. ज्या खेडेगावात अशा तहेवी ग्रंधालये उघडता आली नाहीत त्या ठिकाणी त्यांनी फिरत्या ग्रंथालयाची योजना केली. आंशिक्ति लोकांना ज्ञानसंपादनाची गोडी लागावी म्हणून त्यांनी उत्तम चित्रपट तयार करवून लॅटर्न स्लाइइसच्या द्वरे ते चित्रपट गावोगावी दाखविण्याची व्यवस्था केली.

३.विचार काळ(१८९५ ते १९०९) :-- अभ्यासातून, अनुभवातून, पाहण्यातून जमविलेल्पा नवकल्पना, जगभरातील नानाविध विचार, प्रशासन पद्धती, साहित्य, कला---संस्कृतीचा सयाजीरावांनी डोळसपणे स्वतः अभ्यास केला. मनापासून या गोष्टींना प्रोत्साहन देण्याची योजना आखू लागले. राज्य हे एक कुटुंब आहे. कुटुंयात उत्पन्न आणि खर्चाची तोंड मिळवणी करावी लागते. अनाठां खर्चास आळा घालणे, शक्य तेथे काटकसरीने बचत करणे आणि आपल्या राज्य कारभाग शिल्लक वाढती राहील याची प्रत्येकांने काळजी घेणे, हे तत्व महाराजानी आपल्या राज्य कारभाग शिल्लक वाढती राहील याची प्रत्येकांने काळजी घेणे, हे तत्व महाराजानी आपल्या राज्य कारभाग शिल्लक वाढती राहील याची प्रत्येकांने काळजी घेणे, हे तत्व महाराजानी आपल्या राज्य कारभाग शिल्लक वाढती राहील याची प्रत्येकांने काळजी घेणे, हे तत्व महाराजानी आपल्या राज्य कारभाग शिल्लक वाढती राहील याची प्रत्येकांने काळजी घेणे, हे तत्व महाराजानी आपल्या राज्य कारभाग शिल्लक वाढती राहील याची प्रत्येकांने काळजी घेणे, हे तत्व महाराजानी आपल्या राज्यात अमला आणले. शेतसाऱ्याची नव्याने आकारणी, नियीमत वसूली, कर चुकविणाऱ्यास जरब बसविणे, प्रत्येक खात्याने आपल्या खर्चाचे अंदाजपत्रक करावे अशाप्रकारची अमलबजावणी अधिकाऱ्यांचा मार्फत महाराज करीत असत. महाराज म्हणजे एक विद्याव्यासंगी व्यक्तीमत्व होते. महाराजांना मं धर्माबदल आस्था होती. ''सयाजीराव गायकवाड यांच्या जातीधर्म मिमांसेकडे मागे वळून पाहतांन लक्षात येते की, महाराजांच्या जाती धर्माविषयक सुधारणा आणि तत्संबंधीची वैचारीक मिर्मांसां

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अत्यंत क्रांतदर्शी होती. इ.स. १९११साली लंडन येथे भरलेल्या पहिल्या जागतिक वंशविषयक बरिषदेत सर्ववंशांना आणि सर्व लोकांना समानसंधीचे व समतोल धोरण आखण्याची भूमिका त्यांनी ब्रांडली होती".

त्रांडला साम महाराजांनी आपल्या शिकागोच्या अध्यक्षीय भाषणात अनेक मुद्यांना हात घालत तेथिल विद्वांनाची मते जिंकली. हिंदूस्थानरंची गौरवी गात हिंदूस्थातील प्राचीन रूखी—परंपरा तसेच वर्णव्यवस्था आणि आजच्या काळात त्यात माजलेली अराजगता देखिल स्पष्ट केली. तसेच आजव्या वर्तमान घडीच्या स्वार्थपूर्ण व्यक्तींच्या कार्यामुळे कशा पद्धत्तीने देशाचे नुकसान होते. हे ही समजावून सांगितले. जे लोक शिकून समाजाच्या विकासात हातभार लावतात, नवसृष्टी तिर्मितीसाठी प्रयत्न करतात ते परमेश्वराचे जोडीदार आहेत. परंतु सध्या स्वार्थाने सर्वांना पछाडलेले आहे. ते म्हणतात, ''मौतिकशास्त्र, वैद्यकशास्त्र, शिल्पशास्त्र, समाजसुधारक आणि धर्मद्रष्टे हे लोक वा नव्यासृष्टीचे निर्माते आहेत. सृष्टीकर्त्या परमेशवराचे ते एका परीने जोडीदारच आहेत. पण स्वार्थ, जातीद्वेष, संकुचित देशाभिमान व लोभ या दुर्गूणाचे मूर्तिमंत पुतळे असणाऱ्या लोकांनी जगत सर्वत्र गोधंळ माजवून दिला आहे.'' खऱ्या अर्थनि प्रत्येक देश आपपपल्या पद्धतीने पुढे जाण्याचा व प्रगती करण्याचा प्रयत्न आहे. परंतु राष्ट्रनिर्मितीच्या आड येणारी स्वार्थाध्र लोक गडूदीकासात अडसर ठरतात.

सयाजीराव गायकवाड यांच्या प्रशासनवैशिष्ट्याचे एक उदाहरण सांगता येईल. ''शिक्षण हेव प्रगती आणि परिवर्तनाचे एकमेव साधन आहे. त्याकरिता ते शिक्षण रयतेला दिले पाहिजे, हे राजाचे कर्तव्य आहे. शेती च उद्योग-व्यापार ही प्रगतीची शिडी आहे. रस्ते, शेतीसाठी व पिण्यासाठी पाणी, लोकांचे आरोग्य हा प्रजेच्या सुखाचा राजमार्ग आहे.'' हे महाराजांनी स्वतः कळवण्यासारख्या खेड्यातून आल्याने ओळखले होते. त्यामुळे समाजाचे सगळे घटक महत्त्वाचे आहेत. दुर्बल, मागासवर्गीय आणि जगंलातील आदिवासी ही आपलीच प्रजा आहे. त्यांना समाजप्रवाहात आणण्यासाठी राजाचे कर्तव्य आहे. यावर सयाजीराव म्हणत 'राज्याचा कारभार आम्ही हाती घेतला आमची प्रजा संतुष्ट राहावी, त्यांचा सुखात वाढ व्हावी, अशी माझी अंत:करणापासून इच्छा आहे. कित्येकांना माझे हे काम आणि प्रयत्न असमंजसपणाचे वाटत असतील परंतु त्या सर्वाच्या मुळाशी एकच उद्देश आहे, आणि तो म्हणजे प्रजाजनाचे हित करणे हा होय. प्रजेचे कल्याण करने हेच माझे कर्तव्य आणि हाच माझा मोक्ष आहे. लोकांनी याकरिता शिक्षण संपादन करून सुधारणांचा स्विकार करावा.' म्हणून अस्पृस्य आदिवासीसाठी मोफत शाळा सुरू केल्या. हा संबंध भारतातील पहिला प्रयोग होता.प्रगत असलेल्या राष्ट्रात शिक्षणाबद्दल अशी जागरूकता होती. त्यामुळेच विलायतेत १८७२ साली, जपानमध्ये १८८० साली, इंग्लंडमध्ये १८८१ साली, फ्रान्स मध्ये १८८४ साली आणि स्पेन—डेन्मार्क येथे १८८५ साली सक्तीच्या प्राथमिक शिक्षणाची सुरूवात झाली. हवा सक्तीच्या शिक्षणासाठी शिक्षण घेणाऱ्या विद्यार्थ्यांकडून फीस घेतली जाई. ऐपत आणि इच्छा असणोरेच शिकू शकत. ही गोष्ट सयाजीराव या तरूण राजाला अभ्यासातून कळली. भारतात याच काळात शिक्षणासंबंधी १८८२ मध्ये हटर कमिशन आले. जोतीराव फुले यावेळी म्हणाले, "समाजातील कनिष्ठ वर्गांना अगोदर शिकवा'' उच्च वर्गाचे प्रतिनिधी मात्र आग्रहाने म्हणाले, "आपण उच्चवर्गीयांना प्रथम शिकवू. तो वर्ग शिकला की, ते शिक्षण खालच्या वर्गापर्यंत आपोआप क्षिस्पत जाईल, ह्या दोन्ही विचारांचा अभ्यास तरूण सयाजीराव यांनी केला. इ. स. १८८२ साली अस्पृश्य—आदिवासी या वंचित समाजासाठी सरकारी खर्चाने शिक्षण देण्याचा हुकूम काढला. त्याच वेळेस महाराजांनी निरनिराळ्या भागात १८ शाळा या अंत्यज लोकांसाठी उघडल्या. शाळांची ही संख्या वाढत जाऊन १८९६ साली शाळांची संख्या २० झाली त्यावेळेस महाराजा सयाजीरावांचे वय अवघे २० वर्षांचेही नव्हते. हे अखिल भारतीय अस्पृश्यता निवारण परिषदेमध्ये त्यांनी अध्यक्षिय भाषणात म्हणाले ''मला या कामी अनेक अडचणींशी झगडावे लागले. कितीही पगाराचे

as hada

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February आमीष दाखविले तरी कित्येक वर्षे हिंदू शिक्षकच मिळेनात, मुसलमानाुकडून व नंतर आह समाजिष्ठांकडून हे काम करून घ्यावे लागले''

ठांकडून हे काम करून घ्यावे लागल या अंत्यत कठिण सुधारणेत महारांजानी अपूर्व यश संपादनाबद्दल महाराजांना परोपका या अंत्यत कठिण सुधारणेत महारांजानी अपूर्व यश संपादनाबद्दल महाराजांना परोपका या अंत्यत कठिण सुधारणेत महाराजाना अपूर्व पदवी दिली. त्यावेळी केलेल्या भाषणके सभा नावाच्या एका संस्थेने महाराजांना 'पतितपावन' अशी पदवी दिली. त्यावेळी केलेल्या भाषणके सभा नावाच्या एका संस्थेने महाराजाना पाततपायन महारांजानी ''या पदवीला मी पात्र आहे. बसे मला तरी वाटत नाही. उलट माझ्यावर या पदवीखे महारांजानी ''या पदवीला मी पात्र आह. बस परेंग मी एकटाच खपत आहे, असे नसून इतर के एक अवधड जबाबदारी लादली जात आहे. या क्षेत्रात मी एकटाच खपत आहे, असे नसून इतर के एक अवधड जबाबदारी लादली जात आहे. पा प्रतीय काळजीमुळे व परिस्थितीमुळे या कामी कोणी आहेत, त्यांच्याकडेही हा मान जातो. राज्याच्या काळजीमुळे अधिकारी मला जे सांग्रज्य भिष् कोणी आहेत, त्यांच्याकडेही हा मान जाता. राज्या मही. माझे अधिकारी मला जे सांगतात त्याव जितके करावयाचे होते तितके माझे हातून घडले नाही. माझे लाघते लागते. मानवी प्रयत्वक जितके करावयाचे होते तितक माझ हातून पुरुष पाहावे लगगते. मानवी प्रयत्नाला ^{भूषी}त मला अवलंबून राहावे लागते. ते जे करतात त्यावरच तृप्त राहावे लगगते. मानवी प्रयत्नाला भूषीय मला अवलबून राहाव लागत. त ज करवात का ते सर्वाधिकारी असूनही या मर्यादा अधिकर असतात. विशेषेत:. हिंदूस्थानातील राजे लोकांना ते सर्वाधिकारी असूनही या मर्यादा अधिकर असतात. विशेषत:. हिंदूस्थानताल राज लागता के राज्याने म्हटले होते.वंचित समाजाल भोवतात !'' अशा स्पष्ट उद्गार वयाच्या १९ वर्षांच्या तरूण राज्याने म्हटले होते.वंचित समाजाल भावतात !'' अशा स्पष्ट उद्गार वयाच्या र'' पंग क्रांतीचा निर्णय होता. एवढेच नाही तर १८९२ उन्नत करण्याचा हा जगातील महत्त्वाचा सामाजिक क्रांतीचा निर्णय होता. एवढेच नाही तर १८९२ साली सक्तीच्या मोफत प्राथमिक शिक्षणाची बडोद्यात सुरूवात केली. सक्तीच्या मोफत शिक्षणाच महाराजांची ही दूरदृष्टी तत्कालीन जगातल्या अग्रेसर शासनप्रणालीना मागे टाकणारी होते १८९१–९२ साली ना. गोपाळ कृष्ण गोखले यांनी पार्लमेंटमध्ये भारतातील प्रजेला सक्तीच्या व मोफत प्राथमिक शिक्षण देणारा ठराव मांडला. महाराजा सयाजीराव यांचा बडोद्यातील शिक्षणाच आग्रह डोळ्यासमोर ठेवून हा कायदा करावा, असे आग्रहाने मांडले.

सर्व क्षेत्रात सयाजीरावांनी लक्षणीय कार्य केलेले आहे हे आपणास दिसून येईल. खन्म अर्थाने महाराजा सयाजीराव गायकवाड हे स्वातंत्र्यपूर्व काळात भारतात लोकशाही संविधानाचा प्रव घातला. बनारस हिंदू विश्वविद्यालय आणि देशभरातील शेकडो संस्थांना मदत केले.व विश्वविद्यालयाचे ते कुलपती होते. पं. मालवीय उपकुलगुरू होते. भारतात स्वातंत्र्यसंग्रामात एकटा सयाजीरावांनी जगभरातील क्रांतीकारकांना मदत करून ब्रिटिश सरकारशी आयुष्यभर संघर्ष केल. भारतात प्रशासनातील सयाजीराव यांचे पुढील प्रयोग देशभर महत्त्वाचे ठरले. त्यांनी १८८५ मध्ये पहिला सहकारी साखर कारखाना काढला, स्वी शिक्षणाचा कायदा केला, १८९० मध्ये स्वतंत्र शेत खाते उघडले, १८९१ मध्ये गाव तेथे ग्रामपंचायत केले, गावोगावी वाचनालय उघडली, सोबत्व व्यायामशाळा करून तरूण मुलांना व्यायामाद्धारे आरोग्याचे महत्त्व पटवून दिले, धार्मिकतेल प्रोत्साहन देण्यासाठी धर्मखात्याची सुरूवात केली व पुरोहितासाठी कायदे केले. १८९२ साल सक्तीचे मोफत प्राथमिक शिक्षण सुरू केले. राइट बंधूंच्या अगोदर आठ वर्षे पुणे येथील संस्कृत पंडित शिवणकर बापू तळपदे यास १८९५ याली जगातील पहिल्या विमानोड्डाण प्रयोगास आर्थिक मदत केली होती. १९०१ साली दुष्काळासाठी फॅमिन कोड केले. १९०६ साली महाराजांच्या मदतीने 'महाराजा सयाजीराव गायकवाड आयुर्वेदिक विद्यापीठाची नाशिक येथे स्थापना केली, जात, पात, धर्म याचा विचार न करता चौसष्ट वर्षांत महाराजांनी कोट्यावधीची मदत गरूजूंना दिली. साहित्य, कला, संगीत, चित्रकला, शिल्पकलाचे ते पाठराखे होते. एवढेच नव्हे तर महाराजा सयाजीराव हे भारतातील एक प्रज्ञावंत, विचारवंत राजा होते. त्यामुळेच मराठी, हिंदी, संस्कृत साहित्य संमेलने, प्राच्यविद्या परिषदा, मानववंश परिषद, जागतिक सर्वधर्म परिषद, औद्योगिक परिषदा, संगीत संमेलने, अखिलभारतीय अस्पृश्यता परिषद, राष्ट्रीय कॉग्रेस अधिवेशने या आणि अशा परिषदाचे ते अध्यव, उद्घाटक आणि आयोजक होते. या त्यांच्या अनेकांगी विविध अष्ठपैऌ कामगीरीतून त्यांची प्रज्ञवंत युगपुरूष, युगदृष्टा म्हणून ख्याती सर्वश्रृत आहे.

निष्कर्षः –

१.सयाजीराव गायकवाड हे देशाभिमान बाळगणारे दृष्टे युगपुरूष होते.

२. सयाजीरावांनी आपल्या कार्यकाळात प्रजेसाठी जे काही चांगले करता येईल ते काम के^{लेले} आहेत.

३ देशप्रदेश गमन करतांना जे जे चांगले, उत्तम असे जे दिसेल ते आपल्या राज्यात आ^{जण्याच} प्रयत्न केला आहे.

४.शेतीसुधारणा, ग्रामीण—खेडूत लोकांना शिक्षणाचे द्वार उघडे करून देणारे ते पहिले राजकर्ते ^{होत.}

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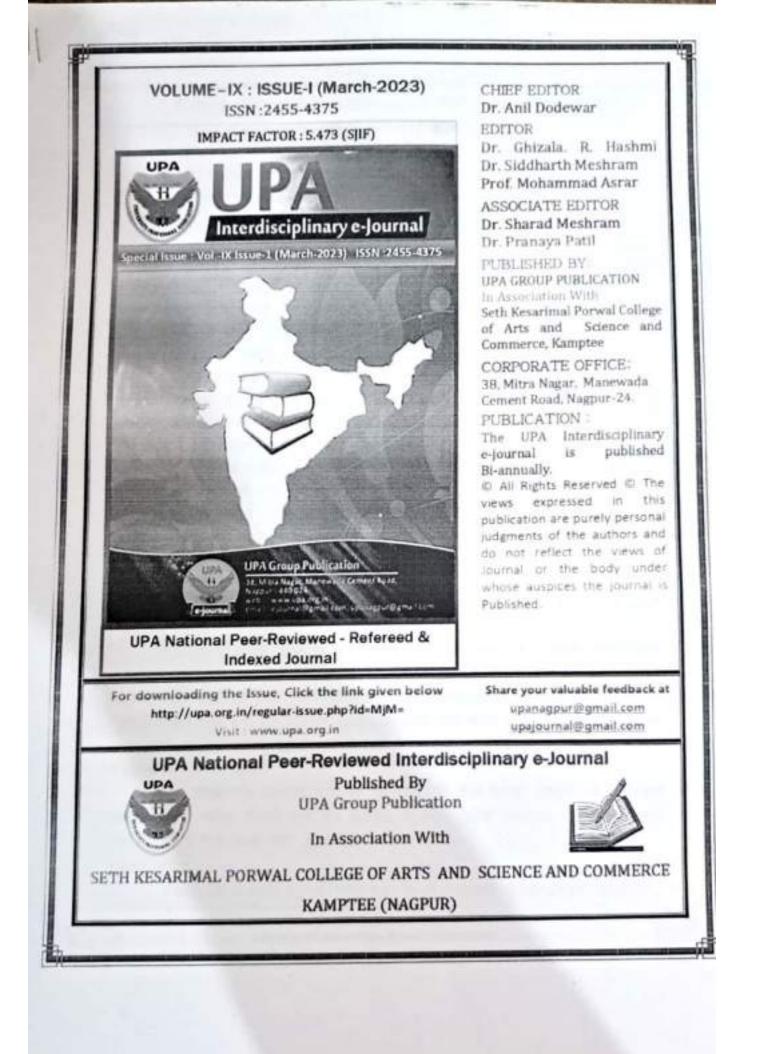
५ प्रधनिर्मितोला प्रोत्साहन देणेव ते लोकांपर्यंत करो पोष्टचेल याची काश नेहमी याळगून असत. ६ रस्ते, रेल्वे, पाणोपुरवठाव उद्योग ही देशाची विकासद्वारे आहेत असे ते समजत. संदर्भ :--

१. भांड बाबा, ''लोकपाळ राजा सयाजीराव'' साकेत प्रकाशन, औरंगाबाद, २०१३

२.भांड बाबा, खंड -१२ महाराजा सयाजीराव गौरवगाथा युगपुरूपाची' चरित्र साधने प्रकाशन समिती, औरंगाबाद, २०१७.

३.वरखडे रमेश, 'माहाराजा यसाजीराव गायकवाड यांचा भाषण संग्रह' भाग --२, खंड --२, महाराजा सयाजीराव गायकवाड चरित्र साधने, प्रकाशन समिती, औरंगाबाद, २०१३

४.डॉ. बुवा जी.ए., 'महाराजा सयाजीराव यांच्या सुंधारणा ग्रंथालय', भाग ४, खंड २५, महाराजा सयाजीराव गायकवाड चरित्र साधणे प्रकाशन समिती, औरंगाबाद, २०२०



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लाखांदुर तालुक्यातील स्वियांचे आजार आणि आहार यांचा अभ्यास

प्रा.डॉ.अल्का टहीकर य चन्द्राण कलिज लाखांदुर जि.भंडांग (गृह अर्थशास्त विभाग प्रमुख)

प्रस्तावना -

स्वी समाज जिवनाचा अर्था हिस्सा समाज निर्मातीत अत्यत महत्वाची परंतु प्राचीन काळाणामुन आधुनिक काळापर्यंत उपेक्षीत सहीलेली परंतु आधुनिक काळात स्वी ही पुरूषांच्या वसेवरीने आर्थिक जबाबदारी पेलायला परावाहेर पडु लागली आहे. निसर्गात जे वात्सल्य,प्रेम,ममता, म्जी ला मिळाली आहे. त्यांची बरोबरी पुरूष कथीही करू शकणार नाही. त्यामुळे स्वी नौकरी व्यवसायात किंवा इतर उपक्रमामध्ये कितीही पुढे गेली असली तरीही स्वतःच्या कुटुबाविषयाची जबाबदारी ती विसरू शकत नहीं. प्रगत देश षडविण्यासाठी स्वी ही शारीगैक तसेच मानसिक दृष्टया सुदृढ असणे अतिशय आवश्यक आहे.

पुरूषप्रधान संस्कृतीत वावरतांना अजुनही स्विया स्वत च्या प्रकृतीकडे डुलीस करतात. प्रकृतीची हेळसांड करताना आणि नशिवाचे भोग म्हणून किल्येक दुखणी अंगावर काढतात. परंतु निरामय जिवन जगायचे असेल तर त्यांनी कुटुबांतील आपले स्थान ओळखून दबुन न राहता आपल्या शारीरीक दुखण्याची योग्यवेळीच दखल घेतली पाहीजे. यासाठी स्वियांना आपल्या शरिराची आणि त्याला ग्रामु शकणाऱ्या दुखण्याची तोंडओळख असेल तर अज्ञानापोटी भोगावे लागणारे भोग त्या सहज टाळु शकतील. यासाठी तीने स्वतःच्या आरोग्याची काळजी प्यायला हवी

जागतीक आगेग्य संघनेने आगेग्याची फार समर्चक व्याख्या केली आहे. प्आगेग्य म्हणजे केवळ आहाराचा अभाव तब्दे तर संपूर्ण शारीरीक, मानसिक आणि सामाजिक स्थिती उल्तम अवस्थेत असणे आणि गंगमुक्त असणे पालाच आरोग्य म्हटले जाते

आरोग्य हे अन्नाधर योग्य निर्भर असते. म्हणून उल्तम पोषण स्वास्थाची मुलभूत बाब ममजलो जाते ज्या प्रकारचा आहार मिळेल त्यावर शरीर सौणाव आणि आरोग्य अवलंबन असते. यासाठी योग्य आहार आवश्यक असतो

अज्ञाप्रकारचा सामान्य आहार म्वी पुरुष दोयांनाडी आवश्यक असतो. परंतु अजुनही ग्रामीण भागात पुरूपाबगेबर स्त्रियाना महत्व दिले जात नाही. पुरूप हा कमावणारा कुटुवांचा कर्ता म्हणुन त्याला अन्ताचा जाम्तीत जास्त बाटा दिला जातो. तसेच मुलीपेक्षा मुलांनास्थ्या जास्त आतार दिला जातो. कौमार्यावस्थमध्ये मुलीची मासिक पाळी सुरू होत असल्यामुळे उलट या वयात तिला सकस आहाराची गरज असते. परंतु आपल्याकडे अजुनही बन्याच कुटुबांत मुलीला अपुरा आहार देण्याची चुकीची पध्दत रूढ आहे. त्यामुळे तिच्या वादीवर परिणाम होतो.

तिला अशक्तपणा, रक्तधय यासारख्या आजागंचा त्रास होऊ लागतो. त्यामुळे पृढे गर्चारपणात गर्भाच्या बाहीवर अनिष्ट परिणाम घडून येऊ शकतात. या वयात मुलीची अंतर्बाहय वाढ अधिक जोमाने होत असल्यामुळे तिला सकस आणि सुदृढ आहार दयायला पाहीजे

स्वियांचे स्वास्थ्य :-

स्वियाचे स्वास्थ म्हणजे कुटुंबाचे स्वास्थ स्विचे स्वास्थ विघडल्यास कुटुवाच्या टैनटिन नियमिनेवर



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परिणाम होतो. म्हणून स्विचे स्वास्थ चांगले गहणे खुप आवरम्पक आहे. स्विला सर्वच प्रकारचे घरकाम, कौट्विक जवाबदाऱ्या मुलांमी देखभाल करावी लागते. त्यामुळे शारिंगेक दृष्ट्या सुदृढ़ राहणे आवण्यक

रिवयांचे आजार :--

आग.

स्त्रिच्या आजागविषयी सांगायचे झाल्यास रक्तश्चय, मासिक पाळीची अनियमितता, इंदय गेंग, प्रमतीचे आजार, मध्मेंद्र, गर्भाशयाचे आजार, स्तनाचे आजार आवळून येतात. यापैको मुख्यत्वे रक्तक्षय , मभमेह, हृदयरोग हे तीन आजार स्विच्या स्वास्थावर धातक परिणाम करणारे असतात.

रिवयाचे आहार --

सुदृढ गहण्यासाठी आहार महत्वाचे कार्य करतो. म्हणून स्विला तिच्या आवश्यकतेनुसार समतोल आहर मिळणे आवश्यक आहे.

स्त्रियांच्या पोषण विषयक गरला :-

प्रत्येक स्विची पोपण विषयक आवश्यकता तिच्या कार्यान्सार वेगवेगळी असते. इलके काम करण्याऱ्या स्वित्या १९०० कॅलगे, साधारण मेहनतीचे काम करण्याऱ्या स्वित्या २२०० कॅलगे तर जास्त मेहनतीचे काम करण्याऱ्या. खिला ३००० कॅलरी आवश्यक असतात. तर गर्भावस्थेमध्ये सामान्य अवस्थे पेक्षा ३०० कॅलरी जास्त आवश्यक असतात.

लाखादुर तालुका हा ग्रामिण भाग आहे. तसेच हा भाग मागासलेला आहे. त्यामुळे स्वियांना आहाराचे आवश्यक ज्ञान नाही. योग्य अन्न घटकाच्या अभावी खिया मध्ये अनेक आजार आहळून आले. सुद्रब आरोग्य करोता समतोल आहाराची गरज असते आहरातील एखादा घटक मातत्याने शग्गिला कमी पडल्यास रोग उद्भव शकतात

लाखादुर तालक्यातील मुख्य व्यवसाय शेती असल्यामुळे ७५ टक्के स्विया हया शेतावर काम करण्यास जातात. शेतातील काम हे कप्टांचे आहे. परंतु कष्टकरी खिया हया परंत दल्यात अपुरे लेवन नेतांना आढळतात. तसेच त्याचा दर्जा योग्य नसतो. कप्टाचे काम केल्याने जो उर्जा उत्सर्जीत होते.

त्याप्रमाणे अपुऱ्या व निकृष्ट जेवणानी पुरेशा कॅलरी त्यांना मिळत नाही. त्यामुळे कॅलरीजची कमतरता आढळते. आणि याचा परिणाम म्हणजे रक्तश्वय यासारखे इतर आजार दिसुन येतात. दररोज शेतावर जात असल्या मुळे मुलांना योग्य प्रमाणात स्तनपान करु शकत नाही. त्यामुळे त्याची रोग प्रतिकार शक्ती कमी होउन त्याच मुली प्रौढ झाल्यावर रोगांना आमंत्रण देतात. भारतामध्ये केलेल्या सर्वेक्षणात असे दिसून आले की, निम्न आर्थिक स्तरातील कुटुबांच्या स्त्रियामध्ये पेतलेल्या आहारामध्ये फक्त १८०० कॅलरी आणि ४० ग्रॅम प्रथनि असल्याचे दिसुन आले आणि ही प्रथनि सुध्दा निम्न दर्जाच्या आहारातुन प्राप्त केली होती.

डाखर्ड विश्वविद्यालयानी केलेल्या सर्वेश्वणात असे दिसुन आले की, गर्भवती स्त्रियाना सपूर्ण आहार दिल्यामुळे गर्भावस्थेत मध्ये त्यांना त्रास झाले नाही. तसेच प्रसुती सुध्दा जास्त त्रास न होता सुखरूप झाली. तसेच गर्भवतीचा आहार वांगला असल्यामुळे दुध सुध्दा भरपुर येते (शैरी)

व्याख्या:--

सामान्य आहार :- "गरीराची भारीरीक, मानसिक कार्ये सुरळीत चालण्यासाठी जो परोपुणं संतुलीत आहार पेतला जातो त्याला आपण 'सामान्य आहार' असे म्हणतो ''

प्रत्येक स्विला तिच्या कार्याच्या स्वरूपानुसार आहार लागतो तसेच स्त्रिला तिच्या अवस्थे प्रमाणे



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(गर्भावस्था, तुम्धमर्जन जनस्वा) आहारांगी जास्त मागणी असते गर्भावस्थेत गर्भाचा तटनघटनीला पोषक आहारांची वरज असते तर स्तनपान करणाऱ्या मातेला बालकाचे संगोपण करावयाचे असते. या करीता पोषक आहार मिळायला हवा शारिरीक कष्ट करणाऱ्या स्विला साधारण काम करणाऱ्या स्विपेशा अधिक केलरोजचा आहार लागतो.

आजार :--

जारियोक आणि मानसिक स्वास्थासाठी संतुलीत आहार असा दैनदिन जीवनात समावेश असने, हा अतिशय महत्यांचा भाग आहे. असंतुलीत आहारामुळे किंवा आहारातील काही घटकाच्या कमतरते मुळे स्वियांमध्ये खालील प्रकारचे आजार आढळून येतात.

रक्तथय :--

रक्तवय म्हणजे शरिग्रतील हिमोग्लोबिनचे प्रमाण सामान्यपेखा कमी होणे होय. लोताच्या कमतरतेमुळे जास्त प्रमाणात स्वियांमध्ये स्वत्धय होतो. आहाराच्या अनियमीतेमुळे स्वियांमध्ये स्वतश्वय हा आजार आढळून येतो. तसेच नित्कृष्ट आहार व कमी वजनामुळे ३० ग्रॅम लोहाची आवश्यक्ता असते. लोह हे मुख्यत: कहचान्ये, हिस्व्या पालेभाज्या, गुळ, किसमीस, टणक कवचांच्या फळांमध्ये आढळून येते. लोहाच्या कमतरतेमुळे रक्त गोलकाची संख्या कमी होऊन स्वतश्वय होता. यामध्ये व्यक्ती अगक्त होऊन निरुत्साही बनतो आहारातुन गर्भवतीला लोहाची कमतरता झाल्यास बालकाला देखील स्वत श्वय होण्याची शक्यता असते. तसेच लोहाचे अयोग्य पोषण, पचनसंखेचे बिकार, स्वतस्वाव यामुळे शर्रगत्वला लोह पुरेशा प्रमाणात मिळत नाही त्यामुळे स्वतश्वय होण्याची शक्यता वाढते.

मथुमेह :--

मधुमेह हा आजार तोण्याचे प्रमुख कारण माणजे स्वादुपिदात निर्माण होण्याऱ्या इन्मुलीन स्वावाची कमतरता, स्वादुपिदातील आयलेट्स ऑफ लॉगर हॅन्स या पेणी इन्मुलीन तयार करतात यात विघाड झाल्यास इन्मुलीन स्वावाने यद होते कवींदकाचे पधनानंतर एलुकोजमध्ये रुपातर होते एलुकोजचे स्कतात शोषन झाल्यावर तिमे व्यलन होऊन स्फूर्ता मिळते. परंतु शरीयतील इन्मुलिनच्या कमतरतेमुळे व्यलन पुर्ण होऊ शकत नाही त्यामुळे एलुकोज जसेच्या तसे गहून वादलेले एलुकोज मुत्रातुन स्ववंते अणा प्रकारे मधुमेह होतो. हा रोग विशेषत: अनुवाणीकता, जीवनणैली (उदा, मानसिक ताण) स्वुल पणा इत्यादी जखमा लक्कर न भरणे, वनल कमी होणे, लवकर थकवा येणे , अववा येणे मुत्रातुन शर्करा जाणे. रक्तात शर्करने प्रमाण वाढणे वरचेवर तहान व भुक लागने जास्त झोप येणे इत्यादी प्रावमिक लक्षणावरुन मधुमेह झाला असे महणता येईल संपूर्ण जगात २००२ च्या सर्वेनुसार १५० मिलीयन लोक मधुमेहाने पिडीत झाले ही सख्या २०२५ पर्यंत दुपटीने वाढण्याची शक्यता जागतीक आरोग्य संघटनेने वर्तविलेली आहे. आएकिन आणि अमेरीकन तसेच पाइन्यात्वचेच्या महीलाना मधुमेह नियंत्रण करणे कटीण जाते. म्हणुन मधुमेह नियंत्रांत करण्यासाठी आहाराफ्यती व्यापाम यावर लख देणे गरजेचे आहे.

हृदयरोग :--

मध्यारथा परिस्थितीत इदय रोग होण्याचे मुख्य कारण शारिरोक व मानमिक ताण हे दिसून येते स्विथारथा इदय रोगामध्ये रोहिनी काठिण्य किंवा इदयरोहिनीचा रोग सगळ्यात जास्त प्रमाणात मृत्युसाठी कारणीभुत ठरते असतों काही घटनामध्ये असे आढळुन आहे को हदयरोहणीचा रोग आणि त्या पासून मृत्यु हे पुरूषापेक्षा स्वियांमध्ये जास्त मोठया प्रमाणात आहळ्छत येतात या हदयरोगाची कथी कथी



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ISSN

लक्षणे सुध्दा दिसून येत नाही व अचानक पणे रोगाचा मृत्यु होतो. ज्या स्वियांचा आहार समलोल आहे आणि ज्याना कुटलेती व्यसन नाही, अणा स्विया शारिंगेकदृष्टया मुद्द असतात तमेच ज्या खियांचे वनज कमी असते. स्युलपणा कमी असतो. अणा स्वियांना इदयरोगाची भिती कमी अमत.

Akesson यानी स्टॉकडोममधील कॅंग्रेलीनम्का संस्थेमधुन केलेल्मा सन २०१८ मधील संशोधनात अंदाजे २५ हजार स्वियाच्या आहागविषयी माहीती गोळा केली त्यानुसार सुदृढ आहार खेळ व व्यापाम हे मुष्टा हृदयरोगाचा थोका जळण्यास फलदायी ठरतात तसेच फळाचे वेगवेगळे पदार्थ भाजीपाला कडधान्ये हे रोहीणी काठीण्याचा हदयरोग टाळण्यास मदत करतात. असे स्ंगोधनावरून दिसून आले. ल्याचप्रमाणे जन्मताच हृदयाच्या रचनेत दोष असणे संसर्गामुळे होणारे होग उटा संधिवात रक्तदाय वाढणे हदयातील झडपाचे विकार, कोलेस्टेरॉल असलेल्या स्निन्ध पदार्थाचा जास्त प्रमाणात उपयोग रजोपोंडाचे कार्य लवकर शांवल्यास देखील हटयरोग होऊ शकतो.

उरिष्टे -

- रिवयाच्या पांगणविषयक दर्जा जाणून मेणे ٠
- स्वियांच्या आहाराबदल सर्वेक्षण करणे.
- त्याच्या आहारात अन्न घटकाणे अभाव असल्यास ते तपासणे तमेच त्यांची कारणे शोधणे.
- आजन्या नव्या पिढितील स्वियांना आहाराविषयक माहिती देणे.
- आहारातील अन्न घटकांच्या अभावी होणाऱ्या आजारायी माहिती देणे
- रोगाच्या निमलेनासाठी उपाययोजना मांगणे.
- विवयाच्या आजागविषयी माहिती देणे.

गहितक :--

- आहाराविषयी असलेले अज्ञान यामुळे आजार होतात.
- ग्रामीण भागात असलेल्या अधश्रष्टेमुळे काही भाज्या आहारात घेतल्या जात नाही उदा द्धीभोपळा वगेर
- आहारात वेगवेगळे अन्तपटक न घेता एकच किंवा सारखे पदार्थ खाल्ले जातात. उदा. तांदळाचा जास्त प्रमाणात उपयोग
- आहार शिजविताना चुकोच्या पच्दतीना वापर केला जोतो.

लघुशोध प्रबंधाची अध्ययन पण्टती :--

लाखांदुर ताल्क्यातील प्रत्येक गावांमध्ये जाउन प्रश्नावली, मुलाखत या पण्टतीने स्वियांच्या विविध आजागविषयों माहीती गोळा करण्यात आस्ते.

१.३ यावरून खालील माहीती प्राप्त झाली.

संशोधन पष्टती:-

अध्ययन क्षेत्राची निवड:-

प्रस्तृत अध्यनासाठी लाखाद्र तालुक्याची निवड करण्यात आली या तालुक्यातील स्वियांना



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आजागच्या समस्या आढळन आल्या त्या सोडविण्याच्या दृष्टीने ही निवड करण्यात आली

स्वियांच्या आरोग्याच्या तकारी दर्शवणारी सारणी

नमुन्याचा आकार:--

लाखादुर तालुक्यात प्रत्येक गावात जाउन २० ते ४० वयोगठातिल स्वियांचा समावेश करण्यात येऊन २५ स्वियांचे सर्वेक्षण केले

स्वियांच्या आरोग्याच्या तकारी:--

आहारातील अन्तपटकाच्या कमतरतेमुळे ग्रामिण भागातील स्वियांमध्ये आरोग्याच्या अनेक तकारी दिसुन आल्या त्यामध्ये हातपाय दुखणे, डोकेंदुखी, श्रकवा, जाणवणे स्क्तश्चय, हार्टअटॅक, मधुमेह गर्भपात आणि इतर आजार सुध्दा आवळले

स्वियांच्या आगेग्याच्या तकारी दर्शवणारी सारणी:--

新雨	आरोग्याच्या तकारी	प्रमाण य टक्कवारी			
		20-24	24-30	30-34	34-80
8	हात पाय दुखणे	-	至(死96)	७(७०%)	5(5%)
2	डोकदुखी	-	₹(३%)	२(२%)	5 (5 56)
3	थकवा आणवणे	-	8(8%)	(3%)	२(२)
x	रक्तश्चय	-	55(552)	\$\$(\$\$%)	(J)(J)(J)
4	हार्टअरॅक	2	-	-	-
Ę.	मचुमेह	8	-	-	-
6	गर्भपात	-	4(496)	8(8%)	3(3%)
6	इतर आजार	-	4(4%)	£(£%)	5(5)

वरील सारणी नुसार २० ते २५ वयोगटातील २ टकके स्विया हया अविवाहीत असून त्याच्यामध्ये मधुमेह आणि हार्टअंटक हे आजार बाढळून आले २५ ते ३० वयोगटातील ४४ टकके स्वियामध्ये सर्वात जास्त रक्तश्वय २१ टक्के, हातपाय दुखणे ६ टक्के, डोकेदुखी ३ टक्के , गर्भपात ५ टक्के व इतर आजार ५ टक्के, आढळले ३० ते ३५ वयोगटातील स्वियामध्ये हातपाय दुखणे ७ टक्के, डोके दुखणे २ टक्के, थकवा ७ टक्के, रक्तश्वय ११ टक्के, गर्भपात ४ टक्के व इतर आजार ६ टक्के आढळले ३५ ते ४० टक्के वयोगटातील हातपाय दुखणे २ टक्के , डोके दुखणे १ टक्के थकवा २ टक्के, ॲनोमिया ७ टक्के , गर्भपात ३ टक्के, व इतर आजार २ टक्के स्वियांमध्ये आढळले.

स्वियांना प्रात होणारे लोह दर्शक सारणी :--

वयोगट २० ते ४०

37.W	व्यवसाय	प्राप्त होणारी सरासरी लोह	,ग्माणित लोह मि.प्रॅम	टक्केवारी
2	मजुरी	<u> </u>	३०मि ग्रॅम	43.00%



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13	शेतमजुरी	१८.२०मि ग्रॅम	३०मि ग्रॅम	80.88%	1
3	शेती	२०.२५मि ग्रॅम	३०मि ग्रॅम	8.9.4%	-
×	गृहीणी	२२.३०मि ग्रॅम	३०मि ग्रॅम	08.33%	-
14	नोकरी	२१ ७०मि ग्रॅम	३०मि ग्रॅम	02.35%	-

वरील सारणी बरून असे निदेशंनास येते को. २० ते ४० वधोणटातील मजुरी करणाऱ्या स्वियांसाठी प्रमाणित लोहांचे प्रमाण ३० मी प्रॅम आहेव त्याना प्राप्त होणारी लोह १७२० टक्के ग्रॅम आहे यावरून स्पष्ट होते की, प्रमाणित लोहांच्या ५७ टक्के लोह त्याना प्राप्त होतात रोत मजुरी करणाऱ्या २० ते ३० वयोगटातील स्वियासाठी प्रमाणित लोहांचे प्रमाण ३० मि प्रॅम आहे व त्याना प्राप्त होणारे लोह १८ २० मि ग्रॅम आहे यावरून स्पष्ट होते की, प्रमाणित लोहाच्या ६०६६ टक्के, लोह त्याना प्राप्त होतात रोती करणाऱ्या २० ते ८० वधोगटातील स्वियासाठी प्रमाणित लोहाच्या ६०६६ टक्के, लोह त्याना प्राप्त होतात रोती करणाऱ्या २० ते ८० वधोगटातील स्वियासाठी प्रमाणित लोहाचे प्रमाण ३० मि ग्रॅम आहे व त्याना प्राप्त होणारे लोह २०२५ मि ग्रॅम आहे यावरून स्पष्ट होते को, प्रमाणित लोहाच्या ६७५ टक्के लोह त्याना प्राप्त होते गृष्टिणोसाठी प्रमाणित लोहाचे प्रमाण ३० मि ग्रॅम आहे. ब त्याना प्राप्त होणारे लोह २२.३ मि ग्रॅम आहे यावरून स्पष्ट होते कौ, प्रमाणित लोहाच्या ७४.३३ टक्के लोह त्याना त्याना प्राप्त होतात तसेच नौकरी करणाऱ्या स्वियासाठी प्रमाणित लोहाच्या प्रमाण ३० मि ग्रॅम आहे व त्याना प्राप्त होलात तसेच नौकरी करणाऱ्या स्वियासाठी प्रमाणित लोहाच्या प्रमाण ३० मि ग्रॅम आहे व त्याना प्राप्त होलात तसेच नौकरा करणाऱ्या स्वियासाठी प्रमाणित लोहाच्या प्रमाणित लोहाच्या ७२३३ मि ग्रॅम लोह त्यांना ग्राप्त होतात.

स्त्रियांचे हिमोग्लोबीनचे प्रमाण दर्शविणारी सारणी 🦟

अ.क	,प्रमाणित हिमोग्लोबिन	प्राप्त होणारी हिमोग्ल्लेबिन प्रमाण	टफकेवारी
8	११.१४ ग्रॅम %	७.९ ग्रॅम %	163.00%
ę.	११ १४ग्रॅम %	९,११ग्रॅम %	36.00%
9	११.१४व्रॅम %	१११३ग्रॅम %	8000%
6	११ १४ग्रॅम %	१३१५ग्रॅम %	03.00%

वरील सारणी वरून असे निदेर्शनास येते की, प्रमाणित हिमोग्लोबिनचे ११ ते १४ ग्रॅम आहे. परंतु ४७ टक्के स्वियामध्ये हिमोग्लोबिनचे प्रमाण ७.०९ ग्रॅम आढळले ३७ टक्के स्वियामध्ये ९.११ ग्रॅम आढळले व ३ टक्के स्वियामध्ये १३१५ ग्रॅम आढळले.

यावरून असे स्पष्ट होते की, अध्ययन क्षेत्रातील ८५ टक्के स्वियांना रक्तक्षय झाला तर केवळ १५ टक्के स्वियांचेच हिमोग्लोबिनचे प्रमाण सामान्य आहे.

सार्यज्ञ :--

या सारणीवरून असे लक्षात येते की, या स्वियांच्या आहारामध्ये डाळी, दुध, फळे, सलाद, मोड आलेले कडधान्य यांचा वापर फार कमी प्रमाणात केला जातो तसेच इडली , ढोकळे यासारखे



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तसेच या भागामध्ये तादळाचे उत्पन्न जास्त होत असल्यामुळे आहरामध्ये पोळी , भाकरी चे प्रमाण कमी आढळते. व भाताचे प्रमाण आस्त असते. तसेच स्वयंपाक करतांना चुकीच्या पध्दतीचा वापर केला जातो. त्यामध्ये भाज्या आधी चिरून धुणे कुकरचा वापर कमी करणे या सर्व वावीमुळे या विवयामध्ये अनेक प्रकारचे आजार झालिले दिसून येतात.

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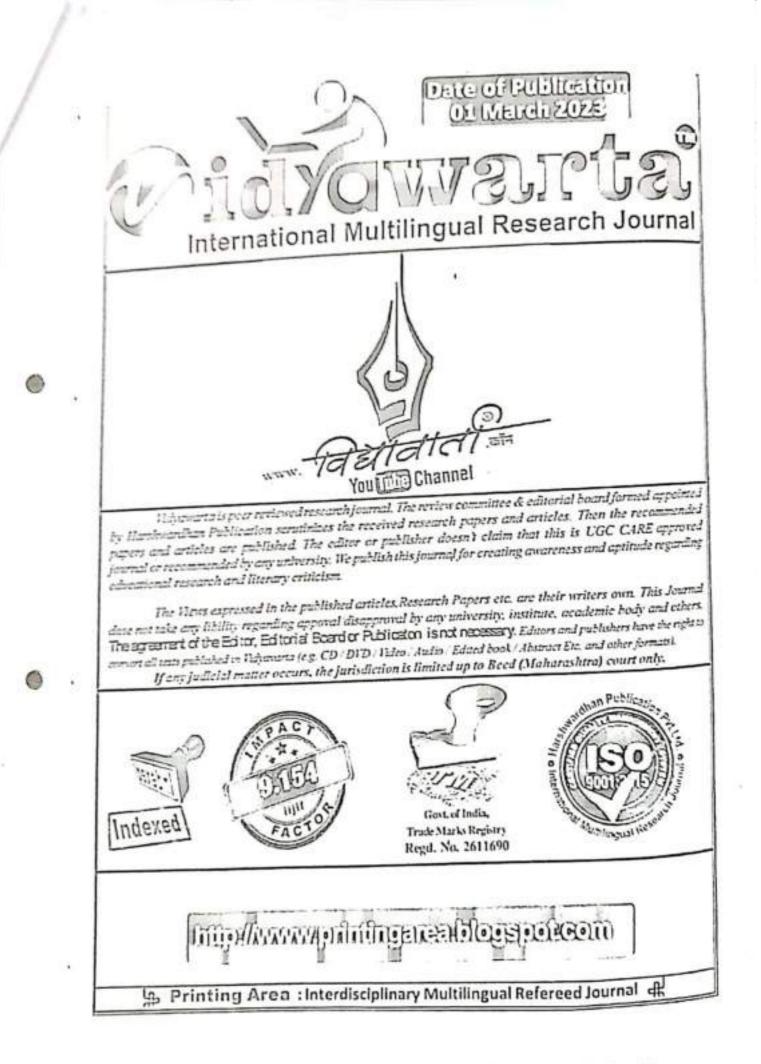
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'भारतातील महिला सवलीकरण' : विरोष संदर्भ पंचायत राज व्यवस्था

> ज्ञ. वॉ. महेन्द्र मालराव वासेकर লন্যজন্যনৰ বিমায় দেনে यंगलेताव सम्हल महत्विद्यालय. ম্বরার, লি. খরার,

प्रस्तावना :

या ७२ वर्षाच्या काळल देशात राजकीपदादवा, ज्योपण हरा सारवया समाजाचा वळी स्वीच टली. भौगीकपुरव्या परिवर्तन धेळन आले पण अस्तरप्रय १९ व्या रातच्यच्या पूर्वाचेत स्विया अज्ञान अंश्वरात अदिवामी आणि सिवयांच्या दर्दाच्या मंदर्भात मुलभुतः व दास्यात खोल रुद्दम वसल्या होत्या. आपल्या असा प्रयाग्या यदाव उपलेख माही, जग वदलके पण स्वतंत्र अस्तित्वाची जाणीव सकती परंगु साज सर्व राज र्थय आणि दानगत जगणाच्या नियाचे जीवन नानवात स्वी देखील एक व्यक्ती आहे. तीला आरता प्रकृतके नाही, स्वनंत प्रालान पुरवमगौगैन जगनान्त्रा विषयम करवुन घेण्याचा पुगे अधिवार आहे तेका स्त्रियांच्या संदर्भात फितन, मनन होज्याची नरज आहे. गीच्या विकासाच्या आड ज्या आमानूव रुखी व परंत्य महिरण नयलोकरण नहनजे निवयांना कुछ आणि मुख येन असनीएं यर त्या निरियत्तव दूर हाल्या पहोलेन या पारंप्रगेळ चळानून याहेर काउणे त्याचप्रमाणे स्त्रि हरा करोता महीला सराक्तीकरण आवश्यक आहे. म्हणजे संतर्भी निर्मितीया फारखाना नाही किंधा धुणीभांधी करणागं वाणिंग मणीन नाही नर मानवी मन असलेली. मागमाला धडवणायी, रक, मामाये सामाहिक प्रण्यात परिपक्ष जाणीव निर्माण होते तत्तेच स्व:ताच्या रूपांतर करणारी समाजव्यवस्थेवीरू पुरुषाइवकीच किंद्रहना न्यांस्था महान्यांची व्यक्ती आहे.

श्रीलना याटलीवाला यांनी आपल्या Empowerment of Women in South Asia Concept and Practices या इश्वमच्ये लिकोन्डे आहे को The Process of Gaining Control over the Self, over the (deology and the resource which determine power may be term "Empowerment" मयरकेकम्प जी नियंत्रण फरण्याची प्रफ़िला आहे.

स करते महादे सीतना महासी रुपत तेन, सीतन सरम्पीक्रम हे सुमाथियेको आदेलम गरी, महिल्ल अधिकार प्रांश काल्याम उल्लामे अधिकार निर्वाहित होतील आणि ग्यांच्या स्थान्ट्रस्यवर संगोदा चेतील उसी समहत्वाचे काल नहीं, उत्प्रची जीवनात्म प्रदेव हेवान। प्रयांच्या वर्गवर्गने महकार्य करून फलेदने . निमयन्यास स्था सञ्ज रहनील सन्तन पुनःत्रय एकद नमुद करवेने कहने को महिला सराक्तीकरणमध्ये त्त्रयांना विगेव माही तर विगेव आहे कन्द्र तुल्यावन प्रबङ्खेला जगा आणि जगू दया हा महिला चराकीकरणाच्या नाग आहे.

महिला सराक्तीकरणाची आवरपकता:-

२१ स्वा संसदमाच्या विद्यान पुरावती अजल, मही परोसे प्रसलेत्वा मध्यपुरीन सनागाच व्यवहर सामाजिक वियमनेत्वाच चलन आहे. राहरी, जनोग, भारतान स्वानंत्र्य मिळुन ७२ वर्षे उलहून गेळी. आदिवासी भागातील पुरुषप्रधान प्रदुवीनुक्ते दावेद्र्य,

> स्त्री संशक्तीकरणानुळे तीला तीच्या अधिकरण्ये. अस्तितेयो, कर्तव्यायो, संबोगील विकास व प्रत्योधी आगेग्याची काळगी देण्यास प्रेरणा मिळते. नौजरी व व्यवसाय प्राण करण्यासाठी ज्ञाहव घरल्या जाते. गिवणामुळे आज भारतातील स्वो ही शिक्षण, उद्योग, गंबनान, संगणक, अंतगळ्थेत्र, सेवा, रोती, क्रिडा, मालिय, इ. अनेक क्षेत्रत स्वियांची प्रकार्यात्मक कामगीचे दिनुन येते. एका याजुला भारतात राष्ट्रपती डॉमनी प्रतीभानाई पार्टील या आपल्या देशाच्या विकासन योगदान करीन अन्तरूया गरीही दुसन्या चाहुका अरेक नियांतरनी ररगेज यस्त्रान्कार, जाखदेख, हुझांवली. भूनहल्या, वेजयावृत्ती, स्विमांकी विज्ञी, स्विमांकी निभीसला,

ग्वियांच्या अंगी असरेरत्या धमनेया, गुगवनेचा

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 मा मागोल महण्डो पिक्रणाने साजामितम्ण च व्यापामिकरण मुलीना मनिष्ठ समाजन्यांनी, माणव्यांनी प्रवृत्ती, मुलीनी जन्मताच हत्या करण्यांनी प्रवर्णती, मुलीपेक्ष मुलीना भिकविण्यास प्रध्यान रेण्यास पाल्कान्य फल, मुलीना भिकविले सर आपल्या कट्ट्रीबाला फायलांग फल, मुलीना भिकविले सर आपल्या कट्ट्रीबाला फायलां छोईल अशी मानसिकता, गळतीचे जाय्त प्रमाण अल्प वयान होणारे वालवियाह, आपल्या भागवंडांगा साभाळण्यांची, मुलीना धार्यी लगयणांग जवामदार्थ, कोट्ट्रीवक दार्यह, कौट्ट्रीविक येकारी ही प्रमुख प्रमुख कारणे आहेत.

शोषि निर्वधाचा उद्देश :--

प्रस्तुत शोध निवंधाचा उद्देश प्रामुख्याने भारततिरू महिला सशक्तीकरणाच्या संदर्भात पंनायत यज व्यवस्थेच्या संदर्भात फेल्या जात असलेल्या महत्वपूर्ण वदलंना पंडिणे, तसेच यामध्ये असलेल्या उणीवा अडवणी च त्यावरोधरन त्याकरीता आवश्यक त्या सुधारणा कोणत्या होऊ शकतात त्या मांडणे ज्ञ आहे. त्यावययेवर सहास्थितीचे वर्णन फरणे हा आहे, सोध निवंध अभ्यास पथ्दती च माहिती संकलन:—

प्रस्तुत शोधनिवंधाच्या लेखनाकरीता विविध मासिके, युगपंत्रे, पुस्तकं व आद्यालाचा आधार घेण्यात आलेल आहे. तसेच या माहितीचे संकलन करून ही माहिती गथ्य विश्लंपन करीन असतांचा मुहे व तकत्याना व आकडेवारीचा आधार पेवून विश्लंधित करण्यात आलेली आहे. या शोध निवंधाकरीता भारतातील पंचायत राज व्यवस्थेची आकडेवारी आधारभूत मानली मेली आहे. त्याचप्रमाणे आशय विश्लंगणाचे संत वापरण्यात आले आहे.

महिला सशक्तीकरण व पंचायत राज व्ययरशा:—

आज महिला सथाकीकरणाच्या प्रक्रियेचा जेवत आपण आवाया पेतो. तेवता आपल्याला भारतातील महिला सथाकीकरणाच्या संवर्भात पंचायत गज व्ययस्थेचा गोल्यचा याद्य असलेखा दिसून येतो. आज भारतासारख्या देशान अमीण स्वसंधर महिला राजाकीकरणाची प्रक्रिया ही पंचायन राज व्यवस्थेमार्फन प्रभावीतित्या अमलास आणली जान आहे. भारतान इ. स. १९९२ या वर्गी

अन्युप अत्याचार, गर्मन शेरखजी येथील आमानुष अत्यानार व जोपन इ. सारग्रज्या पटना आयारी भारगीय बन्द्रजन पडन आहेत. त्यापुळे अणा अमानुष अन्याय अत्याच्याय प्रतियेथ करण्यासाठी स्वियांना मानसन्मानांची व ननानतेची वाग्लूक मिळण्यासाठी त्याच्या त्यायीक हुरुभूत हक्क व अधिकारासाठी भारगीय समाजात इतिम्ब सवस्वीकरणाची निर्तात आवश्यकता आहे.

महिला सबमीकरणाची मुख्यत महात्मा फुले, प्रविज्ञेवाई फुले यांच्या प्रत्याच प्रयत्नातुन समाजात इडविण्याचा प्रयत्न झाला परंतु त्याच्या मार्गावर अनेफ अडवनों आल्पान नरीही त्यांनी अस्परप्रय महिला, विडवा नसेम भारतातील संपुर्ण महिलांच्या सबोगीन इतनेसाठी प्रयत्न केले, जानेवारी १८४८ रोजी पहिली नुत्तीचे शाळा पुणे येथील शानिवारयाडयात सुरू केली व त्यानून शिक्षण टेण्याचा भारतीय समाजात शुभारंभ केल, नेव्हापासुन महिलांच्या संघर्मीकरणाला व शैक्षणिक उन्हांकीय प्ररंभ झाला, कारण भारतीय समाज खन्या अवनि जनामच्ये सामर्थ्यशाली होण्याकरीता शिक्षण हा पुलभून पटक आहे हे महात्मा व्योनीया फुले यांनी ओळखले होते.

शिवण आणि महिला संशक्तीकरण :----

स्त्री सञन्त्रीकरणान शिवणाची चुमीका अन्यंन मतन्वाची आहे. शिक्षण हा कोणत्याही समाजाच्या सुध लिया पाया आहे शिखणाये प्रमाण वाढले तर अपेथित विकास साच्य कारणे शक्य होते रखी शिक्षण हे आर्थिक चित्रसाठी आवश्यक आहे परंगु प्रजननना कमी करणे, नुजने योग्य पारत्न पोपण करणे तसेच माता आणि जन्नय याच्या आगेग्यसाटी सहाय्यक ठरते. शिक्षणामुळे वियोनकेल सुण गुणांचा विकास गड्न येतो. यांच्या व्यक्तीमन्वाला नयीन आकार मिळतो. नयीन थेवागच्ये यगस्त्री होण्याची पात्रना स्टाभने, महित्यांच्या शिक्षणाचे भगान भारतात केंगळ या गज्यात अधिक महणजे ८८ टक्दे' एवढे आहे. त्या खालोखाल महायप्यून ६६ ^{रामहे} एवर्ड आहे. महाराष्ट्रान झालांन आणि पदवी ^{फीर्}मच्चे उनीर्ण होणाऱ्यांमध्ये मुर्लाचे प्रमाण अधिक आहे. उदा. अभियांजीकी, वैद्यकीय, विम्थापन, माहिगी ^{संगणक} अञ्चा विविध क्षेत्रान महिल्या सुद्धा नितवयाच ग्धम अगल्याचे सिद्ध कर्मन आहे. असे असले

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महित्याचा पंचायत यहां व्यवसंग्रेसचेहत आसणात सहायता साहत. आजे, आज या जासीमा महित्या ग ध्यात प्रथे ५०० ठवको देखा वामी आगलेग्य दिन्स, मामगरिकाणाच्या प्रक्रियेन जावी आइवळावंता सामेरे आहे. यागत या तिपहुत आहंत्रण्य महिलांसचे शुवित महवाची, मनाम्मची, वानीय राजवाल्य, निहारन वजी गोरण्य, वाहिस्टायी जोटाय, सुम्परिस शहिमा शहरे जेम्ब्रामीयमें स्टोब्स्टी, अम्प्रायमापे राज प्रमुखे मीतज्ञ रेग्रोल प्रमाण सभाग येग्यानान्छे आहे. आज या माननीतारणाची प्रक्रिय प्रमाणिन हेत आहे. त्याव्योत विश्व अधियण, मध्यत्व भोजन व्यवंद्रम यांगाम्ब्रुग्र मणगोव्ययामंदर्भन वादवादी खामेठ जैनेव्यम्न महित्य गोरत्वन्त अनन्तरात्वनीतः देखेल योग्या प्रचतः मयसोकन्याचे प्रक्रिय इतिव देनवम् वर सफ्रेड पाइन्द्र आहे. भोडभगान पंजायन गांत व्यवसंख्या संदर्भ :--কৈবাৰ ঠাৰ আদলহান নিয় আদলহাৰ বিদৰ হাই। বাৰবাই সিই, দিনা ক্ৰমান নাম্পু, ২০০৫

मध्यीकवाच्या अक्रितेचा आता पढे केन प्राण क्राव्या प्रवासन हते. आते. सरेवासून वचित असलेवन्या स्वीया तत्वुतक् ३. डॉ.एस.मी. स्वितव्यनुत्रम्यत्मक राम्सन हवं गल्याम्यत व मतत्वाम्यत सरभागे हेत आहेत. गणनिनी सम्मीनावयम आज्यात प्रयासन, आस দৈন নিয় আলমানে সিদ্ধ কিঁচু আৰু মহামন্দ্র ও, আলআই মইকেনেটেম কলত মাল আনি মহার্থে তির আদেশদের অন্যার্থনের আনিয় ব্যক্তর নামন্দ্র, নার্ত্রনার সম্যান, নামন্দ্ विगत आहे. आज मीटना समनोकम्याचे माजम ५, शत्म पंजयन गढ व्यवसंग्ये अमगणे उनत्त्वता सम्द्रवीयः विद्यम, साईवयं प्रधायन, सन्त भिन्न तेल आहे. ग्यामचे पाती अनुमधी आहेत गया अन्द्रती या प्रश्नीतम्ब मोईकन्त्र तन्त्र ता त्वाज भौग्वतम् अधिप्रयानः मोतन्ता मध्यमीग्वामहत्तांत र्तनतालाम्ब सम्प्रा आहे गावी सत्रत प्रियम आह भीतासन प्राचित स्थापन समहमने ५० प्रचते जयहलान एवं बेहमान्या मार्थत निष्ठाल विकास 80. 92

दिल्लाने थ राज्येग --

अन्तेयतत्वाः येत्वरभाः स्थान गृत् अत्रान्त्वत्व

0104 >> वहां गण्डावृष्टने हाथ प्रस्तान अतन्त्र अन्तर्गध्वत वयना यह शासन्द को, आज साल পাৰ বিশ্ব জৈনি দেও মালেৰ প্ৰদানখনৰ মহাৰ, আলেৰাম্বৰ সুকলৈ কৰা প্ৰদাল মহিলা মাই জনসাত मन्त्रत, पंचायत स्तीमने सामग्राने व पंचायत गढ़, तसे देखोले या पंचायतगढ़ व्यवस्थितिक त्यत्वे सूर्य विभावतील विरोध व्यवलाख वार्ष कोत आत. महार्वाक्रमात्वी एक मनी उत्तरुक उन्हें उत्ते আন্ধানিক বলৈৱা নামবাৰাম্য মহাবাৰ আল্পানৰ জন্ম হব মন্দ্ৰাৰ বলৈবে বিদ্যান ইন্দ্ৰম वेग आपाना गरीही से उपनेखनीय वयातना प्राणमा पांचे त्यापत आहे. व प्यतप्ये प्रमुख्याने स्वतिह, গগৈগানী গণ্যাবন হয়ে ব্যাবাহীন্বার ব্যাব্যান্দ্র ব্যাহীয়। বীঠায় সায়ভদুন খাঁসম স্বক করি জলবান ভারত गरिकाणी शेरदुर धाग्नान मामाजिक व आर्थिक स्वमण्ड्यो धीम्पान्मक मांडमी करने उन्हेंने दस्ते गतिकाणांत एक केवली दिया हिरोही आहे. पंजासत आहे, बोडकपुल आज महिला मामकोव्यमाचे प्रीयज्ञ, गत व्यक्तपेत महिन्द मग्राग्रेक्रणाय्य संख्यमंत्री संख्यमा अख्रि प्रमर्थनिया प्रस्थनि ख्याययपेत प्रमोग आग्रेण मिकल, गेप्रवार मार्ग्ड स्वांत्र, सर्व जेडक्यांडी व संबन्धीय इच्छारतीये प्रयत्म मंडेला

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নামনারে মানার মনিনা মধ্যমিকার্যের হিরমে ৫, নার্বের নিদ্যামরিরের করকর্ত্রাকা রমিনা,

महाराष्ट्र मारख्या राज्यात महिला २. डॉ. माळ्ठे:महाप्टन्वाठील सिल्हा, सुराव

रेक्सोकेक्स एम. जी,पंचायन गर आणि

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A STUDY ON MULTIFUCTIONAL APPLICABILITY OF CARBON NANOTUBE, GRAPHENE AND THEIR COMPOSITE

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ABSTRACT:

Carbon based materials such as carbon nanotube and Graphene is one of the most promising materials in the field of nanotechnology and which has attracted a tremendous amount of research in the last few years. Because of its high surface to volume ratio, high electrical conductivity, high mechanical strength, high thermal conductivity, high electronic mobility, and high chemical stability. dew to such property CNTs and GNS is extremely attractive materials. In this review paper we are studied about multifunctional applicability about carbon nanotube and graphene and their composite with various semiconducting metal oxides such as ZnO,TiO2,SnO2,CuO,ZnS,etc and conducting polymers such as polyaniline (PANI).etc and studied there applicability in various filed such as gas sensors, bio sensors, supercapacitors, photocatalysis activity and many biological applications.

INTRODUCTION :

Carbon is an IV group of element. Carbon is known to be associated with its rich and diverse form of chemistry. Carbon atoms participate in the formation of a great number of molecules. carbon nanomaterial's have a unique place in Nano science due to their exceptional electrical ,thermal, chemical, and mechanical properties; which have applications in various areas such composite materials ,energy storage as conversion ,sensors, drug delivery, field of emission devices, and Nano scale electronic development devices. nanofabrication of techniques and nanomaterials that have progressed within the last two decades, graphite is now being actively used as a starting material to engineer various types of carbon-based nanomaterials (CBNs), including single or multiwalled nanotubes, fullerenes, nanodiamonds,

and Graphene. In the last few years, study of carbon based nanomaterials have become the most studied for developing of gas sensors, supercapacitors , photocatalytic biosensors, activity, photoluminescence and lithium ion battery etc. carbon nanomaterials are used Specially because of their outstanding and remarkable physical and electrical properties. carbon nanomaterials e.g., carbon black (CB), fullerene, carbon fiber (CF), carbon nanotubes (CNTs) and graphene(GNS)(fig 1) Graphene and CNTs are allotropes of carbon. Graphite is a multilayers form of carbon. Graphene is a single layer of graphite and it is 2 dimensional and when graphene is in cylindrical form then it is called as carbon nanotube ,this are obtained in single layer and multilayer form and it is 1 dimensional nature which have received a great covenant of attention as materials, With

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their inherent physical and electrical properties, such as high surface-to-volume ratios, high electrical or heat conductivities, chemical inactivity, and high tensile strength. With the gratefulness development deeper of nanofabrication techniques and nanomaterial's that have developed within the last two decades, graphite is now being actively used as a starting material to engineer various types of carbonbased nanomaterial's (CBNs), including single or multi- walled nanotubes, fullerenes, Nano diamonds, and Graphene [1] These carbon based materials possess excellent mechanical strength, electrical ,thermal conductivity, and optical properties much of the research efforts have been focused on developing these advantageous properties for various applications, such as high-strength composite materials and electronics. Each member of the carbon family exhibits unique features and has been broadly exploited in various biological applications including bio sensing, drug



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Carbon-based nanomaterials, such as carbon nanotubes (CNTs), and graphene(GNS) can be found in functionalized or non-functionalized forms. graphene or carbon nanotubes can be functionalized with -COOH and -OH groups via chemical oxidation methods to produce GO and functionalized carbon nanotubes, which are highly dispersible in water compared to their pristine counterparts. These nanomaterials can also be functionalized with metal or metal oxides. such as ZnS, SnO₂, TiO₂, WO₂, .[3]. With increasing interest in nanotechnology, many types of metallic and carbon-based nanomaterials have emerged. Initial interest in these nanomaterials was for application in the electronics industry, due to their exceptional thermal electrical properties.[3] and Nanocomposites are the combinations of two or more nanoparticles synthesized by various techniques which shows unique physical properties and extensive application potential in different areas.

delivery, tissue engineering, imaging, diagnosis

and cancer therapy [2]

Carbon based	Biological Applications	Electronic	Sensing Applications		
materials Such as SWCNT, MWCNT and	engenearing, imaging	Solar cell, semiconductor chip, supercapacitor. Batteries, photocatalitic	flammable and toxic		
GNS	theapy, antibacterial study, dye detection	22130 27 8	Bio sensors used as dye removal		

Applications of carbon based materials

Types of carbon-based nanomaterials

There are various types of carbon nanomaterials such as carbon black, fullerence , carbon nanotube and graphene all this nanomaterials their properties and applications discus as follows

Carbon black

Carbon black is produced by the incomplete combustion of coal and coal tar, petroleum products or vegetable matter. Carbon black is a form of Para crystalline carbon that has a high surface-area-to-volume ratio, although lower than that of activated carbon Carbon black is

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used as a colorant and reinforcing filler in tires and other rubber products; pigment and wear protection additive in plastics, paints, and ink pigment. It is used in the as a food colorant when produced from vegetable matter Carbon black is available with surface areas that are higher than 1000 m2/g, particle size lower than 50 nm, and density much lower than the theoretical value for graphite (2.25 g/cm3).[4]

Fullerenes

Fullerene is nothing but an allotrope of carbon it consist of carbon atoms that are connected by single and double bond .the structure is quite



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similar to that of graphite and is made up of sheet connected hexagonal cage like structure ,they are referred as buckyballs and buckytubes like structure. Fullerenes are stable, but not totally unreactive. Fullerenes are used in the medical field as light activated antimicrobial agent.it is used as conductor, it is used in

making cosmetics product

Carbon Nanotube

Carbon nanotubes can be considered as cylindrical formed by rolling or folding of Graphene sheet. There are two types of carbon nanotubes 1) single walled carbon nanotube (SWCNT) and 2) multi walled carbon nanotubes (MWCNT). CNTs were discovered in 1991 by lijima et al., there has been a rising interest among researchers to discover their unique mechanical stiffness, strength, high thermal conductivity, electrical, chemical, mechanical and physical properties to develop high performance devices in nanotubes for their numerous applications. CNT can be observed as one of the most promising materials among their Nano scale material. Carbon nanotubes are a very sensitive material because they can easily interact with many gases and change their conductivity in the presence of several studies at room temperature, even if these investigates have different chemical behaviour Because of the arrangement of the atoms on the surface of the MWCNTs and their high area/volume ratio, adsorption processes are highly preferred, which increases their sensitivity to the surrounding atmosphere[5]. MWCNTs can vary greatly, which includes variations in outside diameter, number of concentric walls along with growth-induced structure, such as internal caps of nanotube walls, and other defects in the graphitic structure. Furthermore, depending on the growth conditions, nanotubes can be quite straight or highly entangled in their bulk forms. This wide range of variability in nanotube structure and the structure/size dependence of



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nanotube properties is a key barrier towards applications of carbon nanotubes in structural and functional composites.[6]

The carbon nanotube has been attractive in various applications such as energy storage devices, sensors and actuators. The onedimensional Nano scale structures of nanotubes, nanowires, and nanoparticles have a large surface area to volume ratio, which is an advantage to maximize the surface response.[7] The fibre like structure of the CNT can have tremendously large ratios aspect (length/diameter) which particularly is necessary for both mechanical strengthening and the creation of electrically conductive ways for electrical property variation[6] CNTs have attracted growing attention as a highly competent vehicle for transporting various drug molecules into the living cells because their natural morphology helps penetration across the biological membranes. Carbon nanotubes are widely used in biomedical applications due to

their versatile properties. These are the attractive candidates for the carrying of anticancer drugs, genes and proteins for chemotherapy [2]

Carbon nanotubes (CNTs) attract more attention because of their unique properties and have become the most promising materials for highsensitive gas sensors. As a kind of promising sensing material, CNTs, have been found to possess electrical properties and are highly sensitive to extremely small quantities of gases, such as alcohol, ammonia (NH3), carbon dioxide (CO2) and nitrogen oxide (NOx) at room temperature,[8] Among the different carbon allotropes, CNTs have attracted escalating attention as a highly competent vehicle

CNT Based Nano composite materials

Nano composites are the mixtures of two or more such Nano sized substances or nanoparticles synthesized by some appropriate techniques shows unique physical properties



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The wide scientific and technical interest in developing of composite materials, wherever can take advantage of the unique properties of carbon nanotubes, has resulted in a tremendous amount of literature on the processing, characterization, and demonstrating of CNT-based composites.

Carbon nanotube /polymer composite are synthesized as a promising materials for industrial devices with advanced applications such supercapacitors, sensors, as electromagnetic absorbers, photovoitaic cells, photodiodes and optical limiting devices (murat ates et al,2017) The elastic behavior and strength of SWCNTs and MWCNTs have been studied extensively. One of the major reasons for the interest in utilizing carbon nanotubes as reinforcements in polymer nanocomposites is their reported exceptionally high stiffness and strength as compared to existing highperformance carbon fibers [6] multiwall carbon nanotube (MWNT) doped polyaniline (PANI)



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sheet of graphite, consisting of sp2 hybridized carbon network with a carbon-carbon distance of 1.42Å and an interlayer spacing of 3.4Å (Figure no 2) The two dimensional graphene is a promising conductor because of optical and electrical properties. Among the various allotropes of carbon, graphene is the most attractive material due to its unique intrinsic properties. Around 70 years ago, in 1947, Wallace evaluated the electronic structure of McClure deduced graphene and the corresponding wave equation in 1956. The name "graphene" was first introduced in 1987 by co-workers "graphitic Mouras and as compounds[2] principle, intercalation In individual graphene in electrons sheets delocalize over the complete sheet, which provides ballistic charge transport [11]

Nanocomposite materials

As compared to the study of single GNS based material, composite of Graphene with many materials such as in metal oxide ZnO,

composite thin films for hydrogen gas sensing applications.[9] A pristine CNT exhibits low sensitivity or response signals for many pollutant gases such as NO2, CO or NH3 Therefore, dopants or many metal nanoparticles have been introduced to CNTs to enhance their sensing performance such as response signal, recovery time and operation temperature [10]

Graphene

Graphene is a 2D single layer of carbon atom with hexagonal packed structure. Nanomaterial consist of single atom thick layer. Structural arrangement is of sp2-hybridized carbon atoms. This structure offers unique optical, mechanical, and electrical properties, including high strength, thermal conductivity, flexibility, and biocompatibility. Among these properties, Over the last two decades, research on Graphene has greatly increased, and various exceptional properties have been observed by investigators. Graphene is described as the planar graphitic

SnO2, TiO2, WO2, MnO2, Fe2O3,NiO,CuO,ZnS ,CdS and so on and conducting polymers such as Polyaniline, polypayrrole which shows better electrical ,mechanical, chemical and magnetic properties , and they shows better applicability as compare to study of individual material Graphene and graphene-based nanocomposites have also been used in bacteria detection and antibacterial applications. It has been reported that GO presents antibacterial effect, although the mechanisms and efficacies are under certain debate.[12] The attachment of commercial TiO2 powders to graphene has also been extensively for improved photocatalytic researched The development performance. of graphene/TiO2in photo catalysis should first be attributed to the improved absorptivity of pollutant molecules, which is a requirement for good photo catalytic activity. It is well known that carbonaceous materials have outstanding absorption properties this is used in various

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environmental applications. [13] G-based composites have emerged and exhibited applicable properties. One of the most commonly used ones is PANI/G or PANI/GO super capacitors. PANI/GO is utilized in supercapacitors with high performance, durability, and environmentally friendly features [14] GO/PANI composites have shown higher specific capacitances than PANI, as well as a higher



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stability after 1000cycles (i.e., capacitance retention was around 86%)[15] Likewise, PANI/G displayed higher conductivity and electromagnetic interference (EMI) shielding than PANI at room temperature The GO/PANI composite displays an excellent electrochemical performance due to a synergistic effect between PANI and GO. Besides,[15]

Multifunctional Applicability of carbon based Nano composite

Carbon based composite materials	Method for preparation of composite	Morphology and particle size	Field of applications	Referen- ces
GNS/TiO2	Hydrothermal method	100 nm and 20nm	Electrochemical biosensor assess the freshness of meat	[16]
PANI/ GNS and Ppy/GNS	Chemical oxidation polymerisation	5% GNS highly porous clearly seen	Electromagnetic interference shielding	[5]
PANI/MWCNT (Nanofiber)	Electrospinning	272nm(at 0.1g/ml)	L.P.G.gas sensing	[5]
PANI/TIO2 PANI/GNS	Situ chemical oxidation polymerisation	2micro-meterfor PANI/Tio2 1 micro-meter for Core shell type structure indicating more surface area	Dye Removal	[5]
GO/IONP	Two step process	100 nm	Antibacterial study	[12]
GNS/PANI	Modified hummers and composite by situ polymerization	3 to 5 micro -meter	Super capacitors	[17]
PANI/MWCNT	Situ oxidative polymerisation	30-40 nm , obtained interwoven fibrous structure	Transport properties	[9]
AuNPs/MWCNT PdNp/MWCNT		100nm 100NM	For No2 gas sensing(at 45 to 250 ° C)	[10]
CuO/SWCNT	Hydrothermal method	1.5 to 6(micro-meter)	Highly sensitive wireless H2S gas sensor	[18]
TiO2/GNS	In situ growth and reduction process or a facile, one-pot growth method.	100 to 400 nm	Photo catalytic performance	[13]
PANI/GO	Chemical oxidation polymerisation method	layered and fibrous structures .(100nm)	High performance super capacitors	[15]



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CONCLUSIONS :

Carbon based materials such as carbon nanotubes and Graphene both are extremely very promising materials in the field of material science; due to their unique properties and multifuctionality. As compared to the study of single carbon based materials. Composite with many metal oxide such as ZnO,TiO2, SnO2 etc and conducting polymers such as polyaniline (PANI) which shows potential application in various field of super capacitor, gas sensors ,photo catalytic activity ,and bio sensing applicability

REFERENCES:

- C. Cha, S. R. Shin, N. Annabi, M. R. Dokmeci, and A. Khademhosseini, "Carbon-Based Nanomaterials: Multifunctional Materials for," ACS Nano, vol. 7, no. 4, pp. 2891–2897, 2013.
- D. Maiti, X. Tong, X. Mou, and K. Yang, "Carbon-Based Nanomaterials for Biomedical Applications: A Recent



- J. Kim, J. H. Yun, and C. S. Han, "Nanomaterial-embedded gas sensor fabrication," *Curr. Appl. Phys.*, vol. 9, no. 2 SUPPL., pp. e38–e41, 2009.
- X. Liu et al., "A Survey on Gas Sensing Technology," pp. 9635–9665, 2012.
- S. B. Kondawar, M. D. Deshpande, and S. P. Agrawal, "Transport Properties of Conductive Polyaniline Nanocomposites Based on Carbon Nanotubes," Int. J. Compos. Mater., vol. 2, no. 3, pp. 32–36, 2012.
- S. W. Lee, W. Lee, Y. Hong, G. Lee, and D. S. Yoon, "Recent advances in carbon material-based NO2 gas sensors," *Sensors Actuators, B Chem.*, vol. 255, no. 2, pp. 1788–1804, 2018.
- P. Modak, S. B. Kondawar, and D. V. Nandanwar, "Synthesis and Characterization of Conducting Polyaniline/Graphene Nanocomposites for Electromagnetic Interference
- Study," Front. Pharmacol., vol. 9, no. March, pp. 1–16, 2019.
- S. C. Smith and D. F. Rodrigues, "Carbon-based nanomaterials for removal of chemical and biological contaminants from water:
 A review of mechanisms and applications," *Carbon N. Y.*, vol. 91, pp. 122–143, 2015.
- E. Llobet, "Gas sensors using carbon nanomaterials: A review," Sensors Actuators, B Chem., vol. 179, pp. 32–45, 2013.
- R. I. Murakami, P. M. Koinkar, T. Fujii, T. G. Kim, and H. Abdullah, Nac 2019 Proceedings of the 2nd International Conference on Nanomaterials and Advanced Composites. 2019.
- G. Pandey and E. T. Thostenson, "Carbon nanotube-based multifunctional polymer nanocomposites," *Polym. Rev.*, vol. 52, no. 3–4, pp. 355–416, 2012.

- Shielding," Procedia Mater. Sci., vol. 10, no. Cnt 2014, pp. 588–594, 2015.
- T. Tian *et al.*, "Graphene-based nanocomposite as an effective, multifunctional, and recyclable antibacterial agent," ACS Appl. Mater. Interfaces, vol. 6, no. 11, pp. 8542–8548, 2014.
- L. L. Tan, S. P. Chai, and A. R. Mohamed, "Synthesis and applications of graphene-based TiO2 photocatalysts," *ChemSusChem*, vol. 5, no. 10, pp. 1868– 1882, 2012.
- M. R. Saeb and P. Zarrintaj, Polyaniline/graphene-based nanocomposites. Elsevier Inc., 2019.
- Q. Zhang, Y. Li, Y. Feng, and W. Feng, "Electropolymerization of graphene oxide/polyaniline composite for highperformance supercapacitor," *Electrochim. Acta*, vol. 90, pp. 95–100, 2013.

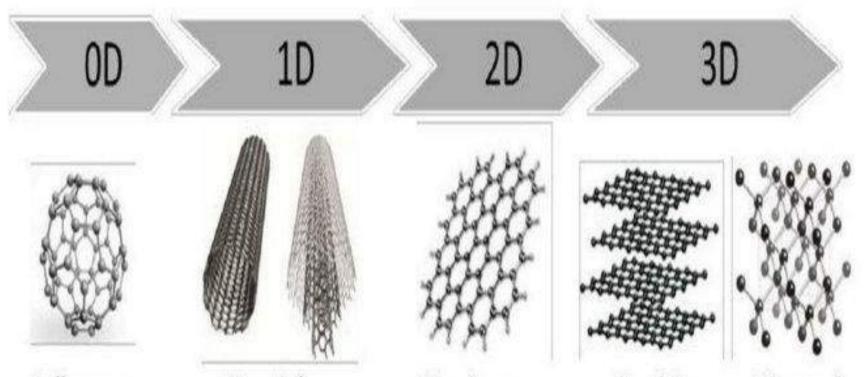


- J. A. V. Albelda, A. Uzunoglu, G. N. C. Santos, and L. A. Stanciu, "Graphene-titanium dioxide nanocomposite based hypoxanthine sensor for assessment of meat freshness," Biosens. Bioelectron., vol. 89, pp. 518-524, 2017.
- T. Yu et al., "Synthesis of microspherical polyaniline/graphene composites and their application in supercapacitors," Electrochim. Acta, vol. 222, pp. 12-19,



2016.

M. Asad and M. Hossein, "Sensors and Actuators B: Chemical Highly sensitive wireless H 2 S gas sensors at room temperature based on CuO-SWCNT nanomaterials," hybrid Sensors Actuators B. Chem., vol. 231, pp. 474-483, 2016.



Diamond Fullerenes Nanotubes Graphite Graphene

Figure 1:types of carbon based materials. © Source by, @phdthesis{phdthesis, author = {Srivatsa, Thushar}, year = {2017}, month = {08},title = {Graphene Based surface coatings on ceramic membranes for water desalination)

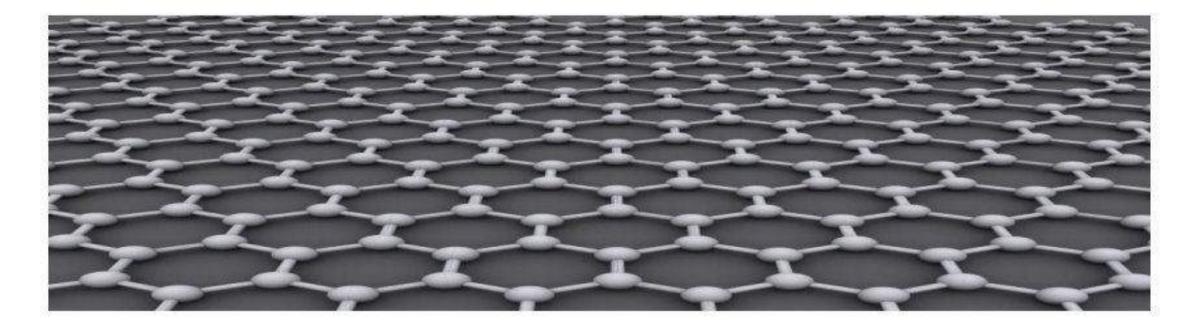


Figure no-2 structure of Graphene (source by Chttps://en.wikipedia.org/wiki/Graphene)



Ethnomedicinal Review on Cassia fistula L.

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ABSTRACT

3.

Cassia fistula is the medicinal plant which is used in Ayurveda, Unani and traditional medicine since long time. The plant parts of the species used for the treatment of around more than forty diseases. Almost every Indian knows this species and it is commonly used in traditional medicine. People of India have great knowledge about this species. The present review compiled the ethnomedicinal data concern *Cassia fistula* which will be helpful for Indians, other than Indians as well as researcher communities those are involved in research of pharmacognosy, phytochemistry, phytomedicine and phytoneutraceutical industries.

KEY WORDS

Cassia fistula, traditional medicine, ethnomedicine

INTRODUCTION

Cassia fistula L. is the ethnomedicinal plant which belonging to family Leguminosae. Some synonyms are as follows, 1. *Bactyrilobium fistula* Willd, 2. *Cassia bonplandiana* DC, 3. *Cassia excelsa* Kunch, 4. *Cassia fistuloides* Collad., 5. *Cassia rhombifolia* Roxb., 6. *Cathartocarpus excelsus* G. Don, 7. *Cathartocarpus fistula* Pers., 8. *Cathartocarpus fistuloides* (Collad.) G. Don, 9. *Cathartocarpus rhombifolius* G. Don. Golden shower, purging cassia, Indian laburnum, pudding- pipe tree are the English names of this species. In Sanskrit, it is known by names vyadhighat, nripdrum, Aaragwadh and Karnikar. In Hindi, it is known by name as Amaltas and in Marathi by Bahawa.



Flowering and Fruiting

MATERIAL AND METHODS

Literature survey was carried via Google search engine. Related research papers were downloaded and scrutinized and shortlisted. All shortlisted 51 relevant articles directly reported traditional and ethno medicinal uses were finalized for the study. Articles were screened and studied for this investigation.

BOTANICAL DESCRIPTION

Trees, about 8- 10 m tall. Leaflets 4-8 pairs, 5.0-12.5 x 2.5-6.0 cm, ovate. Flowers yellow, in 24-40 cm long, lax, drooping racemes. Pods 2.0-2.5 cm across, indehiscent. Seeds numerous, embedded in dark coloured pulp. Fls. & Frts. : April- October¹.

Kingdom:PlantaeDivision: MagnoliophytaClass: MagnoliopsidaOrder: FabalesFamily: LeguminosaeGenus: CassiaSpecies: fistula

ETHNOMEDICINAL USES

For the present review fifty one research papers were studied and compiled ethnomedicinal information in the following paragraphs.

Amoebiasis: For the treatment of Amoebiasis seed powder used by tribals of Nankura districts of West Bengal². **Anemia:** Traditional healers (Vaidya, Hakim, Janata and Maharaj) of Nanded district used root powder for treatment of anemic disorders³. **Asthma:** Fruits are used in asthmatic troubles in Srikakulam district of Andhra Pradesh⁴. One to two seeds are taken for the treatment of asthma and also bark is chewed for the same⁵. **Breast cancer and wounds:** Fruit crushed in water and applied at the affected parts till cure by people of Bidar district of Karnataka⁶.

Burns: Leaves grounded with Coconut oil and paste is applied externally for a week for the treatment of burns⁷. **Constipation:** About 2gm tamarind (mucilaginous pulp surrounding the seeds) given to children and pregnant woman to remove constipation by local people of Panurti taluk of Cudallore district of Tamil Nadu whose inhabited near sacred groves⁸. Tribes of Kalahandi district take in small quantity to cure constipation⁹. Ripe pulp also used by tribal and rural communities of Rajasthan¹⁰. Leaves and fruits used in constipation are reported from Ajoydha Hill region of Purulia district of West Bengal¹¹. **Cough:** Ash of the pod given with honey to cure cough of children by local people of Solan district of Himachal Pradesh¹². **Cuts and wounds:** Leaf juice is applied to clearing cuts and wounds by people of Chatara region of Sonebhadra district of Uttar Pradesh¹³.

Diabetes: For treatment of diabetes, people of Dhar district of Madhya Pradesh given fruit pulp¹⁴. **Dye:** Trunk bark is used as dye with bark of Terminallia bellirica, Pterocarpus masupium by local people of Aravalli Hills of North Gujrat¹⁵. **Dysentery and diarrhea:** Konda Reddi and Koyas tribes of Khammam district of Andhra Pradesh crushed stem bark with five pepper grains and extract is given for three days to cure dysentery and diarrhea¹⁶. Khasis tribe of Meghalaya used fruit pulp for the treatment of dysentery occurs in new born babies¹⁷. **Dysentery and indigestion:** Paste of fruit with sugar used to control dysentery and indigestion problems by local people of Udayagiri forest in Eastern Ghat, Odisha¹⁸.

Earache: Fruit pulp extract dropped into ear to the treatment of ear pain by Billa tribe of Maharashtra¹⁹. **Enlargement of The stomach:** Paste of pods grinded with tamarind and given to cattle for the treatment of enlargement of stomach by Gond tribe of Bhandara district of Maharashtra²⁰. **Erysipelas:** Leaves are used for the treatment of erysipelas by the people of Jawadhu hills in Tamil Nadu²¹. **Fever:** People of Rajouri Poonch district of Jammu and Kashmir used plant for the treatment of fever²². **Fever in Infants:** Seed powder is given for the treatment of fewer in infants by local people of Mokhada, Thane district of Maharashtra²³.

Gonorrhoea: Gond and Baiga tribe women of Achanakmar wildlife sanctuary of Bilaspur, C.G. applied flowers on the affected part to the treatment of Gonorrhoea²⁴. **Headache:** Stem bark applied on forehead to relief pain in head by People of Thuamul Rampur area of Kakahandi district²⁵. **Indigestion:** Leaf extract of this plant is used in indigestion by Khamptis tribe of Arunachal Pradesh²⁶. Seed decoction used with honey to cure indigestion problems in children by local people of Katei Baba sacred grove of Akole taluk of Ahmednagar district of Maharashtra²⁷.

Indigestion in Children: Decoction of seed with honey given for the treatment of indigestion in children by villagers of Adhalwadi who living near Katei Baba sacred grove in Akole taluka in Ahmednagar district²⁷. **Infantile diarrhea or irregular bowels in newborns:** In Meghalaya, Khasis people used fruit pulp to the

treatment of germs in infantile diarrhea or irregular bowels in newborns²⁸. **Jaundice:** Root powder given in the treatment of jaundice by traditional practioners of Nanded district²⁹. **Laxative:** Rella chettu is the local name of Cassia fistula in Srikakulam district of Andhra Pradesh. Local medicine men used root bark and leaves as laxative³⁰.

Leprosy: Seeds used in the treatment of Leprosy by tribals of Sonebhadra district of Uttar Pradesh³¹. Neck pain: Leaf extract applied in neck pain by ethnic people of Sheshachala hill range of Kadapa district of Andhra Pradesh³². Nervous disorder: Root bark pounded with root of *Cryptolepis buchanani* and used to revival of nervous system paralysed by alcoholic intoxication by Malamalasar tribe of Parambikulam wildlife sanctuary of Kerala³³. Nose infection: Leaf paste and bark applied in the treatment of nose infection by tribal of Amrawati district³⁴. Reduce bitter taste: Garasia tribe of Rajasthan put mango fruits with flowers of the same plant to reduce bitter taste³⁵.

Rheumatism: Thuamul Rampur block is coming under Kalahandi district of Orissa. Paraja, Kutia Khdnha, Tekeria and Jhadia are the tribes inhabited in the same block. These tribes used fruit decoction for the treatment of rheumatism³⁶. **Ringworm and Skin diseases:** Leaf paste is applied on ringworm by inhabitants of Solan district of Himalchal Pradesh³⁷. Leaves and flowers are used in ringworm by tribes of Satpuda region of Dhule and Jalgaon districts of Maharashtra³⁸. Kanikkar tribe of Kanyakumari district uses this plant for the skin diseases³⁹. **Scorpion bite:** Seeds are used as antidotes by tribals of Sonebhadra district of Uttar Pradesh¹³. **Smelling mouth:** Young leaves of Casssia fistula given for the treatment of foetid smell of mouth by local people of Ivanur Panchayat of Cuddalore district of Tamil Nadu⁴⁰. Leaf extract given orally for the treatment of jaundice by tribals of Mayurbhanj district of North Orissa⁴¹.

Snakebite: For the treatment of snake bite, one teaspoonful fruit powder given internally by Halakki, Kadukurba and Lambani tribes of Bidar district of Karnatka⁴². Sahariya tribe of Gwalior applied seed extract on snakebite and Gond tribe of Bastar applied fruit pulp, seeds and leaves in snakebite⁴³. Roots are used for snakebite by people of Kalrayan and Shervarayan Hills, Eastern Ghats of Tamil Nadu⁴⁴. **Stomach pain:** Gond, Halba and Kawar tribe of Darekasa hill range of Gondia district Maharashtra used fruit pulp for the treatment of Stomach pain in adults as well as infants⁴⁵. **Stomachache:** Traditional healers (Vaidya, Hakim, Janata and Maharaj) of Nanded district used fruit pulp as purgative⁴⁶. Bark decoction given with garlic and pepper powder to cattle as purgative by local healers of Madurai, Dindigul and Theni districts of Tamil Nadu⁴⁷.

Stomachache and stomach tumor: Seeds are boiled and taken orally to cure stomachache and stomach tumor by the people of Sanchor and Mount Abu regions of Sirohi district of Rajasthan⁴⁸. **Typhoid:** Bhil, Menna, Garasia, Damor, Sahariya, Gujar, Kathodia, Dindor, Ahari, Raot are the tribes of Rajasthan. These tribes used pods decoction for the treatment of Typhoid⁴⁹. **Urinary disorders:** Poultice of fruit pulp applied externally in the treatment of urinary problems by tribals of Balaghat district of Madhya Pradesh⁵⁰. **Weakness:** Gonds of Adilabad district of Andhra Pradesh used fruit pulp with crushed paste of pepper, garlic and tamarind as tonic in weaknesses⁵¹. **Wound healing:** Stem bark decoction employed to wash wound healing by the people of Solan district of Himachal Pradesh⁵².

CONCLUSION

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Cassia fistula L. is tremendously used plant species for traditional medicine since long decades by Indian tribes. Near about all parts of the plant species have medicinal properties. People of the Indian continents have great knowledge about this plant to cure the diseases.

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REFERENCES

1. Lakshminarsimhan, P. & Sharma, B. D. (2000). Flora of Maharashtra state Dicotyledones, Vol. 1 (Ranunculaceae to Rhizophoraceae). Botanical Survey of India.

2. Sinhababu, A. & Banerjee, A. (2013). Ethnobotanical study of medicinal plants used by tribals of Bankura districts, West Bengal India. *Journal of Medicinal Plants Studies*, 1(3), 98-104.

3. Shaikh, R. U., Dukare, D. D., Sarwade, K. P. & Sarwade, P. P. (2014). Ethnobotanical study of folk medicinal plants used by villagers in Nanded district of Maharashtra (India). *International Journal of Ayurvedic and Herbal Medicine*, *4*(5), 1585-1595.

4. Rao, K. P. & Sreeramulu, S. H. (1985). Ethnobotany of selected medicinal plants of Srikakulam district, Andhra Pradesh. *Ancient Science of Life*, *4*(4), 238-244.

5. Khyade, M. S., Awasarkar, U. D., Deshmukh, R. R. & Petkar, A. S. (2010). Ethnobotanical reports about few important diseases from Akole tehasil of Ahmednagar district (MS) India. *Asian J. Exp. Biol. Sci.*, *1*(2), 393-403.

6. Prashantkumar, P. & Vidyasagar, G. M. (2006). Documentation of traditional knowledge on medicinal plants of Bidar district, Karnataka. *Indian Journal of Traditional Knowledge*, 5(3), 295-299.

7. Patil, S. J. and Patil, H. M. (2012). Ethnomedicinal herbal recipes from Satpura hill ranges of Shirpur tahsil, Dhule, Maharashtra, India. *Research Journal of* Recent Sciences, *1*, 333-336.

8. Ramesh, D., Anbalagan, M. & Arumugam, K. (2014). Ethnobotanical survey on sacred grove of Panruti taluk, Cuddalore district, Tamil Nadu. *International Journal of Research in Plant Science*, *4*(1), 1-7.

9. Nayak, S., Behera, S. K. & Misra, M. K. (2004). Ethno-medico-botanical survey of Kalahandi district of Orissa. *Indian Journal of Traditional Knowledge*, *3*(1), 72-79.

10. Sharma, L. K. & Kumar, A. (2007). Traditional Medicinal practices of Rajasthan, *Indian Journal of Traditional Knowledge*, 6(3), 531-533.

Dey, A. & De, J. N. (2010). A survey of ethnomedicinal plants used by the tribals of Ajoydha hill region, Purulia district, India. *American-Eurasian Journal of sustainable Agriculture*, 4(3), 280-290.
 Verma, S. & Chauhan, N. S. (2007). Indigenous medicinal plants knowledge of Kunihar forest division, district Solan. *Indian Journal of Traditional Knowledge*, 6(3) 494-497.

13. Singh, P. K., Kumar, V., Tiwari, R. K., Sharma, A., Rao, C. V. & Singh, R. H. (2010). Medicoethnobotany of Chatara Block of district Sonebhadra, Uttar Pradesh, India. *Advances in Biological Research*, 4(1), 65-80.

14. Alawa, K. S. & Ray, S. (2012). Ethnomedicinal plants used by tribals of Dhar district, Madhya Pradesh, India. *CIBTech Journal of Pharmaceutical Sciences*, 1(1-2), 7-15.

15. Punjani, B. I. (2002). Ethnobotanical aspects of some plants of Aravalli hills in North Gujrat, *Ancient Science of Life*, 21(4), 268-280

16. Raju, V. S. & Reddy, K. N. (2005). Ethnomedicine for dysentery and diarrhea from Khammam district of Andhra Pradesh. *Indian Journal of Traditional Knowledge*, *4*(4), 443-447

17. Hynniewta, S. R. & Kumar, Y. (2010). The lesser known medicine *Ka Dawai Niangsohpet* of the *Khasis* in Meghalaya, Northeast India, *Indian Journal of Traditional Knowledge*, 9(3), 475-479.

18. Shadangi, A. K., Panda, R. P. & Patra, A. K. (2012). Ethnobotanical studies of wild flora at G. Udayagiri forest in Eastern Ghat, Odisha. *Journal of Environmental Science, Toxicology and Food Technology*, 2(2), 25-37.

19. Kamble, S. Y., Patil, S. R., Sawant, P. S., Sawant, S., Pawar, S. G. & Singh, E. A. (2010). Studies on plants used in traditional medicine by *Bhilla* tribe of Maharashtra. *Indian Journal of Traditional Knowledge*, 9(3), 591-598.

20. Gupta, R., Vairale, M. G., Deshmukh, R. R., Choudhary, P. R. & Ware, S. R. (2010). Ethnomedicinal uses of some plants used by *Gond* tribe of Bhandara district, Maharashtra. *Indian Journal of Traditional Knowledge*, 9(4), 713-717.

21. Ranganathan, R., Vijayalakshmi, R. & Parmeshwari, P. (2012). Ethnomedicinal survey of Jawadhu hills in Tamil Nadu. *Assian Journal of Pharmaceutical and Clinical Research*, 2(2), 45-49.

22. Azad, S. A. & Bhat, A. R. (2013). Ethnomedicinal plants recorded from Rajouri- Poonch districts of J & K state. *Indian Journal of Life Sciences*, 2(2), 77-79.

23. Sonawane, V. B., Saler, R. S., Sonwane, M. D. & Kadam, V. B. (2012). Ethnobotanical studies of Mokhada, district Thane, *International Journal of Life Science & Pharma Research*, 2(2), L-88-L93.

24. Sahu, P. K. (2011). Plants used by Gond and Baiga women in ethnogynaecological disorders in Achanakmar wild life sanctuary, Bilaspur, C.G. *International Journal of Pharmacy and Life Sciences*, 2(2), 559-561.

25. Nayak, S., Behera, S. K. & Misra, M. K. (2004). Ethno-medico-botanical survey of Kalahandi district of Orissa. *Indian Journal of Traditional Knowledge*, *3*(1), 72-79.

26. Sen, P., Dollo, M., Choudhury, M. D. & Chaudhury, D. (2008). Documentation of traditional herbal knowledge of *Khamptis* of Arunachal Pradesh. *Indian Journal of Traditional Knowledge*, 7(3), 438-442.

27. Waghchaure, C. K., Naik, S. S. & Abhang, A. R. (2011). Ethno-medico-botanical studies on Katei baba sacred grove and nearby area of Adhal wadi from Akole Taluka, Ahmednagar district (Maharashtra). *International Journal of Pharma and Bio Sciences*, 2(3), 393-398.

28. Hynniewta, S. R. & Kumar, Y. (2008). Herbal remedies among the *Khasi* traditional healers and village folks in Meghalaya. *Indian Journal of Traditional Knowledge*, *7*(4), 581-586.

29. Shaikh, R. U., Dukare, D. D., Sarwade, K. P. & Sarwade, P. P. (2014). Ethnobotanical study of folk medicinal plants used by villagers in Nanded district of Maharashtra (India). *International Journal of Ayurvedic and Herbal Medicine*, *4*(5), 1585-1595.

30. Rao, K. P. & Sreeramulu, S. H. (1985). Ethnobotany of selected medicinal plants of Srikakulam district, Andhra Pradesh. *Ancient Science of Life*, 4(4), 238-244.

31. Singh, P. K., Kumar, V., Tiwari, R. K., Sharma, A., Rao, C. V. & Singh, R. H. (2010). Medicoethnobotany of Chatara Block of district Sonebhadra, Uttar Pradesh, India. *Advances in Biological Research*, 4(1), 65-80.

32. Reddy, S. R., Reddy, A. M., Philomina, N. S. & Yasodamma, N. (2011). Ethnobotanical survey of Sheshachala hill range of Kadapa district, Andhra Pradesh, India. *Indian Journal of Fundamental and Applied Life Sciences*, *1*(4), 324-329.

33. Yesodharan, K. & Sujana, K. A. (2007). Ethnomedicinal Knowledge among *Malamalasar* tribe of Parambikulam wildlife sanctuary, Kerala. *Indian Journal of Traditional Knowledge*, 6(3), 481-485.

34. Hutke, V. D., Tiwar, N. N. & Khushlani, R. N. (2012). Ethnomedicinal uses of some plants utilized by tribes of Amravati district, Maharashtra. *Bionana Frontier*, 2(2-II), 47-49.

35. Meena, K. L. & Yadav, B. L. (2010). Studies on ethnomedicinal plants conserved by Garacia tribes of Sirohi district, Rajasthan, India. *Indian Journal of Traditional Knowledge*, 1(4), 500-506.

36. Nayak, S., Behera, S. K. & Misra, M. K. (2004). Ethno-medico-botanical survey of Kalahandi district of Orissa. *Indian Journal of Traditional Knowledge*, *3*(1), 72-79.

37. Verma, S. & Chauhan, N. S. (2007). Indigenous medicinal plants knowledge of Kunihar forest division, district Solan. *Indian Journal of Traditional Knowledge*, 6(3) 494-497.

38. Jain, D. L., Baheti, A. M., Jain, S. R. & Khandelwal, K. R. (2010). Use of medicinal plants among tribes in Satpuda region of Dhule and Jalgaon districts of Maharashtra- An ethnobotanical survey. *Indian Journal of Traditional Knowledge*, 9(1), 152-157.

39. Chendurpandy, P., Mohan, V. R. & Kalidas, C. (2010). An ethnobotanical survey of medicinal plants used by the *Kanikkar* tribe of Kanyakumari district of western Ghats, Tamil Nadu for the treatment of skin diseases. *Journal of Herbal Medicine and Toxicology*, 4(1), 179-190.

40. Manikandan, S. (2013). Ethnomedicinal flora of Ivanur Panchayat in Cuddalore district, Tamil Nadu, India. *International Journal of Research in Plant Science*, *3*(2), 39-46.

41. Rout, S. D., Panda, T. & Mishra, N. (2009). Ethno-medicinal plants used to cure different diseases by tribals of Mayurbhanj district of North Orissa, *Ethno-Med*, *3*(1), 27-32.

42. Prashantkumar, P. & Vidyasagar, G. M. (2006). Documentation of traditional knowledge on medicinal plants of Bidar district, Karnataka. *Indian Journal of Traditional Knowledge*, 5(3), 295-299.

43. Kadel, C. & Jain, A. K. (2008). Folklore claims on snakebite among some tribal communities of central India. *Indian Journal of Traditional Knowledge*, 7(2), 296-299.

44. Kadavul, K. & Dixit, A. K. (2009). Ethnomedicinal studies of the woody species of Kalrayan & Shervarayan hills, Eastern Ghats, Tamil Nadu. *Indian Journal of Traditional Knowledge*, 8(4), 592-597.

45. Patale, C., Nasare, P. & Narkhede, S. (2015). Ethnobotanical studies on the medicinal plants of Darekasa Hill range of Gondia district, Maharashtra, India. *International Journal of Research in Plant Science*, 5(1), 10-16

46. Shaikh, R. U., Dukare, D. D., Sarwade, K. P. & Sarwade, P. P. (2014). Ethnobotanical study of folk medicinal plants used by villagers in Nanded district of Maharashtra (India). *International Journal of Ayurvedic and Herbal Medicine*, *4*(5), 1585-1595.

47. Rajendran, S. M. & Agarwal, S. C. (2007). Medicinal plants conservation through sacred forest by ethnic tribals of Virudhunagar district, Tamil Nadu. *Indian Journal of Traditional Knowledge*, *6*(2), 228-333.

48. Negi, R. S., Pareek, A., Menghani, E. & Ojha, C. K. (2012). Ethnomedicinal studies at Sanchor and mount Abu regions, located in Sirohi district of Rajasthan, *Cibtech Journal of Pharmaceutical Sciences*, *1*(1), 14-21.

49. Jain, A., Katewa, S. S., Galav, P. & Nag, A. (2008). Some therapeutic uses of biodiversity among the tribals of Rajasthan. *Indian Journal of Traditional Knowledge*, 7(2), 256-262.

50. Jain, S. P., Srivastava, S., Singh, J. & Singh, S. C. (2011). Traditional phytotherapy of Balaghat district, Madhya Pradesh, India. *Indian Journal of Traditional Knowledge*, *10*(2), 334-338.

51. Murthy, E. N. (2012). Ethnomedicinal plants used by gonds of Adilabad district, Andhra Pradesh, India. *International Journal of Pharmacy and Life Sciences*, *3*(10), 2034-2043.

52. Verma, S. & Chauhan, N. S. (2007). Indigenous medicinal plants knowledge of Kunihar forest division, district Solan. *Indian Journal of Traditional Knowledge*, 6(3) 494-497.





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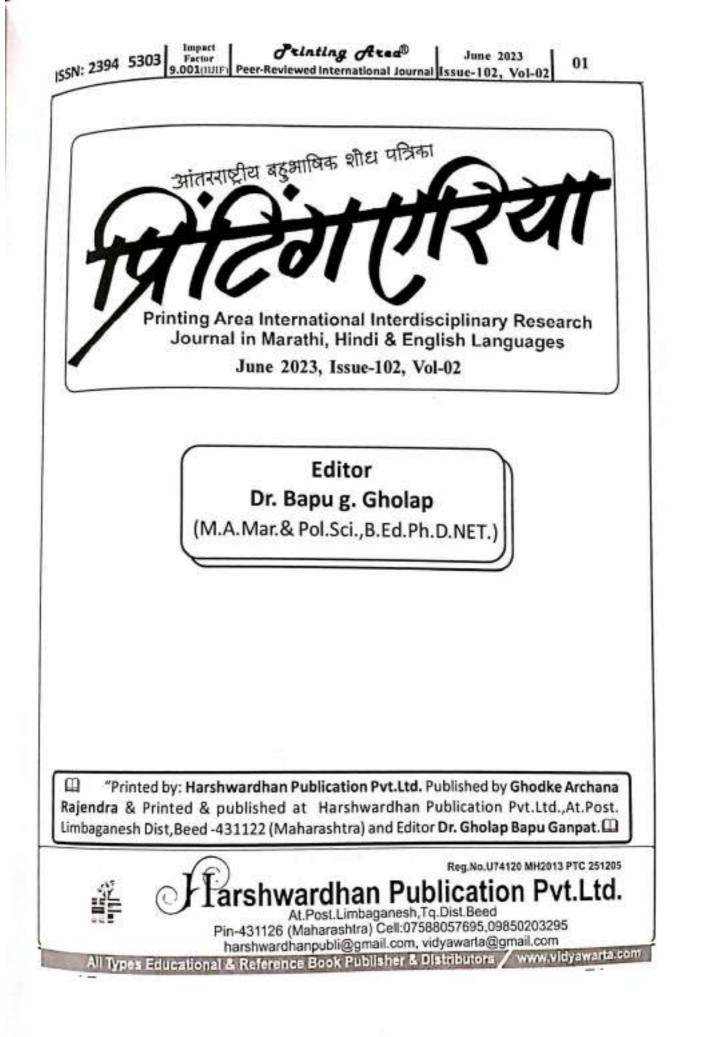
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Editors Message...

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In globalised era Higher Education Plays very crucial role in Development of Nation, as it empowers the individuals with necessary competence for achieving important personal, social and higher level of professional goals. Its importance depicted by words of first Prime Minister Jawaharlal Nehru "A university stands for humanism, for tolerance, for reason, for the adventure of the ideas and for the search of truth. It stands for onward march of human race towards even higher objectives. If the universities discharge their duties adequately, then it well with the nation and the people". India's higher education system is the world's third largest in terms of students, next to China and the United States. Policies and approach adopted by Indian government after implementation of economic reforms are not favorable to the higher education. Since the reforms period there has been a continuously decline in the budgetary allocations made by the government to fund higher education in India. Present paper aims to find out new trends in higher education in India. Paper also discusses various challenges in the field higher education in India.

India has the largest higher educational system with respect to the number of institutions. After the independence of the country, the state and central governments have given great attention to the development of higher education. As a result, the system of higher education in India has seen an impressive growth in terms of a number of universities and colleges. The share of the unaided private sector has increased significantly since 2001 in terms of the number of institutions and enrollment. Indian higher education System comprises three stages - under graduate level, post graduate level and doctorate level. The Ministry of Human Resource Development (MHRD) is highest body of Governance which is responsible for supervising the higher education system through UGC. Higher education in India has expanded rapidly over the past two decades. This growth has been mainly driven by private sector initiatives. India's Higher Education sector has witnessed a tremendous increase in the number of Universities/University level Institutions & Colleges since independence Indian higher education presently includes 892 universities out of which 48 central universalities, 394 state universities, 125 deemed universities and 325 private universities. Apart from the above universities, other institutions are granted the permission to autonomously award degrees. However, they do not affiliate colleges and are not officially called 'universities' but 'autonomous organizations' or "autonomous institutes". They fall under the administrative control of the Department of Higher Education. These organizations include Indian institute of Technology, Indian Institutes of Management, National Institute of Technology and All India Institute of Medical Sciences.

Dr. Bapug Gholap

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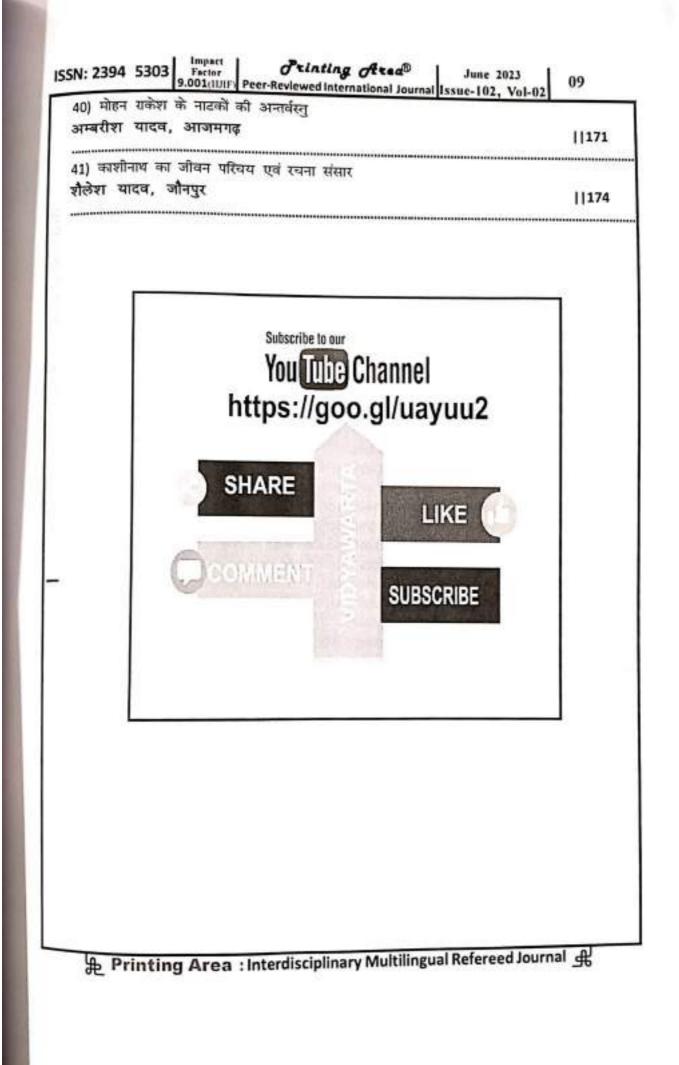
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Joshua's Gabbilam: A Voice against Untouchability and Indian Caste System

Dr. Virendra B. Turkar Assistant Professor of English, Yashwantrao Chawhan Arts, Commerce & Science College, Lakhandur

Abstract:-

The present paper aims at critically studying the pathetic condition of the downtrodden with a special focus on Gurram Joshua's efforts to raise their voice against unjust untouchability in his great epic poem Gabbilam with the help of its translated versions in English penned by Madhav Rao and Chinnaiah Jangam. . It's a sad tale of the woes and worries of the people belonging to lower castes and being suppressed since ages by the upper caste men. The poet deftly selects the bird Gabbilam (bat) symbolizing the predicament of untouchables in India as a principal figure for his noted poetic venture. The bird is shown carrying the message of the suppressed to the lord Shiva with a fervent appeal for the eradication of untouchability and the restoration of the freedom to the oppressed people from the age old cruel clutches of caste and religion based discrimination for the welfare and development of the nation.

Key Words:- Gabbilam, untouchability, discrimination, upper caste, lower caste, caste system Introduction:-

Gurram Joshua's 'Gabbilam' is regarded as the epic of downtrodden communities in India because it speaks about the pains and agonies of the people who were suppressed over ages. He cleverly uses the bird bat, which is

.001(IIIIF) Peer-Reviewed International Journal Issue-102, Vol-02 considered ominous by Hindus, as the messen ger of subaltern classes of India, especially the palit people in the context of Joshua's 'Gabbilam'. Unlike the auspicious and privileged birds such as swan, peacock, parrot, pigeon, the poet opts the inauspicious bird bat having nor. turnal movements and the one that hangs up. side down indicating the inner and implicit mo. tive of Joshua to invert the traditional cultural and social hierarchy which had been responsible for the suppression of untouchables. 'Gabbilam' was inspired by Kalidasa's noted epic 'Meghdoota' in which the principal characterof Yaksha chose cloud to be his messenger to his beloved, from whom he had been separated by the curse of his master for a short period of one year. On the contrary, the untouchables have been deprived of their right to live as human beings with equal status and opportunities for several centuries and even today continue to suffer at the hands of privileged sections of the society. The poet tries to present the contrast between the malediction of a year for Yaksha and that one of awfully long-long span for the downtrodden people. Chinnaiah Jangam talks about this analogy in similar tone in his translated version of Joshua's 'Gabbilam" as:

> Gabbilam means bat. Jangam continues, "Jashuva read Meghaduta and he inverted it." Kalidasa had chosen the cloud to be the messenger of the Yaksa pining for his beloved. Jashuva chose the bat to tell the story of Dalit life to India standing on the threshold of Independence and to the maker. The lines run thus: "When you hang upside down inside the temple/ You will be closer to the ear of the God Shiva/ Make sure the priest is not around/When you recount the story of my life." But Gabbilam's protagonist, the Dalit, is a heroic figure. In the preface to Part I, Jashuva writes, "The protago" nist in Meghaduta was sentenced to one year, but my hero was sentenced from birth without any end for generations.1

Gurram Joshua's "Gabbilam" is a mod-

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Impact Factor 9.001(IUIF) Peer-Reviewed International Journal Issue-102, Vol-02 ern epic with a subtle attack on untouchability. Joshua chooses the bird bat with a special intent to present it as a messenger, having some significant symbolic importance, to Lord Shiva. Joshua's voice, raised through the bird bat, represents the feelings, emotions, pains and pangs of millions of downtrodden people who had been deprived of their right to live as a human being for hundreds of years in India. Joshua's birdmessenger starts its journey from Tanjore in Tamil Nadu and further moving through several towns and places of Andhra Pradesh, Orissa, Bihar and Uttar Pradesh, finally reaches Lord Shiva in the Himalayas. Thus, Gabbilam's nationwide journey imparts a wider and broader identity to it. Joshua gives vent to the voice of entire suppressed community living in India and across the globe. In his epic, Joshua appears to be desperately raising certain serious questions regarding age old rotten caste system of India rendering the particular section of the society helpless and depressed. Unfortunately the oppressed have to still struggle for their right and just status as a man. Certain privileged sections have intentionally and heartlessly imposed the untouchability on Dalits. He describes in his autobiography that some well-known poets such as Tirupati Venkata Kavulu and Koppurapu Sodarulu inspired him a lot. One day Koppurapu gave visit to Jashuva's village Vindukonda. On this occasion, a public meeting was arranged wherein the villagers were asked to recite poems in his honor. As Jashuva was keenly interested in poetry, he composed a poem on Subba Rao and presented it in the meeting. He was admired by the esteemed poet but the people started shouting at him. Jashuva depicts that humiliating experience as:

How can an untouchable enter the meeting? By making uproar some people boycotted the meeting. They shouted and looked like angry cobras. I went out of the meeting with much guilt. 2

Shri.K.Madhava Rao brought Joshua's

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poetry to National and even International level. Coming from the same social background as that of the poet, Madhava Rao expressed the spirit of the original poetry in English. The translator, with devotion, has given praiseworthy contribution to Telugu literature. Joshua's Gabbilam is a sad story of the tribulations of the suppressed people. Joshua's was a tormented, passionate call for righteousness and equal opportunity in the preeminent customs of humanism. Gabbilam depicts, with poignant pathos, the dilemma and spirits of dalits, who for ages have been maltreated and oppressed. It portrays the sufferings and resentment of the Dalits in the modern and ancient communal context. The story of Gabbilam is the agonizing account of the miserable life of downtrodden people - also the story of the journey of social reform movements in India. Only those who personally went through the pains and pangs of the oppressed communities, can genuinely express it through their writings and Joshua was the same person who experienced the trauma of being an untouchable and put it into the words through his poems.

Joshua has strongly criticized the Hindu caste system in his epic poem "Gabbilam". He raises certain questions regarding age old caste system of India that rendered the particular sections of the society helpless and depressed. Unfortunately the oppressed have to still struggle for their right and just status as a human being for ages unknown. The poet has intentionally used the bat for carrying a message up to the God Shiva as it is believed to be an ominous bird by the Hindus. It was thought that the entry of the bird bat into the house is an inauspicious thing. The bird stands for the pathetic condition of the untouchables who were also not allowed to come to the houses of the upper caste people and compelled to live in the outskirts of the villages. There is even one more relevant analogy that we can notice between this bird and the oppressed people of India as

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the former moves during the night only, while the Dalits had also the permission to enter the villages only in the absence of the upper caste people. The same analogy, the poet has capitalized to lash out at the cruel and ugly Indian Caste system that hampered the progress of particular section of society in the name of caste. The fact is that it was fully based on the principle of birth and not on the principle of caliber and quality. The heart-rending fact, according to Joshua, was the maltreatment given to the Dalits through the practice of untouchability based on Indian caste system. It's this pain that made him write his master piece 'Gabbilam'. He mocks at the kind and sympathetic attitude of people towards the ants to which they offer food out of charity and in a similar way milt to the poisonous snake but can't give human treatment to his fellow men and women belonging to lower castes. He warns the nation of this odious mentality of upper caste people predicting the fall of the country due to such callous and heinous narrow mindedness

To gauge the complexity of the anguish of Joshua in this epic poem, one needs to have knowledge of the harsh and brutalizing caste system which has been an insegregable part of the Hindu religion for thousands of years. The book, 'Manusmrithi' which is known as Manu Dharma Shastra, was written by the king Manu. The treatise deals with how a man should maintain relation with the society and his attitude towards elders, ladies and others. It tells how he should conduct himself as a family man and as an individual in various stages of his life. The part dealing with the caste system has the greatest impact on the lives of untouchables. A person, who is not familiar with the realities of India might find it difficult to believe all this. But untouchability is as real as the inhuman slavery and as ugly as racial discrimination. No doubt, there has been considerable improvement in the conditions of downtrodden people. But unfortunately, the system is not totally dead vet. No wonder Ambedkar was driven to burning the Manusmriti and Joshua spent his whole life decrying religious discrimination and untouchability imposed by Manu and his successors. Buddha did not believe in the caste sys-

ISSN: 2394 5303 | Impact Factor 9.001(IIIIF) Peer-Reviewed International Journal Issue-102, Vol-02 9.001(IIIIF) Peer-Reviewed International Journal Issue-102, Vol-02 tem. Dr.Ambedkar became the voice of the untouchables and he demanded separate elector. ates, freedom and protection for his caste men with a greater priority than political independence from the British. Mahatma Gandhi started a movement for abolition of untouchability. He declared the practice of untouchability as the biggest blot on Hinduism. Joshua has badly criticized the perverted caste system that made a slave out of a human being in the name of religion and subjected quite a big part of the society to senseless agonies, pains and unbearable humiliations in his great epic poem 'Gabbilam' In this regard, Chinnaiah Jangam expresses his view in a dialogue with Geetha Hariharan as: The primary purpose of the title Gabbilam is to turn the literary and cultural canons upside down. Jashuva uses a subversive strategy to counter status-quo writings by exposing their hypocrisy. The title begins this project of subversion, as a counter-narrative to dominant Brahmanical narratives. It questions the legitimacy of caste, and it protests the inhuman treatment of untouchables and their dehumanization."

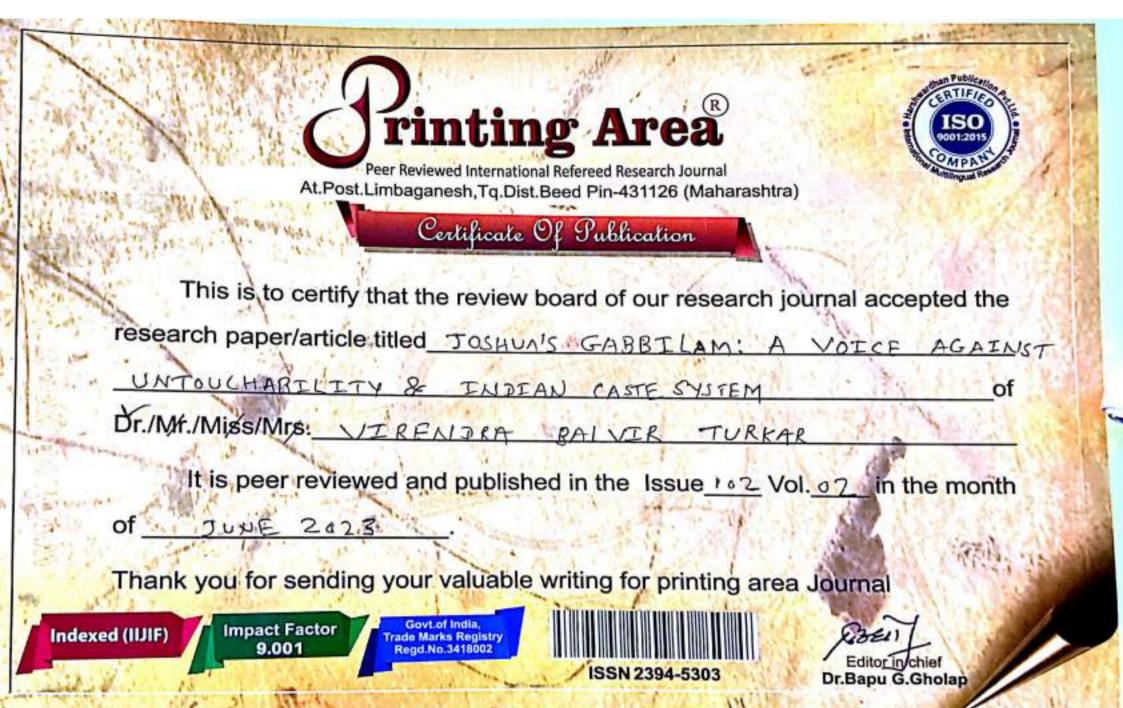
Thus, Jashuva's 'Gabbilam' is a peaceful revolt against the age old Indian caste system and untouchability that crippled people of lower castes with the burden of discrimination and humiliating treatment depriving them of their right to live as a human being. The poet comes up with the bird which doesn't have acceptance and recognition as an auspicious and normal creature in the society. The bat is considered to be an ominous bird that keeps hanging upside down. The poet aims at turning the traditional societal psyche upside down like that of the bird, bat. All things considered, Gabbilam is a strong and patient voice against the Indian caste system and the untouchability. References:-

1. https://www.telegraphindia.com/culture/batman-found-in-translation-of-gabbilama-dalit-epic/cid/1866315

2. Gurram Jashua, Naa Katha (My Story), Jashuva Foundation, Vijayawada, 1996, p. 61.

3. https://indianculturalforum.in/2022/ 11/26/gabbilam-hanging-like-a-bat-turning-theliterary-canon-upside-down/

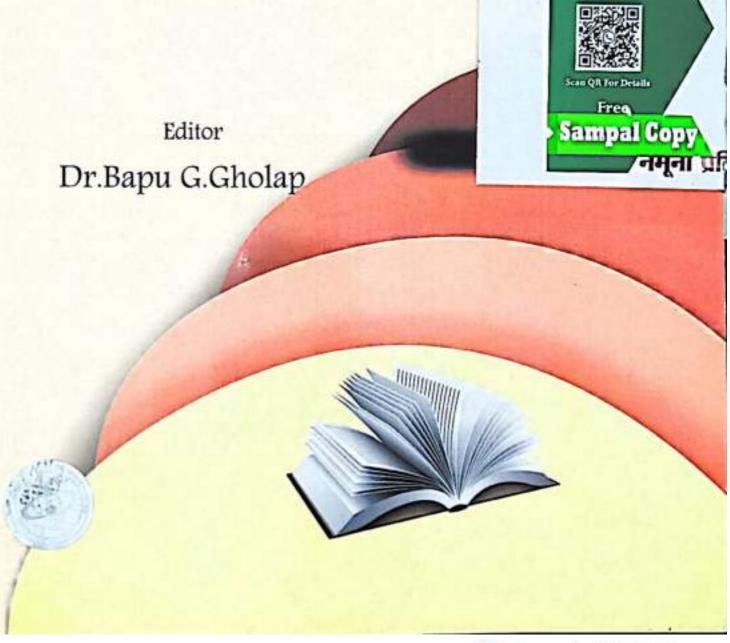
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गांधीवादी विचार

(स्वरूप आणि प्रासंगिकता)

संपादक डॉ. संजय पी. धनवटे

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गांधीवादी विचार (स्वरुप आणि प्रासंगिकता)

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गांधीवादी विचार (खरूप आणि प्रासंगिकता) महात्मा गांधी यांचे शैक्षणिक विचार भोजराज व्ही. बोदेले सहायक प्राध्यापक यशवंतराव चव्हाण कला, वाणिज्य व विज्ञान महाविद्यालय लाखांदूर जि. भंडारा, Email-bhojrajbodele@gmail.com, मो. नं. ९४०३२३७८३१

सारांश ः

सारार गांधीजींची शिक्षणविषयक कल्पना ही श्रम, नीती व ज्ञान यावर आधारीत होती. मातृभाषेतून शिक्षण, कमीत कमी पाठ्यपुस्तके वापरून श्रमाधारीत शिक्षण हे गांधीजींच्या उत्तम शिक्षणाची सूत्रे होत. त्यांच्या दृष्टिने शरीर, मन, हृदय यांचा समतोल विकास होय.त्यांच्या मते केवळ साक्षर होणे म्हणजे शिक्षण नव्हे. शिक्षणाद्वारे उच्च—नीच जात—पात, धर्म यासंबंधीचा भेद भाव नष्ट व्हावा. सर्व धर्माची तत्वे, आदर भाव, उदार सहिष्णुता यांची आकलन करून देण्याची वृत्ती विद्यार्थ्यांत निर्मान व्हावी व ती जोपासली जावी हा होता. शिक्षणाने ग्रामीण उद्योगांचा ऱ्हास थांबवावा. प्रस्तावना :

महात्मा गांधी यांचा जन्म २ आक्टोबर १८६९ मध्ये पोरबंदर येथे झाला. त्यांचे शिक्षण विषयक विचार शिक्षणशास्त्रातील विद्वानांपेक्षा गांधीजींचा शिक्षण विषयक विचार अगदी वेगळा होता. आजचे शैक्षणिक धोरण पुस्तकी आहे. गांधीजींच्या मते, शिक्षण म्हणजे श्रम, नीती व ज्ञान यांवर आधारित होती. सगळा समाज, विशेषत: कष्टकरी जनता स्वावलंबी व स्वाभिमानी बनू शकेल अशी शिक्षणव्यवस्था त्यांना हवी होती. त्यांच्या मते केवळ साक्षर होणे म्हणजे शिक्षण नव्हे ! व्यक्तीमत्वाचा संपूर्ण विकास साधणे हेच शिक्षणाचे घ्येय असले पाहिजे थोडक्यात गांधीजींच्या विचार प्रणाली नुसार 'शिक्षण म्हणजे माणूस घडविणे होय'.

हे शिक्षण मुख्यतः मातृभाषेतूनच असावे याविषयीही ते आग्रही होते. त्यांच्या 'वर्धा शिक्षण योजने'चे शिक्षण क्षेत्रात एक क्रांती केली. ^{गांधी}जींचे असे सर्वस्पर्शी व सर्वोपयोगी विचार होते.

बीजशंब्द :शिक्षण, श्रम, नीती, ज्ञान, स्वावलंबन, स्वाभिमान, साक्षरता. शिक्षण म्हणजे काय ? :फक्त अक्षर—ज्ञान एवढाच त्याचा अर्थ ^{अस}ला तरी ते एक साधन मात्र ठरते. त्याचा चांगला किंवा वाईटही



गांधीवादी विचार (स्वरुप आणि प्रासंगिकता)

उपयोग होऊ शकतो. बहुतेक लोक त्याचा वाईटच उपयोग करतात. त्यातुळे हे सिद्ध होते की अक्षर — ज्ञानाने जगाचा फायदा कमी, नुकसानच अधिक झाले आहे.''शिक्षण प्राथमिक असो की उच्च, आम्ही ते घेतल्याने मनुष्य बनत नसू, आपली कर्तव्य काय आहेत हे जाणून घेत नसू तर ते शिक्षण व्यर्थ आहे''. ते पूढे म्हणतात, ''मी सर्व स्थितीत अक्षर ज्ञान निर्श्वक मानतो असा गैर समज होऊ नये आम्हाला त्या ज्ञानाची मूर्तीसारखी पूजा करायला नको तर त्याचा उपयोग तर त्याचा उपयोग नीती मध्ये आहे तेच खरे शिक्षण होय''.

वर्षा शिक्षण योजना :--१९३७ ला वर्धा येथे भरलेल्या अखिल भारतीय राष्ट्रीय परिषदेत गांधीजींनी ही योजना मांडली होती. त्यातील काही सुत्रे पुढील प्रमाणे १. शिक्षण हे मातृभाषेतूनच हवे. २. केवळ परीक्षांवर जोर देणारे पुस्तकी शिक्षण नको. ३. शिक्षणात पाठ्य--पुस्तके कमीत कमी असावी. ४. शिक्षण मुख्यत: श्रमाधारित असावे.

शिक्षण म्हणजे समतोल विकास : गांधीजींच्या दृष्टिने शिक्षण म्हणजे शरीर, मन व हृदय याचा समतोल विकास होय. शिक्षणाने बुद्धी वाढते तसे शरीरही मजबूत व्हायला हवे. व हृदयाची विशालताही वाढावी. 'साविद्या या विमुक्तये' असे आपल्याकडे म्हणतात. त्याचा अर्थ सर्व प्रकारच्या गुलामगिरीतून सुटका. ज्ञान हे आपल्या व्यक्तीगत अभ्युदयासाठी नसते. ते सर्वसामान्य लोकांच्या उपयोगी पडण्यासाठी असावे.शिक्षण हे सृष्टीचे संचालन करणाऱ्या गूढ गोष्टीचे भान देणारे असावे. तसेच बुद्धी, कृती व भावना यांचा समतोल विकास होत गेला की कुणीही या 'माणूस' बनण्याच्या प्रक्रियेच्या अगदी जवळ पोहचतो. एकुणच सहिष्णुता, क्षमा, समता, सहकार्य इत्यादी गुणामुळे स्वयंपूर्णता, निष्कलंक वाढीस लागते.

चौफेर शिक्षण : गांधीजींचा शिक्षणविषय विचार चौफेर होता. त्यांनी समाजातील प्रत्येक घटकाला दिल्या जाणाऱ्या व आवश्यक असणाऱ्या शिक्षणावर सृक्ष्मपणे विचार केलाहोता. स्त्रिया, मूले, प्रौढ, हरिजन, शेतकरी या सर्वांना कसे व कुठले शिक्षण द्यावे याचे स्वच्छ गणित त्यानी मांडले होते. स्त्रिचे क्षेत्र कित्येक युगे चूल आणि मूल हेच मांडले जायचे. तिचे स्वंतत्र अस्तित्व नाकारले गेले होते. एक व्यक्ति म्हणून तिचे मूल्य अगदी नगण्य असायचे. या स्त्रिंयाचे अस्तित्व व स्वत्व जागवण्याचे काम प्रथमत: गांधींजींने केले. स्त्री ही खरे म्हणजे पुरूषांची जननी आहे. एक स्त्री साक्षर झाली तर एक संपूर्ण कुटूंब

गांधीवादी विचार (स्वरुप आणि प्रासंगिकता) मुधारते. मुलांना तोंडी ज्ञान दिले तर त्यांचा विकास अधिक वेगाने सुधारत. 3 होतो. लहानपणापासून आपण मुलांना पाठ्यपुस्तकांचे गुलाम बनवतो होतो. अन्तींना खेद होता. तर त्या प्रेवजी प्रत्यांचे होतो. लिहान यो के बात होता. तर त्या ऐवजी मुलांना आधी चित्रकला, यावा गावाणा जावा चित्रकला, व्यवहारोपयोगी व धार्मिक ज्ञान द्यावे. त्यांच्या दृष्टिनि घर म्हणजे खरी व्यवहारापया अर्ड व वडिल हे मुलांचे प्रथम शिक्षक आहेत. घरातच शाळा होता. संस्कार चांगले असले तर मुलांचा विकास लवकर होतो. प्रौढांना संस्कार खेडेगावचे गणित, तेथला भूगोल, इतिहास, आरोग्यशास्त्र या सर्वांचे खडगाय ने स्वाच ज्ञान असावे. ते त्यांना व समाजालाही अधिक उपयोगी ठरते. विशेषत: भाग भागातील शेतकरी, कष्ठकरी वर्गांना शिकविणे म्हणजे त्यांचा सर्वांगीन विकास करणे होय. केवळ अक्षर ज्ञानाने हे काम होण्यासारखे नाही. तर त्यांच्यात असलेले अज्ञान, अशिक्षितपणा. खेळवळपणाचे गंड काढले पाहिजे. त्यांच्यात नैसर्गिकरित्या असलेल्या गणांचा विकास साधला जावा. त्यांनी हरिजनांच्या सेवेसाठी आपले जीवन वाहून टाकले होते. केवळ शिक्षणात नव्हे तर एकूणच जीवनातून उच्च-नीच, जात-पात, धर्म यासंबंधीचा भेदभाव नष्ट व्हावा असा त्यांचा प्रयत्न होता. मंदिराप्रमाणे शाळा—महाविद्यालय व अन्य शिक्षण संस्थांमधून हरिजनांना मुक्त प्रवेश असावा. त्यांना स्वच्छ पाणी व उत्तम शिक्षण मिळावे हा त्यांचा आग्रह होता. वर्षानुवर्षे समाजाने हरिजनांना सन्मानाने, सभ्यपणेव स्वच्छतापूर्ण रितीने जीवन जगणे नाकारले होते. आता विशेषतः स्वराज्यात त्यांना सन्मानाने जगण्याचे सर्व हक्क आहेत हे आम्ही मान्य करायला हवे. केवळ मान्यच करायला हवे असे नाही तर त्यांना जगण्यासाठी तशी संधीही उपलब्ध करून द्यायला हवी.

म. गांधी आणि शिक्षक: शिक्षणाविषयी विचार करतांना गांधीजींनी शिक्षकाविषयी खूप अपेक्षा व्यक्त केल्या आहेत. शेवटी जे शिक्षण मिळते ते शिक्षकाच्या माध्यमातुनच मिळते शिक्षण देने हा काही केवळ एक व्यवसाय नाही. विद्यार्थ्याचे जीवन घडवणे व त्यांना अडचणीच्या वेळी मदत करणे हे शिक्षकाचे आद्य कर्तव्य ठरते. खर म्हणजे शिक्षकाचे कार्य विद्यार्थ्याच्या विचारांना चालना देण्याचे आहे. गांधीजी म्हणतात, ''आपन मानसे विचार करणारे, ज्ञान प्राप्त करूण घेणारे ज्ञानी आहोत आणि या काळात सत्य कोणते व असत्य कोणते, कटू भाषण कोणते व मधूर कोणते, शुध्द वस्तु कोणती अशुध्द वस्तु कोणती हे आपल्याला समजले पाहीजे.''



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म. गांधी आणि विद्यापीठीय शिक्षण:म. गांधीजी उच्च शिक्षणाचे कार्य करणाऱ्या विद्यापीठातील शिक्षणाविषयी भूमिका मांडतात. महाविद्यालयाचे व विद्यापीठे हे पवित्र मंदिरे आहेत. ही चरित्र संवर्धनाची केंद्र असली पाहीजे उच्च शिक्षण घेतलेल्या तरूणांनी काहीतरी समाजउपयोगी नवे शोधन्याचे प्रयत्न केले पाहीजे असे गांधीजींचे विचार होते. आज उच्च शिक्षणाचे स्वरूप बदलले आहे उच्च शिक्षण हे केवळ पदवी मिळविण्यापुरते मर्यादीत झाले असून समाजपर्रिवनाची उद्दिष्टये शिक्षणप्रणालीतून नाहीसी झालेली दिसते म्हणूनच उच्च शिक्षणाच्या क्षेत्रात म. गांधीजींची भूमिका ही समाजकेंद्री दिसून येते. म. गांधीजींच्या शिक्षण विषयाच्या विचाराला त्यांच्या सपूर्ण तत्वज्ञानाचे अधिष्ठान लाभलेले दिसते.

शिक्षण व धर्म : गांधीजींना धर्म व शिक्षण यांची सांगड हवी होती. मुला—मुलीमध्ये सर्व धर्मांबद्दल समाजात आदराची व प्रेमाची भावना असावी. त्यांनी सर्व धर्मांच्या, पंथांच्या व उपासनांच्या मार्गांचा आदर करावा असे त्यांना वाटे. गांधींनी धार्मिक शिक्षणात खालील गोष्टींचा अंतर्भाव केला आहे. १.आपल्या धर्माव्यतिरिक्त अन्य धर्मांच्यां सिद्धान्तांचाही अभ्यासक्रमांत समावेश करावा. २.सर्व धर्मांची तत्वे आदर भावाने व उदार सहिष्णुवृत्तीने बाळगावी. ३.विद्यार्थ्यांची आध्यात्मिक श्रद्धा दृढ करावी.४.यर्व धर्मांमध्ये मौलिक एकता कशी आहे हा विचार विद्यार्थ्यांच्या मनावर बिंबवावा. ५.कोणत्याही धर्माविषयी लोकांच्या भावना दुखावतील अशा आशयाला स्थान देऊ नये.

म. गांधी यांचे शिक्षण विषयक निवडक विचार :

१.शिक्षण आणि चाऱ्रित्र्य :''चारित्र्य संवर्धनाच्या सखोल पायावरच आपल्या प्राचीन शिक्षणपद्धतीची इमारत उभारलेली आहे.''

२.चाऱित्र्यहीन शिक्षक हा रूचिहीन मिठासारखाच असतो ''राजकारणपटू चारित्र्यहीन असला तरीही तो यशस्वी होईल, परंतु समाजशिक्षकाला चरित्र्यहीन असून चालायचे नाही''

३. विद्यार्थ्यांना संदेश ''विद्यार्थ्यांनो, तुम्ही आशावंत असले पाहिजे. जर तुमच्यामध्ये त्यागभावना आणि संयम नसेल तर तुम्ही यशस्वी होणार नाही. धर्मराज्य हे जर तुमचे ध्येय असेल तर त्यागावाचून ते संपादन करणे मुस्कील आहे. जरी त्याग न करता ते तुम्हाला मिळाले तरी त्यागावाचून ते टिकविता येणार नाही. जर तुम्हाला काम



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पहिंज ४. स्वावलंबन व शिक्षण : शिक्षणातून सर्व विद्यार्थ्यांचा विकाय ४. स्वापरम्म जिल्हाचा फायदेशीर व्यवसायाचा अवलंब केल पाहिने. साधण्यासाठा ५.ज्ञानाची कसोटी : शिक्षणातून स्वावऌंबी बनणे ही त्याच्या जानाची

५.ज्ञानाचा मन्हे, तर वैज्ञानिक पद्धतीने शिकवल्या गळेल्या जागाचा कसोटी नव्हे, तर वैज्ञानिक पद्धतीने शिकवल्या गळेल्या ज्यागायुर कसाटा गर्भ, व्यक्तीची सारी सुप्त गुणवैशिष्टने विकसित होणे ही खरी कर्मार्थ

अहि इ.अम आणि शिक्षण : शिक्षण केवळ साहित्य प्रधान करणे हा एक गुन्हाच आहे. अशा साहित्य प्रधान शिक्षणामुळे विद्यार्थी शारीयिक श्रम करण्यास असमर्थ ठरतात. यासाठी बाल्यावस्थेपासून मुलांच्या मनावर

७.अहिंसा शिक्षणाने उत्पन्न होते : अहिंसा ही यात्रिक कृती नाही, अहिंसा हा हृदयाचा अत्यंत सूक्ष्म गुणधर्म आहे. तो शिक्षणानेच उत्पन्न होतो. अहिंसा हे दुर्बलाचे हत्यार नाही, ते बलिश्वांचे आहे. अहिंसा म्हणजे दुष्कृत्याला क्षमा करणे, सूड घेणे नव्हे, 'क्षमा हे शूर पुरूषांचे भषण आहे' हे वचन खरे आहे.

८. शिक्षणाचा पाया : शुध्द चरित्र्य आणि पवित्र अंतकरण हा जर तुम्हा विद्यार्थ्याच्या शिक्षणाचा पाया बनवायचा असेल तर दरगेज प्रामानिकपणे आणि धार्मिक वृत्तीने प्रार्थना करणे यासारखे कोणतेही दुसरे साधन नाही.

९. शिक्षणाचे उद्दिष्टये :विद्यार्थ्यांचे शिल जर तयार झाले नाही तर तो अयोग्य प्रकारचे ज्ञान मिळविण्याचा संभव आहे. विद्यार्थ्यांमध्ये नैतिक वृत्ती दूढ करणे हे शिक्षणाचे मुख्य उद्दिष्ट आहे.

१०. स्वच्छतेचे प्रशिक्षण : श्रिमंताने पैशाच्या रूपाने तज्ञानी आपल्या ज्ञानाने आणि प्रत्येकाने स्वच्छतेसाठी हौसेने मदत केली पार्हाजे. आजचे काम चालले आहे ते अज्ञान, बेपर्वाई आणि विरोध या सर्वांना तोंड देऊन शहर स्वच्छ ठेवण्यासाठी स्वयंसेवकाने पुढे का येऊ नये? शाळांच्या आणि महाविद्यालयाच्या विद्यार्थ्याना स्वच्छतेचे प्रशिक्षण का मिळू नये व स्वयंसेवक म्हणून त्यांनी का पुढे येऊ नये? जर शालेय शिक्षणात मुले आणि मुली शिस्त शिकू शकली नाही तर त्यांच्या शिक्षणावर खर्च केलेला पैसा आणि वेळ व्यर्थ होय'

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११. आध्यात्मिक शिक्षणः प्रार्थना म्हणजे धर्माचा आत्मा आणि सार होय. म्हणून मनुष्याने आपल्या जीवनाच्या गाभ्यात प्रार्थनेला स्थान दिले पाहीजे. कारण कोणताही मनुष्य धर्माशिवाय जगूच शकत नाही. निष्कर्ष : —

१.म. गांधीजींच्या शैक्षिणिक विचारामध्ये शिक्षण मातृभाषेतून असावे असे ते म्हणतात.

२.शिक्षण हे चौफेर असावे. त्यात स्त्री, मुले, प्रौढ, शेतकरी, हरिजन, ग्रामीण इत्यादींचा समावेश असावा.

३.शिक्षणात पाठ्य-पुस्तके हे मर्यादीत असावेत.

४.शिक्षण हे पुस्तकापेक्षा कृतीशिल असावे.

५.शिक्षणात निसर्गाचा समावेश जास्त असावा. कारण निसर्ग हा सर्वात मोठा गुरू असतो.

६.शिक्षण हे चारित्र्य सपन्न असावे वशिक्षक हे चारित्र्यवान असावे.

७.शिक्षणातून सर्वधर्मसमभाव वाढीस लागावे.

८.शिक्षणातून आत्मिकता व आध्यात्मिकता वाढावी.

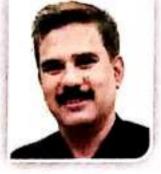
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१.भगत रा.तु. शिक्षणातील थोर विचारवंत चैतन्य प्रकाशन, कोल्हापूर (२००५).

२.घोरमोडे के. यु. व घोरमोडे कला, शैक्षणिक विचारवंत (भारतीय व पाश्चात्य), विद्या प्रकाशन, नागपूर, २००६.

३.जाधव व्ही.के. आधुनिक भारताचा इतिहास, विद्या प्रकाशन, नागपूर, २००४.

४.डॉ.शाहा. मु.ब. गांधी विचार, यशवंतराव चव्हान महाराष्ट्र मुक्त विद्यापीठ, नाशिक, जाने. २००७.



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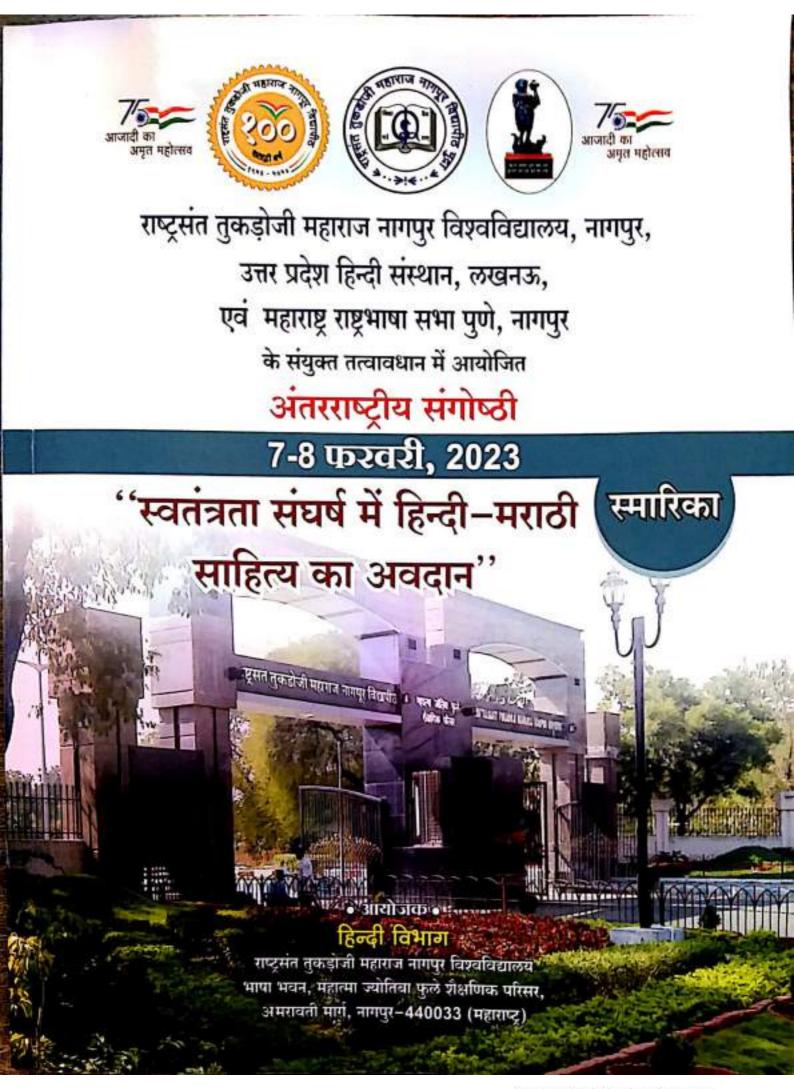
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🖝 स्वतंत्रता संघर्ष में चर्चित-अचर्चित हिन्दी साहित्यकारों का अवदान	थीमती प्रेमलता पाटिल
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भारतीय खातंत्र्य लढ्यात सयाजीराव गायकवाड यांचे योगदान

🗋 प्रा. भोजराज व्ही. बोदेले

यशवंतराव चव्हान कला, वाणिज्य व विज्ञान महाविद्यालय लाखांदूर, जि. भंडारा

ब्रिटिश सरकारच्यासोबत राहूनच आपल्याला आपले स्वातंत्र्यांचे लढे मोठ्या हूशारीने लढावे लागतील हे महाराज समजून होते. कारण त्यावेळचा लॉड कर्झन हा मोठा हट्टी व हुशार इंग्रज अधिकारी होता. त्यामुळे यांच्यासोबत मित्रत्वाचे तह करून वागावे लागेल हे गायकवाडांना समजले होते. लॉर्ड कर्झनला महारांजानी पत्र पाठवून सांगीतले आपण सरकार आहात तर आमच्या मिळालेला करातील काही भाग आमच्यासाठी असावा असे महाराज त्या इंग्रज अधिकाऱ्याना सांगत असत. स्वातंत्र मिळविण्याकरिता अभिनव भारत क्रांतिकारक संघटना स्थापन केली होती. तसेच बडोद्यात तरूण संघाची स्थापना केली. महाराजाचे ब्रिटिश सरकारसोबत असलेले मित्रत्वाचे करार असल्यामुळे त्यांनी आपल्या राज्यकारभारात आम्ही इंग्रज सरकारचे गुलाम नाहीत. आमचे करार हे मित्रत्वाचे आहेत याची वारंवार आठवण करून देत. संस्थानिकांना राज्यात स्वातंत्र्य द्यावे अशी त्यांची मागणी रास्त होती. कारण संस्थानिक हे मोकळेपणाने आपले राज्य कारभार चालवू शकतील. महाराजांनी भारतीय राष्ट्रीय काँग्रेस आणि विलायतेतील क्रांतिकारकांना महाराजांची वेळोवेळी मदत केली. आपले तरूण हेच देशाच्या पारतंत्र्याच्या बेड्या तोडण्याचे कार्य करू शकतात असे ठाम भूमिका महाराज सयाजीराव यांची होती. स्वातंत्र लढ्यात कार्य करणाऱ्या तरूणांना आर्थिक मदत करीत, तसेच उमद्या तरूणांना आपल्या संस्थानात प्रत्यक्ष सेवेत घेवून त्याच्या पाठीशी नेहमी खंबीरपणे उभे असत. यावरून असे म्हणता येईल की, महाराज सयाजीराव गायकवाड हे भारतीय स्वातंत्र लढ्यातील कांतीकारकांचे पाठीराखे होते.

स्वातंत्र्यपूर्वकाळात भारतात साडेपाचशेहून अधिक लहान-मोठी संस्थाने राज्य होती. या संस्थानातील बहुतांशी राजे आपल्या ऐश्वर्याच्या डामडौलात मश्गूल राहून सार्वभौम सत्तेचे नम्र मांडलिकत्व सिद्ध करण्यासाठी धडपडत होते. याउलट एकट्या सयाजीराव गायकवाडानी राट्रीय चळवळीला आणि क्रांतीकारकाना उघडपणे मदत केली. आयुयभर त्यांनी ब्रिटिश सत्तेशी हिमतीने सघर्ष केला. सयाजीराव गायकवाड यांचे बडोद्यातील प्रशासन, सामाजिक सुधारणा ब्रिटिश प्रशासनापेक्षा चांगल्या होत्या. अशी तुलना होऊ लागली. ही गोट ब्रिटिश सरकारला न आवडणारी होती. राट्रवादी विचाराचे जहाल क्रांतीकारक अरविंद घोष यांना महाराजांनी बडोद्यात नोकरीस बोलावले. त्यांच्या सोबतच खासेराव जाघव, बॅ. केशवराव देशपांडे या महाराजाच्या अधिकाऱ्यांची साथ मिळाली. बडोद्यातील मानिकरावांचा आखाडा देशभरातील. क्रातीकारी चळवळीचा अड्डा बनला लोकमान्य टिळक, लाला ल्यपतराय या राट्रीय चळवळीच्या मंडळीचे बडोदा केंद्र बनले. या चळवळीला या मंडळीच्या माध्यमातून सयाजीराव गायकवाड यांचा आश्रय आणि मदत मिळू लागली. ही गोट ब्रिटिश सरकारच्या नजरेतून सूटली नाही. हिंदूस्थानचेसी. आय. डी. प्रमुख सी. आर. क्लीव्हलॅड यांच्या मार्गदर्शनाखाली हेरांनी माहिती जमवून वरीष्ठ सरकारला पाठवू लागले. गल्तर्नर जनरलकडून लंडन भारतमंत्र्यांना सयाजीरावांच्या देशद्रोहाचा अहवाल जाउ लागला. येवढे असून सुद्धा सयाजीराव गायकवाड ब्रिटिश सरकारला घाबरले नाही.

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<u>Chapter</u> 6

NANO-MAGNETIC ADSORBENTS FOR REMOVAL OF HEAVY METALS FROM WASTEWATER

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ABSTRACT

Heavy metals exist in maximum of the industrial wastewaters and water components are amongst the maximum severe environmental contaminants. As such, elimination of those metals from water and wastewater is a vital technique for protective public health and the environment. Thanks to its biocompatibility, flexibility, low cost, and excellent results, the adsorption approach has been widely used for this kind of purpose, making it essential to increase cheaper adsorbents in eliminating those metallic contaminants. In latest years, using magnetic adsorbents has received interest due to the fact of their magnetic property, which enables the separation and elimination of the adsorbent the usage of an outside magnetic composites, mainly the nano-sized ones, show off superiority over different adsorbents. Given their excessive adsorption yields, those were used as green and cost-powerful adsorbents for eliminating heavy metallic contaminants.

KEYWORDS: Adsorption, waste water, Magnetic Nanoparticle, Heavy metals

INTRODUCTION

Water is important and essential part of the universe and it plays a vital role within the proper functioning of the earth' ecosystems. Water stocks on earth can be divided into two categories i.e. salt water and fresh water. The total volume of water on earth is about 1386 million cubic km. Only 2.5 % of the total volume of water is fresh water and less than 1 % of all fresh water is directly available for human use (Amin et al., 2014). From a global point of view, water is unevenly distributed, with great natural variations in availability at the local level. Water pollutants are one of the most important modern-day issues which could pose a hazard to human health and the environment. The presence of poisonous chemical substances and organic agents above natural ranges maybe described as water pollutants. Pollutants contained in wastewater can be chemical contaminants which include heavy metals, natural and inorganic particles, toxins, pharmaceuticals, and hormones, or other risky substances. (Unuabonah & Taubert, 2014). Despite the presence of vast bodies of

water, drinking water is not readily available in most parts of the world. This is most dramatic in regions with rapid industrialization and population growth like large cities. Over seven hundred organic and inorganic micro pollutants are mostly toxic and carcinogenic while some have long residence times in the environment and are neither biodegradable nor bio transformable. Drought and desertification are day-to-day realities for many people and have a devastating impact on people's livelihoods. Availability of water for purposes like drinking, irrigation and industrial use are the major concerns.

Several techniques available to remove these and other micro pollutants from water and industrial wastewater: chemical precipitation, ion-exchange, electrodialysis, electrolysis and adsorption (Dąbrowski et al., 2004; Demirbas, 2008; Leta, 2017). Among these, ion- exchange is expensive technique and chemical precipitation leave behind secondary pollutants however adsorption is a less expensive technique that removes both organic and inorganic pollutants from water (Demirbas, 2008). It is therefore extremely engaging for water treatment, particularly within the developing countries that are most heavily plagued by water contamination.

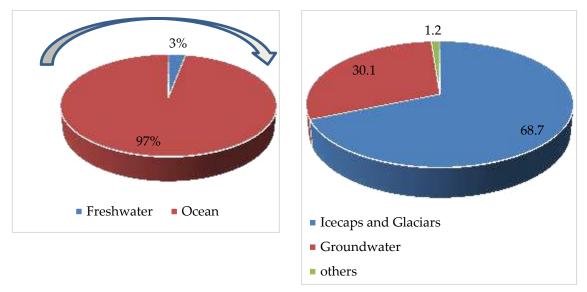


Fig. 1: (a) Water Distribution on the Earth and (b) Freshwater Distribution on the Earth.

TYPES OF WATER CONTAMINATION

Water resources in most developing countries are being impure on the so much aspect their capability to sustain ancient uses as a result of high increase rates. Increasing urbanization and manufacture have exacerbated the case by creating really big purpose sources of pollution. Major centres of population and rural agro-industry have seriously broken

surface water quality, even in very massive rivers and groundwater has together been contaminated. There are varied ways of water contaminations a number of them at intervals the subsequent subsections are shortly mentioned.

AGRICULTURE

The agricultural sector is the most important consumer of worldwide fresh resources, with farming and livestock production exploitation concerning 70 % of the earth's surface water supplies, however it's conjointly a heavy water polluter. Round the world, agriculture is the leading reason for water degradation. When it rains, fertilizers, pesticides, and animal waste from farms and cattle operations wash nutrients and pathogens—such micro-organism and viruses—into our waterways. Nutrient pollution, caused by excess element and phosphorus in water or air, is the number-one threat to water quality worldwide and may cause algal blooms, a cyanogenetic soup of blue-green algae which will be harmful to people and wildlife.

SEWAGE AND WASTEWATER

Used water is also one kind of wastewater. Wastewater comes from our sinks, showers, and toilets (suppose sewage) and from commercial, industrial, and agricultural activities (suppose metals, solvents, and poisonous sludge). The time period additionally consists of storm water runoff, which happens whilst rainfall contains street salts, oil, grease, chemical substances, and particles from impermeable surfaces into our waterways More than eighty percent of the world's wastewater flows returned into the surroundings without being dealt with or reused, in step with the United Nations; in a few least-evolved countries, the discern tops ninety five percentage. These centers lessen the quantity of pollution which includes pathogens, phosphorus, and nitrogen in sewage, in addition to heavy metals and poisonous chemical substances in commercial waste, before discharging the treated waters returned into waterways.

RADIOACTIVE WASTEWATER

Radioactive waste is produced from industrial, medical and scientific processes that use radioactive material. Radioactive waste can have detrimental effects on groundwater, surface water and marine resources. Radioactive waste comes from many sources like operations conducted by nuclear power stations produce radioactive waste, mining and refining of uranium and thorium are also causes of marine radioactive waste, waste is also produced in the nuclear fuel cycle which is used in many industrial, medical and scientific processes and many more.

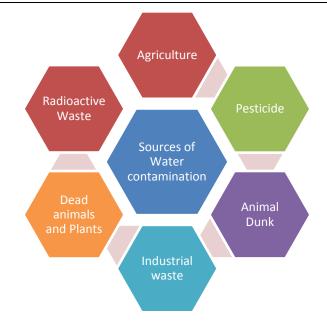


Fig. 2: Major source of water contamination

HEAVY METALS

Heavy metals are the most non-unusual maximum contaminants that can be found in industrial wastewater, these cause damage to the nearby environment and pose various health risks to humans (Ruthiraan et al., 2019). Such metals are non- decomposable with inside the surroundings and generally tend to modify the physical, chemical and organic qualities of water. The supply through which metals are launched into the ecosystem consist of volcanic eruption, soil, and rock weathering and human activities which include using polluting chemical compounds from metals, mining, manufacturing, etc. Additionally, heavy metal storage is found at significant depths in surface waters which are followed by streams / springs to lakes / rivers. However, factors contributing to the concentration and identity of heavy metals in surface water involves chemical aspects containing oxyhydroxides / aquatic vegetation scavenges heavy metals causes bioaccumulation in living organisms (Khan et al., 2015). Metals with density more than 5 g/cm3 are referred to as heavy metals, for instance, lead, mercury, arsenic, zinc and chromium are few of the heavy metals. In 1987, United States Environmental Protection Agency (USEPA) posted a listing of the contaminants discovered in wastewater that impose critical dangers into the human health, which include antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, zinc, silver, thallium, and selenium(Ramos et al., 2002). In fact, the systems present in these metals can impose excessive damage and trouble on features of the cardiovascular system, liver, kidneys,

blood, skin, glands, reproductive system, immune system, nervous system, urine and digestive system("Heavy Metal in Drinking Water Its Effect on Human Health and Its Treatment Techniques – a Review," 2018). These metals have been classified based on their atomic weight, density, chemical properties, and toxicity. Based on the periodic table, one can categorize heavy metals under three general classes

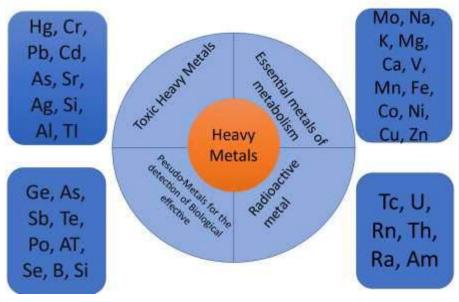


Fig. 3: Classification of Heavy Metals by Toxicity (Tamjidi et al., 2019)

ARSENIC

Environmental pollution by arsenic is due to natural phenomena such as volcanic eruptions, soil erosion and human activities (Ungureanu et al., 2015). Inorganic arsenic may be a confirmed substance and is that the most vital chemical stuff in drinking-water globally. Arsenic may also occur in an organic form. Inorganic arsenic compounds (such as those found in water) are extremely toxic whereas organic arsenic compounds (such as those found in seafood) are less harmful to health. The on the spot signs and symptoms of acute arsenic poisoning encompass vomiting, stomach ache and diarrhoea. These are observed with the aid of using numbness and tingling of the extremities, muscle cramping and death, in intense cases.

CADMIUM

Cadmium (non-degradable) ions particularly maintain big toxicities in addition to accessibly developed to organism through food that makes it tough to rip off and causes organic damage. Cadmium introduces into the surroundings via gradual erosion and rocks

and soil abrasions, along with volcanic eruptions. Furthermore, cadmium is a pollutant that immediately affects human health in numerous methods along with limiting cell growth, bone infections and lung damage. Due to these kind of health issues, WHO (World Health Organization) has said that the restriction of cadmium in blood need to now no longer be greater than 0.005mg/L(Boparai et al., 2011).

CHROMIUM

Chromium is widely distributed in the earth's crust. It can exist in oxidation states of +2 to +6. Wastewater contamination by chromium is of great concern because of its widespread 29 applications in industrial processes such as metallurgy, tanning industries, refractories and 30 foundries and its high toxicity. In fact, hexavalent chromium Cr (VI) has significant toxic 31 effects on humans and animals (Jobby et al., 2018). Moreover, Cr (VI) compounds have been classified by the 32 International Agency for Research on Cancer (IARC) as carcinogenic to humans. The 33 World Health Organization (WHO) fixed the upper limit value for Cr (VI) compounds in drinking water to 0.05 mg L-1 34 (*Cadmium in Drinking-Water Background Document for Development of WHO Guidelines for Drinking-Water Quality*, 2011).

WATER-TREATMENT TECHNOLOGIES

A multiple number of techniques are available for waste water treatments Fig. 3 shows list of important techniques used for water treatment and their classification on the basis of conventional techniques, established techniques and ongoing research techniques.



Each method has its personal benefits and barriers in time period of the nature of pollutant it could treat, cost, performance and environmental impact. Combination of various strategies for powerful and monetary elimination of contaminants is a primary studies vicinity those days. This section discusses about various treatment techniques mentioning their recent use in the removal of heavy metal with the help of nano-magnetic material by adsorption methods.

NANO-MAGNETIC ADSORPTION

In the past decade, nanoscale solid materials became vital as a result of their special properties and therefore the nanomaterials field has gained increasing attention from scientists and engineers. A key reason for the modification within the chemical and physical properties of tiny particles as their size decreases is that the increased fraction of the "surface" atoms, that happens beneath conditions (coordination number, symmetry of the local environment, and so forth) that are totally different from those of the bulk from the energy purpose of view, a decrease in the size of a particle ends up in a rise of the surface energy fraction. Nanomaterials possess a series of distinctive physical and chemical properties. A very vital one is that the majority of the atoms that have high chemical activity and adsorption capability to several metal ions are on the surface of the nanomaterials. The surface atoms are unsaturated and are so subject to combination with different component ions by static electricity. Therefore, nanomaterials will powerfully sorb many substances as well as trace metals and polar organic compounds (Mercury in Drinking-Water Background Document for Development of WHO Guidelines for Drinking-Water Quality, 2005). Presently, the distinctive physical properties of nanomaterials are becoming vital attention, specially the salient magnetic properties. Alteration within the characteristics of nanoparticle such as size, composition, shape and structure will enhance the material's magnetic properties.

Magnetic nanoparticles are extremely recyclable, non-toxic, reusable associated possess magnetic characteristics that provide advantages of convenient separation upon using an external magnetic field (Ambashta & Sillanpää, 2010). The sorption on the surface of solid adsorbents demonstrates an excellent perspective for the treatment of heavy metal ion contaminated water. It's a lot of advantageous than alternative ways as a result of its simple design and low investment in terms of initial cost and space needed.

The adsorption method becomes extremely cost effective if the adsorbent used is recyclable. Because of these properties, adsorption process is gaining a great deal of attention from researchers within the treatment of industrial waste water contaminated with heavy metal ions (Wang & Chen, 2009). Ideally an adsorbent need to offer enough binding sites for suitable adsorption of heavy metal ions. Main traditional adsorbents used for heavy metal ion removal are activated carbon, metal oxides, clay etc. to name a few (Moreno-Piraján & Giraldo, n.d.; Sharma et al., 2018). These traditional adsorbents suffer from certain constraints comparable to low sorption capacities, lack of functional tunability, reusability and recyclability. To beat such limitations, new sorbents in nano dimensions are being synthesized and adopted for water decontamination.

The advantages of support magnetic nanoparticles, in addition to changed magnetic nanoparticles as an appropriate candidate for adsorption, are indexed as follows: (1) a huge variety of particles produced the usage of easy and convenient methods. (2) The capability

of adsorption is significant because of the huge surface area. (3) Toxicity is decrease and offers precise magnetic strength, and (4) metal-weighted down sorbents conveniently separate from processed wastewater via an external magnetic field. However, water pollution are ordinarily non-magnetic. Therefore, it's far most efficient that the magnetic nanoparticles blend at the side of the pollution competently, and captured cautiously with pollution because of their maximum ferromagnetism.

REFERENCE

- Ambashta, R. D., & Sillanpää, M. (2010). Water purification using magnetic assistance: A review. In *Journal of Hazardous Materials* (Vol. 180, Issues 1–3, pp. 38–49).
- [2] https://doi.org/10.1016/j.jhazmat.2010.04.105
- [3] Amin, M. T., Alazba, A. A., & Manzoor, U. (2014). A review of removal of pollutants from water/wastewater using different types of nanomaterials. In *Advances in Materials Science and Engineering* (Vol. 2014). Hindawi Publishing Corporation. https://doi.org/10.1155/2014/825910
- [4] Boparai, H. K., Joseph, M., & O'Carroll, D. M. (2011). Kinetics and thermodynamics of cadmium ion removal by adsorption onto nano zerovalent iron particles. *Journal of Hazardous Materials*, 186(1), 458–465. https://doi.org/10.1016/j.jhazmat.2010.11.029
- [5] Cadmium in Drinking-water Background document for development of WHO Guidelines for Drinkingwater Quality. (2011).
- [6] Dąbrowski, A., Hubicki, Z., Podkościelny, P., & Robens, E. (2004). Selective removal of the heavy metal ions from waters and industrial wastewaters by ion-exchange method. In *Chemosphere* (Vol. 56, Issue 2, pp. 91–106). Elsevier Ltd. https://doi.org/10.1016/j.chemosphere.2004.03.006
- [7] Demirbas, A. (2008). Heavy metal adsorption onto agro-based waste materials: A review. In *Journal of Hazardous Materials* (Vol. 157, Issues 2–3, pp. 220–229). https://doi.org/10.1016/j.jhazmat.2008.01.024
- [8] Heavy metal in drinking water its effect on human health and its treatment techniques a review. (2018). International Journal of Biosciences (IJB), 12(4), 223–240. https://doi.org/10.12692/ijb/12.4.223-240
- [9] Jobby, R., Jha, P., Yadav, A. K., & Desai, N. (2018). Biosorption and biotransformation of hexavalent chromium [Cr(VI)]: A comprehensive review. In *Chemosphere* (Vol. 207, pp. 255–266). Elsevier Ltd. https://doi.org/10.1016/j.chemosphere.2018.05.050
- [10] Khan, A., Khan, S., Khan, M. A., Qamar, Z., & Waqas, M. (2015). The uptake and bioaccumulation of heavy metals by food plants, their effects on plants nutrients, and associated health risk: a review. *Environmental Science and Pollution Research*, 22(18), 13772–13799. https://doi.org/10.1007/s11356-015-4881-0
- [11] Leta, S. (2017). Chemical precipitation method for chromium removal and its recovery from tannery wastewater in Ethiopia. https://www.researchgate.net/publication/316601925
- [12] Mercury in Drinking-water Background document for development of WHO Guidelines for Drinkingwater Quality. (2005).
- [13] Moreno-Piraján, J. C., & Giraldo, L. (n.d.). *Heavy Metal Ions Adsorption from Wastewater Using Activated Carbon from Orange Peel*. http://www.ejchem.net

- [14] Ramos, R. L., Bernal Jacome, L. A., Mendoza Barron, J., Rubio, L. F., & Guerrero Coronado, R. M. (2002). Adsorption of zinc(II) from an aqueous solution onto activated carbon. In *Journal of Hazardous Materials* (Vol. 90).
- [15] Ruthiraan, M., Mubarak, N. M., Abdullah, E. C., Khalid, M., Nizamuddin, S., Walvekar, R., & Karri, R. R. (2019). An Overview of Magnetic Material: Preparation and Adsorption Removal of Heavy Metals from Wastewater. In *Nanotechnology in the Life Sciences* (pp. 131–159). Springer Science and Business Media B.V. https://doi.org/10.1007/978-3-030-16439-3_8
- [16] Sharma, M., Kalita, P., Senapati, K. K., & Garg, A. (2018). Study on Magnetic Materials for Removal of Water Pollutants. In *Emerging Pollutants - Some Strategies for the Quality Preservation of Our Environment*. InTech. https://doi.org/10.5772/intechopen.75700
- [17] Tamjidi, S., Esmaeili, H., & Kamyab Moghadas, B. (2019). Application of magnetic adsorbents for removal of heavy metals from wastewater: A review study. In *Materials Research Express* (Vol. 6, Issue 10). Institute of Physics Publishing. https://doi.org/10.1088/2053-1591/ab3ffb
- [18] Ungureanu, G., Santos, S., Boaventura, R., & Botelho, C. (2015). Arsenic and antimony in water and wastewater: Overview of removal techniques with special reference to latest advances in adsorption. In *Journal of Environmental Management* (Vol. 151, pp. 326–342). Academic Press. https://doi.org/10.1016/j.jenvman.2014.12.051
- [19] Unuabonah, E. I., & Taubert, A. (2014). Clay-polymer nanocomposites (CPNs): Adsorbents of the future for water treatment. In *Applied Clay Science* (Vol. 99, pp. 83–92). Elsevier Ltd. https://doi.org/10.1016/j.clay.2014.06.016
- [20] Wang, J., & Chen, C. (2009). Biosorbents for heavy metals removal and their future. In *Biotechnology Advances* (Vol. 27, Issue 2, pp. 195–226). https://doi.org/10.1016/j.biotechadv.2008.11.002

SCIENCE OF ENVIRONMENT

DR. WASUDEO B. GURNULE



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Chapter 3

ETHNOMEDICINAL & AGRO-ECOLOGICAL PRACTICES IN CROP-PEST & DISEASE MANAGEMENT

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ABSTRACT

Modern agricultural and farming practices have exponentially increased crop yield, variety and availability almost year-round contributing to the growth of economy and country. However, over time, indiscriminate and excessive use of chemical fertilizers and pesticides have also led to the degradation of soil fertility, ecology, human and animal health. High input and maintenance in machine farming. CTOD failures, resistance of insects-pests/diseases to synthetic pesticides/microbicides, deteriorating soil and environment etc. further increased difficulties in agriculture sector especially for low-income group/small land holders. Rural and Tribal communities, with their limited natural resources, traditionally passed down certain crop pest & disease management practices and seed preservation techniques using wild/local medicinal plants or plantproducts which may provide an alternative to toxic synthetic pesticides/herbicides, and favour sustainable, eco-friendly agro-ecological practices maintaining biodiversity. Identification and validation of such indigenous practices and processes could provide a sustainable solution to present day crisis and potentially benefit wider farming communities. In this chapter, ethnomedicinal and agro ecological practices used for crop pest and disease management, particularly in rural and tribal parts of Eastern Vidarbha (Maharashtra), are discussed.

KEYWORDS: Ethnomedicine, Agriculture, Pesticides, Phytochemicals, Biodiversity.

INTRODUCTION

In India, on an average a farmer holds a small agriculture land (about 1 hectares) and the small land holders cultivate about 83 percent of total landholdings. However, its contribution to GDP has declined from 51% to 16% since 1951 to present day although dependency on agriculture has increased from 70 million households to 120 million households (Down to Earth, 2021; Chandra Babu & Joshi, 2019). Since the green revolution

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agriculture was on the path of fast paced modernization in India including use of machinebased sowing-to-processing processes, irrigation systems, chemical fertilizers, pesticides, herbicides, etc. This had positive impact on the growth of economy and food security of our country, however, concurrently affected the traditional farming practices negatively (John & Babu, 2021). Furthermore, overuse of chemical fertilizers and pesticides rendered soil & environment heavily polluted creating numerous health hazards to plants, humans & animals, alike. Modern agricultural practices, having high maintenance cost cumulated with crop damage due to pests and diseases, emergence of pest/disease-resistance, became nonsustainable overtime especially to small scale farmers leading to migration to other jobs and even to extremes such as suicides. The rural and tribal farmers, still practicing traditional agriculture, have potentially sustained with some locally adapted ingenious low input low risk agricultural practices not only addressing agro-biodiversity but the food security of local community. Such practices may include but not limited to seed preservation, use of ethnomedicinal formulations against pests and diseases and various agro ecological methods. The identification and evaluation of such ingenious practices could potentially benefit a large section of farmers especially the small land holders. Also, this could potentially add new climate specific, soil specific crop varieties (seed/gene pool) to existing knowledge.

ETHNOMEDICINAL PRACTICES IN OTHER COUNTRIES

Several of the published studies report the uses of various local or wild medicinal plants by ethnic groups and their formulations against agriculture pests and diseases as general remedy. Kamanula et. al., (2010, 2011) report on pesticidal plants for stored maize and beans and as ethno-veterinary product against ticks (Southern Africa) especially the high potential of Tephrosia vogelii, also known as fish-poison-bean is a herb/small tree native to tropical Africa & tropical America is also used to improve soil nutrition (30% increase) and 23-26% higher crop yield (Bucagu, et. al., 2013). Nyahangare et. al. (2015) reports from Zimbabwe on some ethnoveterinary plants against ecto-parasites such as Cissus quadrangularis, Lippia javanica, Psydrax livida and Aloe sp. Guimaraes et. al., (2006) report on control of pests by peasant farmers in Brazil using pest-repellent plant marigold (Tagetes minuta) while laboratory experiments supporting the above findings that T. minuta extracts significantly controlling or inducing mortality in Sitophilus spp. and termites (Termitidae) (Santa Cecilia & Rossi, 1991, Cosmas, et. al. 2012). Hikal et. al. (2017), has extensively reviewed various botanical extracts as insecticides and their physiological effects against several pests. It reports the various botanical extracts as having insect-repellent or cidal, as antifeedants, ovicides or oviposition inhibitors and interfering with physiology of insects. Several of the plants described having repellent activity included Ziziphora tenuiore, Myrtus communis, Achillea wilhelmsii, M. piperita and Zanthoxylum species, etc, while some plants described as

having antifeedants or toxic activity against pests were M. alternifolia, Neem (Azadirachta indica), Thymus vulgaris, etc.

ETHNOMEDICINAL PRACTICES IN INDIA

In India, it's a general observation as well as profoundly published in literature that the rural and tribal communities have a rich traditional ethnomedicinal knowledge passed down from generations as well as peri-urban farmers also use or adapt certain ethnomedicinal practices for crop pest/disease management. However, several of these publications were concerned with the phytotaxonomic evaluation of plants and/or treatment of ailments or diseases of mankind while some for veterinary use. There have been few attempts to collect ethnomedicinal information on plants or their formulations used against crop pests and diseases by ethnic communities in India. (Kumar, et al., 2009, review). In Maharashtra state, Gupta, et. al., (2010), Kamble et. al., (2010) and Dhale (2013), have reported tribal communities' (Gond, Bhill) usage of ethnomedicinal formulations as insect repellent, insecticides against animal/crop pests.

In the state of Maharashtra, particularly the eastern parts of Vidarbha region, that includes districts of Gondia, Bhandara, Gadchiroli, and Chandrapur, is a hotspot of biodiversity having huge forest cover, national parks, wildlife sanctuaries, rivers, ponds, natural dams and diverse wildlife flora and fauna, with various indigenous communities carrying a wealth of traditional knowledge.

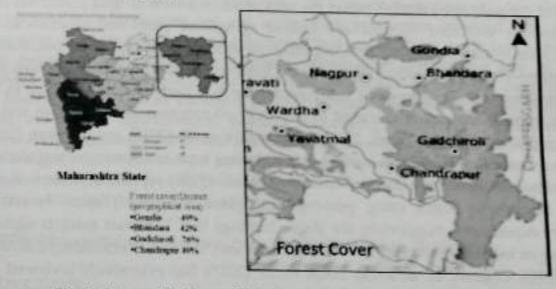


Fig. 1: Geographical area of Eastern Maharashtra with Forest Cover

Several ethnobotanical surveys have been conducted in this Eastern part of Maharashtra to explore the vast reserve of flora and fauna as well as to collect the ethnomedicinal information from the rural and tribal communities (Gond, Madia, Gowari, Rajgond, Halba,

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Gawali, Pradhan, etc.). However, reports on their ethnomedicinal and agroecological practices crop pest and disease management are scarce.

Some of the ethnomedicinal and ethnoveterinary plants and formulations reported from eastern Maharashtra region are summarized in Table 1.

Koche et. al. (2008)	Nagzira wildlife sanctuary, Gondia	70 plants (32 families), ethnomedicinal use for human diseases
Kulkarni et. al. (2009)		Review, Nerium and Argemone plant extracts against pests of Cotton, tomato, pigeonpea
Cherian & Ramteke (2009)	Gondia district	13 species of pteridophytes (Ethnomedicinal ferns) used for human ailments
Gupta et. al. (2010) (2007-2008 survey)	Bhandara district	Plants used by Gond tribe; 53 plants species used for diarrhoea to skin diseases
Harney (2013)	Chandrapur	62 plants reported for ethnomedicinal use for human diseases
Bakare (2014)	Chandrapur	48 plants species for human diseases
Gadpayle et. al. (2014)	Bhandara District	Ethnoveterinary practices, 41 plant species recorded
Wadekar & Tondare (2015)	Gadchiroli	23 plants species of Asteraceae, used for human diseases
Tiwari (2017)	Gadchiroli	Ethnomedicinal uses were corroborated with chemical and biological activities available in published literature
Shambharkar & Gogle (2017)	Gadchiroli	Ethnomedicinal plants for cancer
Sushil kumar (2020)	E Ratio	Neem oil as insecticide & biopesticide in brinjal crops
Mishra et. al., (2021) Plants as insecticides & pesticides	Gadchiroli	plants belonged to 30 families and 57 genera of the angiosperms used against 34 ailments

Table 1: Some Ethnomedicinal & Agro-veterinary Practices in Eastern Maharashtra

THE ETHNOMEDICINAL FORMULATIONS

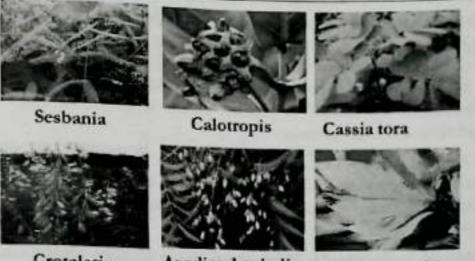
The ethnomedicinal formulations are made using wild or locally available medicinal plants, weeds, herbs or trees. The ethnomedicinal formulation vary depending upon the geographical area, type of pest, availability of plants and season, ease of usage etc. The parts of plants used in such ethnomedicinal formulations may include whole plant (small plants or all distinct parts of a large plant), aerial parts or stem, swollen part on stem, climber, bark, gum, latex, flowers, pods, fruits, rind/peel, seeds, roots, rhizomes or bulbs. A formulation may have one or many parts of the same plant or a combination of different parts of various plants as ingredients.

The ethnomedicinal formulation used are mostly in the form of liquid extracts made by crushing of plant parts and mixing in water to be used directly or after a brief period of fermentation. Such preparation may be sprayed on standing crops against aerial pests or mixed in soil or seeds to prevent attack of soil insects. The dried powder of some ethnomedicinal formulations (usually made of leaves) are used against stored crop-pests. The following table summarizes some of the common ethnomedicinal preparations used against insect pest diseases in Gondia-Bhandara region (Table 2).

Ethnomedicinal plants/ formulation	Process/Preparation	Practice/Intended Usage	
Neem leaves, neem oil, (Azadirachta indica)	Spray on crops, soil (neem cake)	Nutrition and pest-control	
Garadi leaves (Cleistanthus collinus)	Spray on crops	Anti-insecticide preparation, anti- bacterial/fungal (Karpa/blast of rice disease by <i>Pirricularia oryzoae</i>)	
Neem leaves, Flax seeds, asofoetida mixture	Crushed, mixed and water extract made	Chili, brinjal and other plant roots dipped in extract during replantation from nursery bed, anti-rot, anti- fungal, anti-parasitic activity	
Compost plus Pig manure	Mixed manure	Soil nutrition enhancement and crop disease prevention	
Charota (Cassia tora), Dhaincha (Sesbania bispinosa) Sutari (Calotropis), San boru (Crotalaria), Ambada (Hibiscus canabinus)	green compost	Soil/crop nutrition and crop pest inhibition (soil insects/root borer/termites)	

Table 2: Some Common Ethnomedicinal Formulation against Insect Pests.

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Crotalaria

Azadirachta indica Hibiscus canabinus

Fig. 2: A Collage of Locally Available Ethnomedicinal Plants used for Insect Pest Control in Gondia-Bhandara Region.

THE ETHNOMEDICINAL PHYTO-CONSTITUENTS

The plants synthesize a large number of primary and secondary metabolites commonly termed as phytochemicals. A large number of the secondary metabolites have been isolated and identified from different plants and found to exert a wide range of physio-chemical properties. The secondary metabolites may be the phytochemical signature of a plant species and may or may not be present in another plant. The secondary compounds and their derivatives were used and explored as potential anti-oxidant, anti-microbial, antiinsecticidal, anti-cancer, anti-inflammatory, stimulant. Irritant, repellent, drug, and so on. In traditional system of medicine, rural and tribal communities through generations of trial and error, without access to modern tools of phytochemical analysis, have accumulated wealth of information regarding potential biological properties and usage of wild and local medicinal plants/weeds/herbs against various human, animal diseases and insect pests and diseases of crops.

The active components present in the formulations for ethnomedicinal or agro-veterinary usage (liquid, powder or fumigant) are the phytochemicals of the plant parts used as ingredient and various by-products or chemical derivatives formed during preparation and may change over standing/fermentation period. Thus, the potency of a preparation depends upon the active ingredients (phytochemicals and derivatives), processing method and storage time.

The major types of phytochemicals especially the secondary metabolites shown to exert various physio-chemical effects are describes as follows.

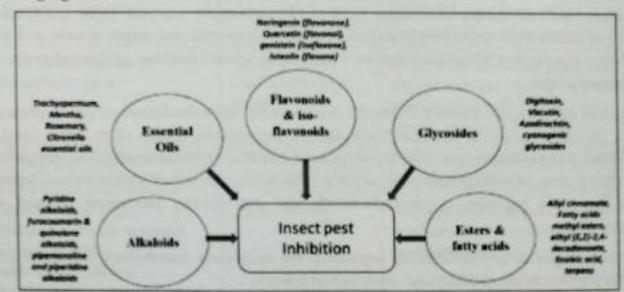
i) Essential Oils: These are concentrated aromatic, volatile liquid (oil) extracts from plants derived through steam distillation. Essential oils extracted from a variety of aromatic herbs have been shown to possess insect- repellent, insecticidal, anti-nutritional property and interfering to insect reproduction. In rural settings, essential oil extraction is not practices, however, herbs/bushes are burned to produce aroma & smoke as insect repellent or insecticide against certain insect pests.

ii) Alkaloids: Alkaloids are one the most important group of secondary metabolites that are synthesized by plants as defense against plant pathogens and herbivores Alkaloids, besides other physiological effects in humans and animals have shown to exert potent insecticidal or inhibitory activity.

iii) Flavonoids and isoflavonoids: These are a group of plant phytochemicals having variable phenolic structures. These have been well studied for their health benefits in humans and animals. These group of phytochemicals have been found to inhibit several key enzymes thereby preventing growth of larvae of several insect species.

iv) Glycosides: Glycosides are natural compounds having sugars attached to another group of phytochemicals like flavonoids, terpenes, etc. Glycosides play important role as plant defense molecules and have been shown to exert potent-insect inhibitory properties.

v) Esters and fatty acids: fatty acids are organic compounds containing long hydrocarbon chain with carboxylic acid group at end that reacts with different alcohols to form esters. Some fatty acids and esters have been shown to possess insecticidal properties.



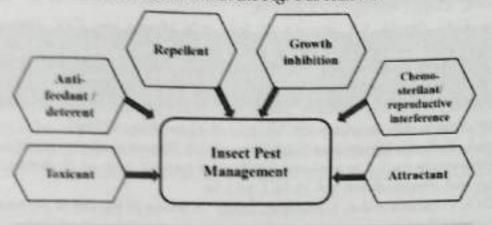
The plant phytochemicals as an active component against insect pests are shown in the following figure 3.

Fig. 3: Phytoconstituents of plants with insect pest inhibitory properties

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The active phyto-components present in the ethnomedicinal formulations have a wide variety of physiological effects on the insect including modification of feeding behaviour, metabolism and reproduction. Some of the insect inhibition processes or effects of ethnomedicinal formulations are shown in the Fig. 4 as follows.



Physiological effects/processes effecting insect pest inhibition

Fig. 4: Insect Inhibition Processes/ Effects of Ethnomedicinal Formulations.

CONCLUSION

The phytochemicals with insect inhibition properties are the natural, biodegradable, minimally toxic, cheaper and potently active alternatives to chemically synthesized insecticides. Moreover, due to local availability of several of such plant species, and based on ethnomedicinal knowledge of rural and tribal communities which have been using insect pest inhibitory formulations since generations, these offer a safe alternative to toxic chemicals in sustainable way. We recommend that such potential insecticidal/inhibitory formulations should be identified and more research is needed to ascertain their insecticidal effects in crude formulations for the wider benefit of farming community.

REFERENCES

- [1] Bucagu C., B. Vanlauwe, K.E. Giller, (2013) "Managing Tephrosia mulch and fertilizer to enhance coffee productivity on smallholder farms in the Eastern African Highlands," European Journal of Agronomy, vol. 48, pp. 19-29.
- [2] Cosmas P., G. Christopher, K. Charles, K. Friday, M. Ronald and M. Belta, (2012) "Tagetes minuta formulation effect Sitophilus zeamais (Weevils) control in stored maize grain,"International Journal of Plant Research, vol. 2. no.3, pp. 65-68.
- [3] Dhale D.A., (2013) "Plants Used for insect and pest control. In North Maharashtra, India," The Journal of Ethnobiology and Traditional Medicine. Photon vol. 118, pp. 379-388.
- [4] Gadpayale J.V. and D.P. Khobragade, (2014) "Traditional ethno-veterinary practices in Bhandara district (M.S.) India," International Journal of Sciences & Applied Research, vol. 1, no 2, pp. 91-99.

SCIENCE OF ENVIRONMENT - I

- [5] Guimarães A. and J. Mourão (2006) "Management of plant species for controlling pests, by peasant farmers at Lagoa Seca, Paraiba state, Brazil: an ethnoecological approach," Journal of ethnobiology and ethnomedicine, vol.2, pp.42.
- [6] Hikal W. M., R. S. Baeshen, and H.A.H. Said, (2017) "Botanical insecticide as simple extractives for pest control," Cogent Biology, vol.3, pp.1-16.
- [7] Kamanula J., G.W. Sileshi, S.R. Belmain, P. Sola, B.M. Mvumi and GKC Nyirenda, (2010). "Farmers' insect pest management practices and pesticidal plant use in the protection of stored maize and beans in Southern Africa," *International Journal of Pest Management*, vol. 57, no. 1, pp. 41-49.
- [8] Kulkarni J., N. Kapse and D.K. Kulkarni, (2009) "Plant based pesticides for control of Helicoverpa armigera on Cucumis sativus," Asian Agri History, vol. 13, no. 4, pp. 327-332
- [9] Nyahangare E. T., B. M. Mvumi and T. Mutibvu, (2015) "Ethnoveterinary plants and practices used for ecto-parasite control in semi-arid smallholder farming areas of Zimbabwe," Journal of ethnobiology and ethnomedicine, vol. 11, no 1, pp.1-16.
- [10] Odeyemi O.O., P. Masika and A. J. Afolayan, (2008) "A review of the use of phytochemicals for insect pest control,"

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Advances in Material Science Characterization and Application



Dr. Ramesh B. Bhise Dr. Mahendra S. Shinde Dr. Vishal H. Goswami



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Advances in Material Science



Chapter: 13

Structural, Morphological, Magnetic, Electrical Study of Ni-Zn Spinel Ferrite Synthesized by Sol-Gel Route.

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Abstract: $Ni_{0.43}Zn_{0.33}Fe_2O_4$ spinel ferrite was prepared by using sol-gel auto combustion route. The sample were characterize with XRD, FE-SEM, TEM, Magnetic, Electrical and optical properties. Particle size, lattice constant, porosity, induced lattice strain, X-ray density, Bulk density were calculated. Particle size of synthesized sample is 18.09 nm confirmed from SEM images. A slight agglomeration is observed in SEM image. The saturation magnetization, remenance, anisotropy constant (K) and Coercivity (Hc) of the NiZn ferrite sample were determined from vibrating sample magnetometer study. The dielectric loss tangent and dielectric constant of ferrites sample have been investigated in the high-frequency range 1000H_z –1 MH_z.

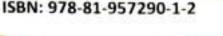
Keywords: Spinel ferrite, Magnetic material, XRD, FESEM, TEM.

I. Introduction

Nickel zinc ferrites are scientifically important class of soft magnetic materials for their widespread industrial applications, ranging from microwave to radio frequencies such as microwave devices, computer memories, and magnetic recording [1]. During the last few decades, ferrites have achieved very much importance within the family of magnetic materials because of their excellent physical properties. In all TV sets have ferrite cores, while in portable radios make use of a pencil of ferrite as an antenna core. Long-distance carrier telephone circuits are employing ferrite cores in high-quality filter coils and transformers. The various properties of nano-crystalline ferrites were highly influenced by the cations distribution among the sublattices, nature of the grain, grain boundaries, in homogeneities, voids, surface layers, contacts, etc. [2]. One of the important characteristics of ferrites is their high values of resistivity and lowest eddy current losses [3], which make them ideal for high-frequency applications. For microwave applications, dielectric properties such as dielectric loss and dielectric constant are very important as the dielectric constant affects the thickness of the microwave absorbing layer and the dielectric loss factor (tanb) of a material determines dissipation of the electrical energy. There are so many researchers who studied the magnetic properties of Ni-Zn ferrites but nonmagnetic properties such as dielectric properties and electrical conductivity are seldom reported.

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In this work, a chemical route technique has been selected for the synthesis of Ni_{0.65}Zn_{0.35}Fe₂O₄ nanoparticles. The various techniques such as XRD, FE-SEM, Magnetic and dielectric measurements have been used to study their structural, electrical and magnetic properties [4].

II. Experimental Procedure

Ni–Zn ferrite powders with compositions of Ni_{0.65}Zn_{0.35}Fe₂O₄ was synthesized by sol–gel auto combustion method. The analytical grade Fe(NO₃)₃·9H₂O, Zn(NO₃)₂·6H₂O, Ni(NO₃)₂·6H₂O and citric acid (C₆H₈O₇·H₂O) was used as raw materials. The appropriate amount of nitrates and citric acid is first dissolved into deionized water to form a mixed solution with molar ratio of nitrates to citric acid 1:1. The pH value of solution is adjusted to about 7 using ammonia. Then, the mixed solution is poured into a bicker and heated at 80 °C. The appropriate amount of nitrates and citric acid is first dissolved into deionized water to form a mixed solution with molar ratio of nitrates to citric acid 1:1 and constant stirring with magnetic needle transform into a dried gel. Being ignited, the dried gel burnt and form loose powder. The solutions were evaporated by continuous heating at 100 °C with agitation until the formation of viscous gel [5]. The detail process is as shown in Fig. 1 [6]. The samples are dried and the dried powders were sintered in air furnace at 700 °C for 7 hrs. Then slowly cooled to the room temperature. Finally, the sintered powder was ground using the mortar and pestle. The equation used for calculating the stoichiometric values of the metal nitrates is as follows:

 $\begin{array}{l} 0.65[Ni(NO_3)_2.6H_2O] + 0.35[Zn(NO_3)_2.6H_2O] + 2[Fe(NO_3)_3.9H_2O] = Ni_{0.65}Zn_{0.35}Fe_2O_4 + H_2O_5 + Volatile \\ \end{array}$

The Structure, microstructure and the chemical composition of the samples are investigated by X-ray diffraction using Cu K_a (λ =1.5406 Å), scanning electron microscopy (FESEM) and TEM. The values of the coercive fields, saturation and remnant magnetizations are obtained from the hysteresis loops obtained from a vibrating sample magnetometer (VSM). The dielectric properties of Ni_{0.65}Zn_{0.35}Fe₂O₄ferrites were studied using impedance analyzer [Wayne Kerr, 6500 measured in the temperature range from 30K to 673K. The dielectric, AC conductivity and impedance spectroscopy measurements were carried out in the frequency range 1000Hz-1MHz and in the temperature range of 303K to 673K.

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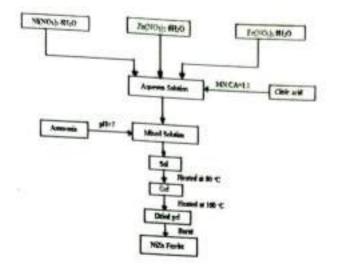


Fig.1 sol-gel method for the synthesis of Nin45Znn35Fe2O4 spinel ferrite.

III. RESULTS AND DISCUSSION

1. XRD Study

The XRD pattern of the samples under investigation is shown in Fig. 2. Higher intensity peaks in pattern show the peaks which are indexed corresponding to (220), (311), (222), (400), (422), (511) and (440). All XRD patterns show the single phase structure of the Ni-Zn spinel nanoferrites. These spectra were confirmed from JCPDS card no's 008-0234. The crystallite size is estimated by using the Debey Scherrer's formula [7, 8].

$$D = \frac{0.9\,\lambda}{\beta\cos\theta} \tag{1}$$

Where D is the particle size, β is the full-width at half-maximum; λ is the wavelength of x-ray (1.5406Å); and 0 the angle of diffraction. The particle size for this sample obtained is 18.09 nm. The x- ray density of the samples is calculated by relation

$$\rho_x = \frac{8M}{Na3}$$
(2)

Where M is the molecular weight of the sample, N the Avogadro's number and a^3 the volume of the cubic unit cell. The measured density is calculated by using relation,

$$\rho_{\rm m} = \frac{m}{\pi r^2 t} \tag{3}$$

Induced strain in the NiZn ferrite was calculated from Williamson -Hall method [9].

$$\beta \cos \theta = 4\epsilon \sin \theta + \lambda D$$
 (4)

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Where D is particle size, λ is wavelength of X-ray, β is FWHM measure in radian, ε is the induced lattice strain and θ is the Bragg angle. The induced lattice strain obtained using above formula is shown in table 1.

Table 1. Shows the structural parameters

a(Å)	Particle size(nm)	Grain size (nm)	Dx (gm/cm ³)	Porosity	Strain %
8.410	18.09	31.4	5.20	0.494	0.145
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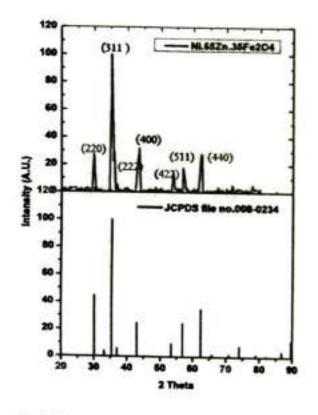


Fig.2 Shows the XRD pattern of Nin45Znn35Fe2O4 spinel ferrite.

2. SEM and TEM study

The microstructure of the studied ferrite samples is analyzed using SEM micrographs as shown in Fig. 3. The micrographs show the agglomerated grainy structure [10]. Nanosized of the particle is confirmed from SEM and TEM images. The SEM image revealed that the grains have an almost regular shape and homogeneous distribution. Advances in Material Science





Fig. 3 SEM micrograph of Nia sta Zna 33 Fe2O4 spinel ferrite.

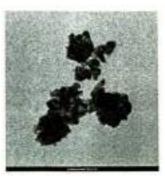


Fig. 4 TEM micrograph of NingsZnn35Fe2O4 spinel ferrite.

3. Magnetic Properties

The Room temperature hysteresis loops of Ni_{0.65}Zn_{0.35}Fe₂O₄ nanoferrites are recorded under the maximum applied field of 15000 Gauss. The magnetic loops as shown in the Fig. 4. Table.2 depicts the magnetic parameters which are calculated from M-H loops. The saturation magnetization and magnetic remanence decreases with the Gd substitution and also the coercivity decreased accordingly [11]. It is noticed that the magnetic parameters are influenced by the extrinsic factors such as porosity, homogeneity, morphology, density and distribution of cations at lattice [12]. The Bohr magneton, magneto crystalline anisotropy constant (K) and initial permeability are also calculated using the following relations [13].

Anisotropy constant (K) =
$$\frac{H_c \times M_s}{0.96}$$
 (5)

Initial Permeability (
$$\mu_i$$
) = Ms²× $\frac{D}{\kappa}$ (6)

Bohr magneton(
$$\mu_B$$
) = $\frac{M \times M_s}{5585}$ (7)

Where, M_s is the saturation magnetization, M is the molecular weight of the samples, D is the grain size and H_c is the coercivity. Table 2 shows the magnetic parameters of the sample.

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Mr (emu/ g)	Ms (emu/g)	Mr/ Ms	Bohr Magneton (µB)	He (Oe)	Anisotropy Const.(erg/Oe)	Initial Permeability(µ;)
6.119	42.98	0.142 3	1.821	168.62	7549.25	4,4265

Table 2: magnetic parameters of Nie as Zna 35 Fe2O4 ferrite.

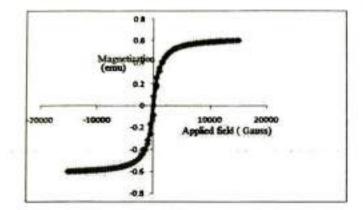


Fig. 5 Variation of saturation magnetization of NinssZnn35Fe2O4

4. Electrical Properties

The variations in the conductivity may be explained by Verwey's hopping mechanism According to Verwey, the electrical conductivity in ferrites is mainly due to hopping electron between ions of the same element present in more than one valance state and distributed randomly over crystallographically equivalent lattice sites [14]. Ferrite structurally from cubic close packed oxygen lattice with the cation at the octahedral [B] and the tetrahedral (A) sites. The distance between two metal ions on [B] sites smaller than the distance between two metals ions on [B] and (A) site, therefore the hopping between A and B has very small probability compared with that for [B]-[B] hopping. The hopping between (A)-(A) sites does not exist, because there are only Fe3+ ions at A sites and any Fe2+ ions formed during processing preferentially occupy [B] sites only [15]. The temperature dependence of σ_{AC} shown in Figure 6, as the temperature increases, σ_{AC} is also increases indicating that the studied samples have the semiconductor behaviour. This behaviour was observed earlier for Mn-Zn ferrites [16]. The increase in the electrical conductivity as temperature increases may be related to the increase in drift mobility of the thermally activated charge carriers (electron and hole) according to hopping conduction mechanism. The important dielectric and electrical parameters were determined using the following formulas:

$$\mathcal{E}' = \frac{Cp}{Co} \tag{8}$$

$$\mathcal{E}'' = \frac{1}{2\pi f CoRp} \tag{9}$$

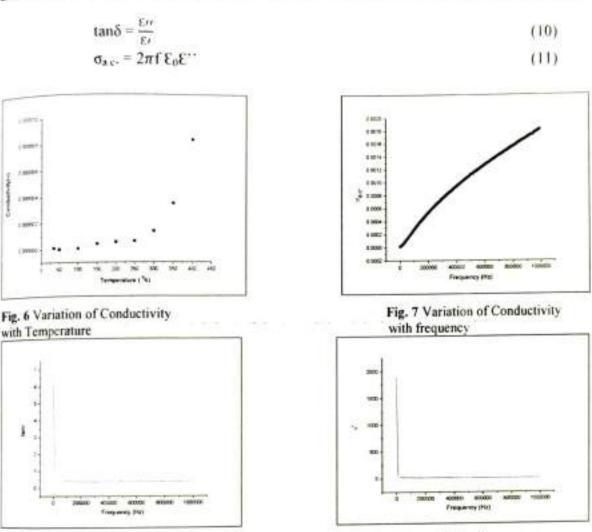
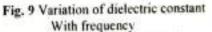


Fig. 8 Variation of tand with frequency



Where, C₀ represents capacitance without the sample in between the parallel electrodes, f is the frequency of the applied field and ε_0 represents the permittivity of vacuum equal to 8.85×10^{-14} F/cm [17]. Spinel Ni-Zn ferrites are considered good dielectric materials and the high frequency dielectric behaviour is mainly dependent upon the particle size and method of synthesis of nano particles [18]. Dielectric parameters (real and imaginary parts of relative permittivity, dielectric loss tangent) for the prepared sample Ni_{0.65}Zn_{0.35}Fe₂O₄ have been studied in the frequency range 1000 Hz to 1MHz at room temperature. The effect of frequency (Hz) on dielectric loss factor tan δ and each of the real dielectric constant ε ' at room temperatures is illustrated in figures 8 and 9 respectively. Both ε ' and tan δ decreases as the frequency increases, this is the normal dielectric behaviour in ferrites. The decrease is rapid at lower frequencies and becomes slow at higher frequencies. The decrease in ε ' and tan δ takes place when the jumping frequency of electric charge carriers cannot follow the alternation of applied AC electric field beyond a certain critical frequency [19,20]. The high values of ε ' could be explained on the basis of Maxwell-Wagner theory which is a result of the inhomogeneous nature of dielectric structure [21].

IV. Conclusion

The sol-gel auto combustion method is very convenient for synthesis of nano-sized Ni-Zn spinel ferrites. In this method gel exhibits a self-propagating behaviour after ignition in air. XRD and SEM micrographs confirm crystalline nature of synthesized sample and confirmed the nanoparticle size of the sample. The sintered Ni-Zn ferrites samples possess fine-grained microstructures as well as good electromagnetic properties, making them good materials for electronic applications with high performance and low cost. Zn content has significant influence on the electromagnetic properties, such as dielectric constant, dielectric loss tangent and magnetic properties for Ni-Zn ferrites.

REFERENCES

- 1. E.C. Snelling, Soft Ferrites; Properties and their Application, Butterworth, London, 1988.
- M. Hashima, Alimuddina, S. Kumar, S. Ali, B.H. Koob, H. Chung, R. Kumar, J. of Alloys and Compounds, 511 (2012) pp. 107-114.
- 3. Y. Yamamoto, A. Makino, J. Magn. Magn. Mater, 133 (1994) pp.500-503.
- M. Naeem, N. Abbas Shah, I.H. Gul, A. Maqsood, J. of Alloys and Compounds, 487 (2009) pp. 739-743.
- N. A. Majid and A. K. Muhammad, Effect of rare earth doping on the structural and magnetic features of nanocrystalline spinel ferrites prepared via sol gel route, Journal of Magnetism and Magnetic Materials, 2018, 460 (15) (2018), pp. 268-277.
- D.L. Chaudhari, D.S. Choudhary, K.G. Rewatkar: Spinel ferrite nanoparticles: synthesis, characterization and applications. IJTSRD (2020) 4(3), pp. 973-978.
- A.K. Nandanwar, D.L. Chaodhary, S.N. Kamde, D.S. Choudhary K.G. Rewatkar, Study of structural and magnetic properties of Zinc-Substituted Cadmium ferrite nanocrystals, materials today proceeding, 29 (3) (2020), pp. 951-955.
- D.L. Chaudhari, A.M. Shahare, A.K. Nandanwar, D.S. Choudhary, K.G. Rewatkar (2021) Synthesis, Structural and Magnetic Properties of Gadolinium-Doped Ni-Zn Ferrites Synthesized by Sol-Gel Auto-Combustion Route. In: Patnaik A., Kozeschnik E., Kukshal V. (eds) Advances in Materials Processing and Manufacturing Applications. iCADMA 2020. Lecture Notes in Mechanical Engineering. Springer, Singapore. https://doi.org/10.1007/978-981-16-0909-1_49

Advances in Material Science

- 9. B. Kaur, M. Arora, A. Shankar, A. K. Srivastava and R. P. Pant, "Induced size effects of Gd³⁺ ions doping on structural and magnetic properties of Ni-Zn ferrite nanoparticles," Adv. Mater. Lett., 3 (5) (2012), pp. 399–405.
- 10. S. E. Shirsath, B.G. Toksha, K.M. Jadhav, Structural and magnetic properties of In³⁺ substituted NiFe₂O₄, Materials Chemistry and Physics, 117 (2009) pp. 163–168.
- 11. M. M. Eltabey, K. M. El-Shokrofy and S. A. Gharbia, "Enhancement of the magnetic properties of Ni-Cu-Zn ferrites by the non-magnetic Al³⁺-ions substitution (2011)," J. Alloys Compd., 509 (5) (2011), pp. 2473–2477.
- M. N. Akhtar, A. Rahman, A. B. Sulong and M. A. Khan, "Structural, spectral, dielectric and magnetic properties of Ni_{0.5}Mg_xZn_{0.5-x}Fe₂O₄ nanosized ferrites for microwave absorption and high frequency applications," *Ceram. Int.*, 43 (5) (2017), pp. 4357–4365.
- Sun Ge-Liang, Li Jian-Bao, Sun Jing-Jing, Yang Xiao-Zhan, The influences of Zn^{2*} and some rare-earth ions on the magnetic properties of nickel-zinc ferrites, Journal of Magnetism and Magnetic Materials, 281 (2004) pp. 173-177.
- 14. E. J. W. Verwey and J. H. D. Boer, Rec. Thav. Chim. Phys-Beas. 55, 370 (1935).
- 15. Z. Z". Lazarevic', C".E. Jovalekic', D. L. Sekulic', A. Milutinovic', Balos" S., M." Slankamenac, N. Z". Rome"evic', Structural, electrical and dielectric properties of spinel nickel ferrite prepared by soft mechanochemical synthesis, Materials Research Bulletin, 48 (2013), pp. 4368–4378.
- 16. P.V. Reddy, R. Satayanarayana, T.S. Rao, Phys. Stat. Sol. (a), 78 (1983) 109.
- A.M. Abdeen, Dielectric behaviour in Ni-Zn ferrites, Journal of Magnetism and Magnetic Materials, 192 (1999), pp.121-129.
- 18. E. Pervaiz and I. H. Gul, Influence of Rare Earth (Gd³⁺) on Structural, Gigahertz Dielectric and Magnetic Studies of Cobalt ferrite, Journal of Physics: Conference Series 439 (2013), pp. 012-015.
- A.M. Abdeen, Electric conduction in Ni-Zn ferrites, Journal of Magnetism and Magnetic Materials 185 (1998), pp. 199-206.
- ²⁰. M. El-Shabasy, DC electrical properties of Zn-Ni ferrites, Journal of Magnetism and Magnetic Materials, 172 (1997), pp.188-192.
- ^{21.} Thakur, P. Mathur, M. Singh, Study of dielectric behaviour of Mn-Zn nano ferrites, Journal of Physics and Chemistry of Solids, 68 (2007) pp. 378-381.

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Chapter 6 Lacustrine Records of Anthropogenic Change and Precipitation in the Monsoonal Core Zone of Central India since the Last Century



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Abstract A sediment core from the Navegaon Bandh Lake (NBL) was studied for diatoms and sediment geochemistry to investigate the anthropogenic impact and climatic variability over the past century. The declined geochemical concentrations show three major impacts on the NBL coinciding with the drought events in the foremost parts of India around 1918, 1975, 1965 and 1991. The rise in the geochemical content of the NBL core was evident in the post dam construction period (i.e., ~1917-1919) with the two major peaks around 1975 and 1998. These major peaks are indicators of the higher rate of soil erosion and improved precipitation in the catchment of the NBL. Anthropogenic activities have caused five major changes in diatom assemblages and ecology in the NBL around 1946, 1956, 1972, 1978 and 2006. The increased agricultural activities in the catchment of the NBL are evident since ~1906–1966 as the fertilizers (K, P) are mainly derived other than soil particles of the catchment. Similarly, deforestation in the region was evident during \sim 1967–1975 coinciding with the period of the highest soil erosion. Another major phase of soil erosion caused by anthropogenic activities was noticed during ~1992–1998. The hypolimnetic oxygen of the NBL has declined for the past \sim 80 years indicating increased eutrophication in the lake till the present. The nutrient input in response to climatic conditions and anthropogenic activities has played a vital role in the diatom shift of the NBL. Aulacoseira granulata was predominant during ~1906–1914, ~1920–1922, ~1941–1943, ~1948–1956, ~1972–1976 and $\sim 1973 - 1982$ in the NBL signifying the increased soil erosion and flux, persistent wet period and increased nutrient levels. While the major period of the profusion of Rhopaloidea musculus in the NBL core was during ~1919-1921, ~1933-1940, ~1956-1972 and ~1978-2004, respectively, indicating a mesotrophic, Meso

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euhyaline and alkalibiontic condition of the lake linked with the long dry period/less rainfall prevailed in the NBL watershed. The planktonic form *Discostella stelligera* was common during ~2007–2012 and indicates the existence of alkaline lake waters with moderate nutrients coinciding with the comparatively dry period/less rainfall and changing water level and deforestation in the catchment of the NBL. Overall, the investigation of the past evidence shows the importance of the study of fossil diatoms and geochemistry to understand the anthropogenic and precipitation changes along with the trophic status of the lake, which may be used for the management of the tropical wetlands in India.

Keywords Diatoms \cdot Geochemistry \cdot Soil erosion \cdot Tropical Lake sediments \cdot Eutrophication \cdot Central India

Introduction

The sediments deposited at the bottom of a lake provide a variety of information that can be used to understand the past conditions of a lake, its watershed, and climate (Meyers and Teranes 2001). Lakes are mostly fed by some rivers or streams and hence the lake consists of autochthonous and allochthonous sediments (Smol 2008). A stream serves as the major source of allochthonous sediments. The allochthonous sediments carry with them the dissolved chemicals and particulate inorganic and organic matter (OM). The autochthonous sediments on the other hand have with them a significant assemblage of remains of macrophytes, phytoplankton, zooplankton, bacteria, microorganism and aquatic invertebrates, which thrive in that environment. Hence, the source of autochthonous material includes biological activity and chemical precipitation within the lake (Smol 2008). The geology of the lake's watershed, climate and land use, including anthropogenic activities, directly affect the quality and quantity of material that enters a lake ecosystem (Cohen 2003). The past changes in the pH, salinity, nutrient status, climatic changes and lake level fluctuations can be inferred by studying the sediment geochemistry and diatoms from the core extracted from the lakes/reservoirs (McFadden et al. 2005; Mullins et al. 2011). The paleolimnological studies were also done using diatoms owing to their sensitivity to environmental changes (Batterbee et al. 1999; Bennion et al. 1995; Liu et al. 2012; Schroeder et al. 2016).

The Indian economy is mainly based on agricultural production which depends upon favourable monsoonal conditions. The central Indian region has been experiencing unreliable climatic conditions with low precipitations for the past few decades affecting the farmers depending upon agricultural produce. The increasing agricultural practices in the region have also been impacting the water quality of the area. Thus, the present chapter provides a good insight into the shift in the past climatic patterns mainly the hydrologic conditions in the parts of the central Indian region determined based on the study of sediment geochemistry and diatoms from the core sediments of the Navegoan Bandh Lake (NBL), Central India. The NBL is one of the major lakes of the Gondia district present in the eastern part of the

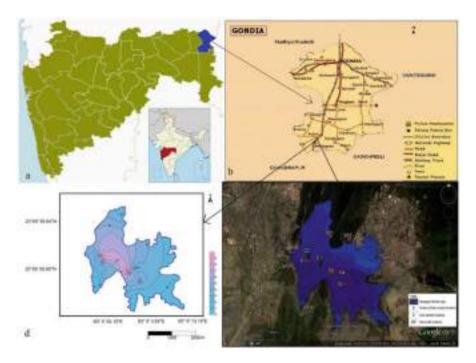


Fig. 6.1 (a) Map of Maharashtra State, India, showing the location of Gondia District, (b) Map of Gondia District showing the location of Navegaon Bandh Lake (NBL), (c) Satellite Image of NBL and (d) Bathymetric map of the NBL

Maharashtra state, India (Fig. 6.1a–c). The NBL (latitude $20^{\circ}53'$ to $20^{\circ}56'$ N and longitude $80^{\circ}06'$ to $80^{\circ}09'$ E) has a circumference of ~27 km and a water surface of ~20 km². The average depth of the lake is about 21 m with a catchment area of about 90 km² (Fig. 6.1d). Various factors such as adjoining lithology, soils, agricultural practices, animal excrements, aquatic plants and vegetal matter influence the water quality of the Navegaon Bandh Lake.

Climate and Rainfall

The Gondia district has tropical climatic conditions and experiences very hot summers and cold winters with temperature variations from ~7 °C to 48 °C, respectively. The summer starts in March and continues till mid-June, while the winter begins in October end and continues till February with December being the coldest month. The district receives rainfall from southwest summer monsoonal winds mainly from June to September. The maximum rainfall generally occurs during July and August with an average annual rainfall of 1197 mm (Gondia District Gazetteer 2013).

Land Use Pattern

The land use pattern of the major portion of the NBL watershed shows the presence of the deciduous forest, agricultural land (mainly used for kharip crop and a very small part used for rabi crops), some wastelands associated with the dense scrubs and very little land is covered by rural build-up (Fig. 6.1c). Fishing takes place in the lake with no other human activities. However, a zoological garden was developed near the lake and has been used as a recreational centre which attracts tourists thereby increasing the plastic pollutants around the lake.

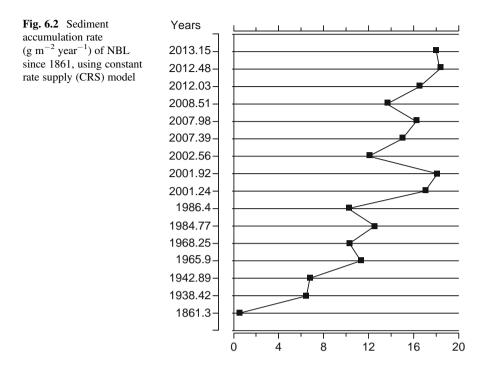
Geological Setting

The Navegaon Bandh Lake is geologically surrounded by the granitic gneiss of the Tirodi gneissic complex, quartzite-gritty quartzite, amphibolites and hornblende schist of the Amgaon gneissic complex. It is also surrounded by the meta gabbros and quartz veins of the Mesoproterozoic age. There are occurrences of phyllites, pelitic schist and basic tuffaceous andesite of the Khairagarh group around it. The pockets of laterites are also distinctly seen around the lake (DRM 2000).

Materials and Methods

Core Sampling, Processing and Chronology

In January 2013, a sediment core (Latitude: N 20° 54′ 55.8″ and Longitude: E 80° 7′ 3.4") of 78 cm length was recovered in the polycarbonate barrel from the deepest part of the NBL using a gravity corer. The total weight of the retrieved sediment core was calculated in the laboratory. Further, the sediment core was vertically cut into two halves and photographed in addition to the description of the core profile. One of the halves of the core was sub sectioned at an interval of 1 cm for the bottom sections and an interval of 0.5 cm for the top 20 cm. It was used for diatom processing and other analyses. The other half of the core was retained as an archive in the laboratory. The chronology for the present study of the NBL follows the already published paper (Humane et al. 2016). The results of the Constant Rate Supply (CRS) model for the sediments of each depth of the NBL core were further used to calculate the bulk sediment accumulation rates of the geochemical elements (g/m²/year) by the related amount (mg/g) of each component in the bulk sediment (Fig. 6.2; Garrison and Laliberte 2010). The uncertainty of the age prevails in the older sediments deeper than ~50 cm of the core. Therefore, the ages of the NBL sediment core up to 48 cm were considered for the calculation of the accumulation rate of geochemical elements at various depths and discussed in this chapter (Fig. 6.3). Diatom analysis was



done by processing some uncrushed core samples. The accumulation rate of geochemical elements for a sediment core is shown in the vertical diagram prepared by the computer program C2, version 1.5 (Juggins 2007).

Maceration for Diatom Study

About 1 gm of a core sample obtained through conning and quartering at 1 cm intervals was used for the maceration to prepare diatom slides following the standard methods (Batterbee et al. 2001). The prepared slides were studied for diatom identification and enumeration under a Leica microscope (DM-350) at $630 \times$ and $1000 \times$ (oil immersion) along with the microphotography of each species. Minimum 300 valves were measured wherever possible in the slides. The occurrences of individual species were converted into a percentage. The identification of diatom species was done with the help of important literature (John 2012; Karthick et al. 2013; Liu et al. 2017; Metzeltin et al. 2005; Metzeltin and Lange-Bertalot 2007).

The recognition of the diatom groups was made based on their division in the complete length of the core and the constrained incremental sum of squares (CONISS) by the computer program TILIA (Grimm 1991).

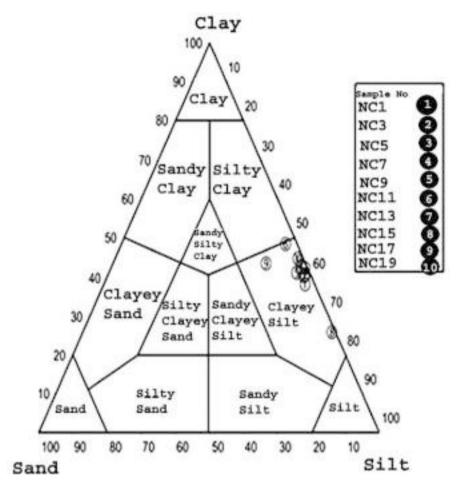


Fig. 6.3 Distribution of sand, silt and clay in the sediment cores of NBL

Results

Description of NBL Core Section

The colour of the entire core varies from light brown to dark brown with a smooth transition. The overall grain size of the core lies in between clayey silt, with intermediate variation from slight sandy-silt to silty clay (Fig. 6.4). The higher organic matter content in the core was demarcated by dark bands representing increased soil erosion coinciding with the wet periods. A few fragments of rotten plant roots/stems are also observed along with a few fish scales and shell fragments. The annual laminations are quite distinct in the core, although not very prominent in the photograph.

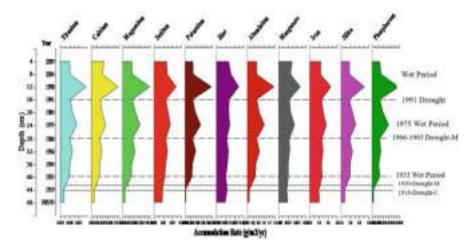


Fig. 6.4 Vertical profile of accumulation rate of the geochemical element in a sediment core of NBL (M – moderate; C – Calamitous)

Geochemical Analysis

The trophic status and changing precipitation patterns were investigated using major and trace elemental content of the NBL core. The past changes in the precipitation trends and the trophic condition of the NBL have been inferred employing the varying accumulation of geochemical elements. The impact of anthropogenic activities other than soil erosion on the trophic status of the NBL is also interpreted (Fig. 6.5).

Chemical Weathering Intensity (CWI)

The deforestation and the enhanced agricultural practices in the catchment have affected the NBL by augmenting the weathering and erosion of soils of the region. In this context, the chemical weathering intensity (CWI) in the catchment of this lake is calculated using the formula $\{(CaO+MgO+Na_2O)/Al_2O_3\}$ to know the strength of weathering and soil erosion (Sun et al. 2009; Fig. 6.6).

Diatom Stratigraphy

The stratigraphic data shows the abundant diatom species in the NBL (Fig. 6.7). The four diatom assemblage zones (DAZ)/units and ten sub-zones were identified for major species abundance and the constrained cluster analysis for the NBL core using

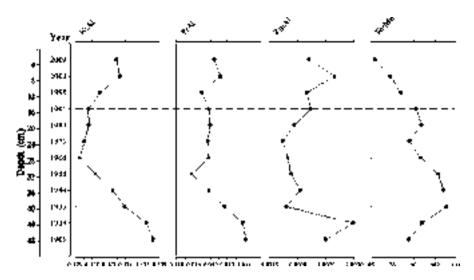


Fig. 6.5 Vertical profile of sediment core of NBL showing K: Al, P: Al, Zn: Al and Fe: Mn

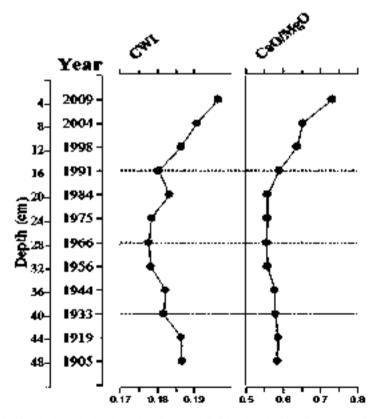


Fig. 6.6 Chemical weathering intensity (CWI) and CaO/MgO ratio of sediment core of NBL

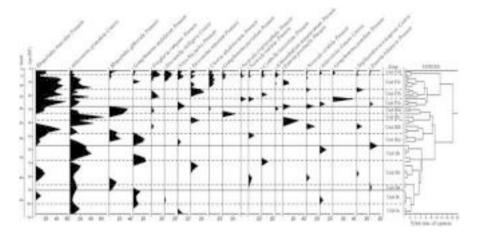


Fig. 6.7 Diatom succession in NBL between (1906 and 2012 A. D.). Only the major taxa (Species with $\geq 1\%$ in at least one sample) were shown. The right is the constrained incremental sum of squares (CONISS)

the program TILIA (Grimm 1991). A total of 62 diatom taxa were observed in the NBL core of which 20 attained a maximum abundance of >1% in at least one sample. Diatom assemblages were categorized as 1) Planktonic diatoms, such as *Aulacoseira granulata* (Ehr.) Simonsen (4–65%), *Discostella stelligera* (Cleve & Grun.) Houk & Klee (2–14%), *Aulacoseira distans* (Ehr.) Simonsen (1–12%), *Stephanodiscus niagarae* Ehrenberg (0.8–13%) and 2) with benthic diatoms such as *Rhopalodia musculus* Müllar (6–57%), *Rhopalodia gibberula* Müllar (3–35%), *Gomphonema undulatum* Hustedt (3–25%), *Fragilaria rumpens* (Kutzing) Carlson (3–18%), *Nitzschia palea* (3–10%), *Encyonema minutum* (Hilse) Mann (4–26%), *Gomphonema parvulum* Kutzing (2–25%), *Navicula cryptocephala* Kutzing (0.6–10%) and *Eunotia bilunaris* (Ehr.) Schaarschmidt (1–15%).

The planktonic diatoms were dominated by *A. granulata* (Fig. 6.8a, b) and *D. stelligera* (Fig. 6.8k), whereas benthic diatoms were represented by *R. musculus* (Fig. 6.8e, i), *R. gibberula* (Fig. 6.8j), *Gomphonema undulatum* (Fig. 6.8g), *Encyonema minutum* (Fig. 6.8h), *Amphora ovalis* (Fig. 6.8c), *Diploneis ovalis* (Hilse) Cleve (Fig. 6.8f, g) and *Cocconeis placentula* Ehrenberg (Fig. 6.8d). *A. granulata* was abundant during ~1906–1980 and progressively decreased on the top of the core (~1983 and above), while *R. musculus* dominated the core with the decline in *A. granulata*. The other benthic diatoms present in the NBL core are *Ulneria ulnabiseriata* Liu et al., *C. placentula*, *D. ovalis*, *A. ovalis* Kutzing, *Epithemia adnata* (Kutzing) Brebisson, *Cymbella affines* Kutzing, *Cymbella lanceolata* (Agardh) Kirchner and *Rhopalodia gibba* Müllar. There are four Diatom Assemblage Zones (DAZ)/units identified in the NBL core (Fig. 6.7).

Unit I (48–43 cm; ~1906–1922) was categorized into two sub-zones. This zone is characterized by the dominance of planktonic diatoms in the entire core. Unit I-a (48–46 cm; ~1906–1918) shows an abundance of the planktonic species *A. granulata*

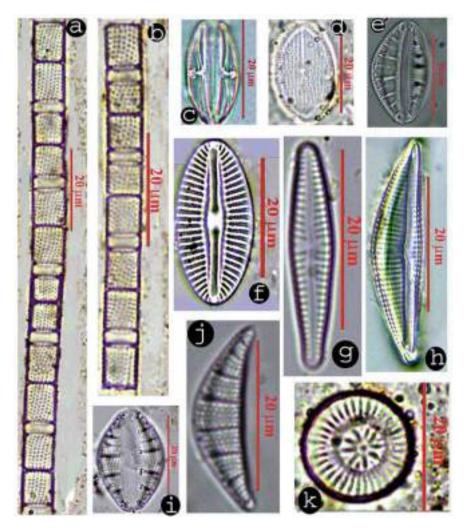


Fig. 6.8 (a) Aulacoseira granulata; (b) Aulacoseira granulata; (c) Amphora ovalis; (d) Cocconeis placentula; (e) Rhopaloidea musculus; (f) Diploneis ovalis; (g) Gomphonema undulatum; (h) Encyonema minutum; (i) Rhopaloidea musculus; (j) Rhopaloidea gibberula; (k) Discostella stelligera

(~13% on average) and benthic species (~10%) present in this zone. The ratio of Planktonic and benthic taxa (P/B) had an average of 2.63. Unit I-2 (45–43 cm; ~1919–1922) was represented by an abundance of benthic diatom species *R. musculus* (~10% on average) and *G. undulatum* (~8% on average). The planktonic diatoms present are *A. granulata* (~6%), *A. distans* (~7%) and *Discostella stelligera* (~2%). The ratio of Planktonic and benthic taxa (P/B) had an average of 0.82. Unit II (42–32 cm; ~1921–1956) is classified into three subzones. Unit II-a (42–40 cm; ~1921–1933) represents the abundance of benthic diatom taxa

G. undulatum (~14%), R. gibberula (~7%) and Eunotia bilunaris (~4%). The only planktonic diatom species present in this zone is A. granulata (~12%). The ratio of Planktonic and benthic taxa (P/B) had an average of 1. Unit II-b (39-36 cm; ~1932–1946) shows the dominance of benthic diatom taxa R. gibberula (~14%), R. musculus ($\sim 13\%$) and Encyonema minutum ($\sim 9\%$). The planktonic diatom species present in this zone are A. granulata (~13%) and Stephanodiscus niagarae (~ 4%). The ratio of Planktonic and benthic taxa (P/B) had an average of 0.76. Unit II-c (35–32 cm; ~1945–1956) has an abundance of planktonic diatom taxa A. granulata $(\sim 30\%)$ and A. distans (~12\%). The benthic diatom species present in this zone is G. undulatum (~23%). The ratio of Planktonic and benthic taxa (P/B) had an average of 1.71. Unit III (31–20 cm; ~1955–1983) is represented by the four subzones. Unit III-a (31–29 cm; ~1955–1966) shows an abundance of benthic diatom taxa such as G. undulatum (~17%), R. gibberula (~ 17%) and R. musculus (~11%). The other benthic diatom taxa are Nitschia palea and Eunotia bilunaris. The planktonic diatom species present in this zone is A. granulata (~23%). The ratio of Planktonic and benthic taxa (P/B) had an average of 0.29. Unit III-b (28-25 cm; ~1967-1972) has an abundance of the benthic diatom taxa R. gibberula (~15%), R. musculus (~33%) and Fragilaria rumpens (~5%). The common planktonic diatoms present in this zone are A. granulata ($\sim 23\%$) and Stephanodiscus niagarae ($\sim 11\%$). The ratio of Planktonic and benthic taxa (P/B) had an average of 0.52. Unit III-c (24-22 cm; \sim 1973–1978) shows the presence of the abundant planktonic diatom taxa such as A. granulata ($\sim 40\%$). The benthic diatom species present in this zone is E. minutum (~16%). The ratio of Planktonic and benthic taxa (P/B) had an average of 1.71. Unit III-d (21–19 cm; ~1979–1983) shows the dominance of the benthic diatom taxa R. musculus (~ 16%) and R. gibberula (31%). The other associated benthic diatom taxa are F. rumpens, N. palea and G. parvulum. The planktonic diatom species present in this zone is A. granuata (~16%). The ratio of Planktonic and benthic taxa (P/B) had an average of 0.18. Unit IV (18-0 cm; ~1982–2012) is divided into four subzones. This zone shows the maximum concentration of benthic diatom species. Unit IV-a (18–16 cm; ~1982–1991) indicates an increase in R. musculus (~38% on average) with a decrease in A. granulata (~ 13% on average). The other prominent benthic diatom species are N. palea (~11% on average) and E. binularia (~7% on average) and the other planktonic species commonly present is A. distans. The Planktonic and benthic ratio of taxa (P/B) had an average of 0.28. Unit IV-b (15–12 cm; ~1990–1998) was characterized by dominant benthic species R. musculus (~33% on average) and planktonic diatom species A. granulata (~19% on average). The second dominant benthic diatom species was Encyonema minutum (~18% on average) followed by Fragilaria rumpens (~10% on average) and Navicula cryptocephala (~10% on average). The planktonic and benthic (P/B) ratio is 0.21. Unit IV-c (11-6 cm; ~1999–2006) prominently shows an abundance of the benthic species R. musculus (~40% on average) and planktonic species A. granulata ($\sim 18\%$ on average). The other benthic diatom taxa present in this zone are R. gibberula, G. undulatum, F. rumpens, N. palea, E. minutum, G. parvulum and E. binularis. The other planktonic diatom species present in this zone are D. stelligera and S. niagarae. The ratio of P/B is 0.34. Unit IV-d (5-0 cm;

~2007–2012) indicates a decline in *R. musculus* (~17% on average) and *A. granulata* (~6% on average). Other planktonic species *D. stelligera* (~11% on average), *A. distans* (~2% on average) and *S. niagarae* (~3% on average). The other benthic forms present in this zone are *R. gibberula* (~7% on average), *G. undulatum* (~3% on average), *F. rumpens* (~12% on average) and *N. palea* (~6% on average). The ratio of planktonic and benthic taxa (P/B) had an average of 0.27.

Discussion

The sediment core of the NBL, Central India is studied to investigate soil erosion, trophic state and past rainfall since the last century using some proxies. The watershed of the NBL is present in the tropical region and has had a nearly stable temperature since the last century. Hence, the amount of rainfall in the catchment area of the lake has been the controlling factor for the soil erosion, accumulation of geochemical elements and diatom assemblage. Therefore, various proxies such as (1) Geochemical elements and their normalized ratio with erosional indicators, (2) Chemical weathering intensity (CWI) and (3) Diatoms are studied from the sediment core of the NBL of Central India.

Soil Erosion and Trophic State

The intensity of the impact on the lakes of a different watershed can be analysed using geochemical variables (Table 6.1; Garrison and Laliberte 2007, 2010). The chemical elements titanium (Ti) and aluminium (Al) are derived from detrital aluminosilicates and thereby the fluctuations in their profiles will suggest the transformation in the rate of soil erosion (Garrison and Laliberte 2010). Phosphorous and nitrogen are important nutrients for the growth of aquatic plants and algae. The synthetic fertilizers and soils contain potassium (K). Thus, soil erosion and the input of commercial fertilizers in the watershed can be distinguished from the variation in the profile of potassium (K) (Garrison and Laliberte 2010). The urban runoff is mostly accompanied by zinc (Zn) as it is a component of galvanized roofs and tires

Table 6.1	Important chemi-
cal indicate	ors of catchment or
lake proces	sses

Process	Chemical elements
Soil erosion	Aluminium, potassium, titanium
Synthetic fertilizer	Potassium
Urban	Zinc, copper
Ore smelting	Zinc, cadmium, copper
Nutrients	Phosphorus, nitrogen
Lake productivity	Organic matter

After Garrison and Laliberte (2010)

(Garrison and Laliberte 2007). The addition from the smelting of lead–zinc ores is seen in the zinc (Zn) profile of the cores (Dean 2002). Similarly, the use of soil modifications for the development of amenities is reflected in the calcium (Ca) profiles and the changes in the oxygen levels in the bottom waters are indicated by the manganese (Mn) profiles (Garrison 2008).

The accumulation rate gives information about the impact of watershed processes on the lake ecosystem (Garrison and Laliberte 2010). The calculation of the rate of accumulation of some geochemical elements of the NBL was done by adding the geochemical concentrations with the rate of sedimentation (Calculation by ²¹⁰Pb dating and CRS model). The elemental deposition in the NBL through time was determined from the accumulation rate. The accumulation rate of phosphorous was similar to the erosional indicators (Ti, Al) in the NBL. The phosphorus content has been progressively increased since ~ 1919 and reached its highest level in ~ 1998 , with its further decline since ~ 2000 till present at the top of the core (Fig. 6.4). Therefore, it can be surmised that the phosphorous content of the NBL is mostly derived from the sediment and soils from the watershed and played an important role as a major source of the nutrient. The profile of phosphorous and nitrogen may not reflect the lakes eutrophication history due to diagenesis (Anderson and Rippey 1994 and Fitzpatrick et al. 2003) and the breakdown of phosphorous and nitrogen into the inorganic components with some of the material then recycled into the water column and removed out of the sediments (Garrison and Laliberte 2010). The calcium content of the NBL is similar to the titanium till the top of the core and indicates that the major part of it was derived from the sediments and soils of the watershed (Fig. 6.4). The geochemical elements such as silica, manganese and sodium also show a similar increasing trend like Ti and Al, which reflects that the major concentration of these elements is derived from the sediments and soils in the watershed of the NBL (Fig. 6.4).

The selected geochemical elements from the NBL are normalized to aluminium (Al) to distinguish the anthropogenic inputs other than mineral sediments. Thus, the factors which influence the lake in addition to sediment/soil input from the watershed can be known. The anthropogenic impact both from the concerned watershed and atmospheric transport through time on the sediments of the NBL have been observed from the elemental profiles normalized to Al (Fig. 6.5). The ratio of these elements would be the same throughout the core if soil particles/sediments were the only sources of potassium, as both aluminium (Al) and potassium (K) are found in sediments/soil particles in the watershed (Garrison and Laliberte 2007). There is a gradual depletion in the K: Al ratio in the NBL since ~1906–1966(Fig. 6.5). This decline in the ratio till ~1966 indicates that potassium was not mainly derived by the erosional processes in the watershed considering the increase in the concentration of erosional indicators (Ti and Al) (Fig. 6.4) and other anthropogenic sources in the form of potash fertilizers in the nearby agricultural lands of the NBL. The K: Al shows an increasing trend during ~1967-~1975 similar to the profile of Al. This indicates that K is an important source derived from soil particles or sediments from the catchment of the NBL. The phosphorous content shows a declining trend, while the K: Al ratio slightly increased during ~1976–1991 indicating the mixed source of K, i.e. from soil particles along with some anthropogenic origin. The K: Al ratio once again shows a rising trend during ~1992–1998 similar to the profile of K. This points to the increased maximum rate of soil erosion in the NBL watershed. From ~1999 till ~2009 the rise and decline in K: Al ratio indicates mix origin of K, i.e. soil particles and potash fertilizers used in the agricultural lands in the catchment of the NBL (Figs. 6.4 and 6.5).

Phosphorous and nitrogen are important nutrients for algal growth (Garrison and Laliberte 2010). The ratio of phosphorous to aluminium (P: Al) shows a continuous decline from ~1906 to ~1956, while the P profile shows a continuous rise in its content during this period. It shows that during this period P was mainly derived through the excessive use of synthetic fertilizers in the agricultural land of the catchment area of the NBL rather than soil particles mainly after the construction of the rockfill dam in ~1917. The P: Al ratio shows a peak during ~1957–1975 more or less similar to the P profile indicating its origin through soil particles or sediments of the catchment area of the NBL. There is little rise in the ratio of P: Al during ~1976–1991 in contrast to the major decline of the P profile suggesting the possible mixed origin of the P. The trend of the P: Al ratio has declined from ~1992 till ~1998 with the highest peak of the P profile. It indicates that most of the P was derived from the erosion of soils or sediments from the catchment of the NBL during this period. The P: Al ratio from ~1999 to ~2009 shows a mixed origin of the P (Figs. 6.4 and 6.5).

The Zn: Al ratio in the NBL core is highest post ~1917 coinciding with the year of the dam construction till ~1933 similar to the Zn profile indicating an increased rate of soil erosion in the catchment area (Figs. 6.4 and 6.5). The increased rate of soil erosion could be attributable to the clearing of forest area for the development of the agricultural fields in the catchment of the NBL. A more or less uniform profile of the Zn: Al ratio is observed from ~1934 to ~1991 pointing to a consistent moderate level of supply of Zn mainly through soil erosion in the catchment. The profile of the Zinc concentration remained highest from ~1992 to ~2009 with its highest content in ~1998. The Zn: Al ratio declined a little from ~1992 to ~1998 indicating some part of the Zn could have derived from unknown sources and transported through the air and precipitated in the NBL basin during this period. The increasing trend of the Zn: Al ratio post ~1999 similar to a higher Zn profile could be attributed to a rise in soil erosion in the catchment of the NBL (Figs. 6.4 and 6.5).

The manganese (Mn) preferentially migrates to iron once the bottom water loses oxygen (Engstrom et al. 1985). This manganese generally moves from the sediments into the deepest water causing the environment of manganese in the deeper waters sediments (Garrison 2008). The iron and manganese tend to remain in suspension for a long period with their preferential movement together (Jones and Bowser 1978). Thus, the ratio of iron to manganese (Fe: Mn) declines (Mn increases) with the loss of oxygen (Garrison 2008). The profile of iron (Fe) to manganese (Mn) in the core of the NBL shows an increasing trend from ~1906 to ~1933 (Fig. 6.5), which shows the existence of a fairly good oxygenated environment during this period. However, the ratio of Fe: Mn started showing a declining trend after ~1933 till ~2009. This

indicates that the bottom water of NBL had started losing oxygen progressively after \sim 1933 and the lake bottom became more and more anoxic till \sim 2009. Thus, the hypolimnetic oxygen of the NBL has declined for the past 80 years indicating increased eutrophication in the lake till the present.

Paleo-Rainfall and Droughts

The Indian sub-continent experiences >80% of rainfall as a result of the seasonal monsoon, which is the lifeline of Indian agriculture (IPCC 2007). Therefore, it is vital to forecast the future climate, particularly rainfall trends considering global warming and its adverse effects (Church and white 2006). Hence, the investigation of the past monsoonal fluctuations is highly essential to forecasting rainfall and understanding past extreme weather events. The paleoclimatic studies in India particularly from the last ice age to the present add comprehensive knowledge on rainfall and droughts (Singhvi and Kale 2008). The different proxies have been used by the various workers to investigate past monsoonal fluctuations. The responses of the diatom community to climate change have been studied by several workers (Anderson et al. 2012; Chen et al. 2014). The other proxies used are chemical weathering intensity and geochemical ratios normalized with erosional indicators like Ti and Al (Colin et al. 1998; Achyuthan et al. 2007; Kotlia et al. 2010 and Veena et al. 2014).

The sediment accumulation rate of the NBL was increased after the construction of a small rockfill dam in ~1917 (Fig. 6.4). The sediment input in the NBL is dependent upon the amount of rainfall that occurred in its catchment area. A higher rainfall is coupled with an enhanced deposition of sediments into the lake. The reduced deposition of sediments in the NBL till ~1919 is coeval with calamitous and moderate drought events that occurred in major parts of India during 1918 and 1920, respectively (De et al. 2005; Fig. 6.4). The exceptional flood in India in ~1933 coincides with the initial rise in the concentration of the geochemical elements of the NBL (Fig. 6.4). The gradual rise in the accumulation of the majority of the geochemical elements was continued and reached peaked in ~1956. This continuous rise of the geochemical elements could be attributed to improved precipitation in the catchment of the NBL. There was a gradual decline in the geochemical content from ~1957 till ~1966. The maximum fall in the concentration of a geochemical element in ~1966 is again coinciding with the other moderate drought event in India in ~1965. Another rise in the geochemical content started in ~1967 and reached its peak in ~1975 (Fig. 6.4). Another decline in the concentrations of geochemical elements of the NBL was noticed after ~1976 and the same trend was continued till ~1991. Many parts of India experienced severe drought in 1987 (De et al. 2005). Thus, the central Indian region in general and the catchment area of the NBL, in particular, had suffered a major drought from ~1987 to ~1991. The highest level of deposition of the geochemical elements in the NBL was observed in ~1998 and possibly could be attributed to the occurrence of maximum rainfall or flood event in the eastern part of the Vidarbha region of Maharashtra, Central India (Fig. 6.4). The post ~1998 period showed a gradual reduction in the rainfall till ~2004 and the low rainfall condition prevailed up to ~2009 (Fig. 6.4). The peaks of the geochemical elemental content also suggest the increased soil erosion in the catchment of the NBL during ~1933, ~1956, 1975 and 1998, respectively (Fig. 6.4). The increased agricultural practices have led to deforestation in the NBL catchment resulting in a rise in soil erosion coupled with varying strength of rainfall in the monsoonal core zone of Central India.

The Chemical Weathering Intensity (CWI)

The oxide such as Al₂O₃, TiO₂ and SiO₂ is used as the most resistant and insoluble elements in the environment during weathering and erosion, whereas CaO, MgO and Na₂O are more soluble and mobile (Engstrom and Wright 1984; Veena et al. 2014; Garrison and Laliberte 2007). The chemical weathering intensity (CWI) is calculated to know the fluctuations in weathering intensity (Sun et al. 2009). The higher value CWI points to more weathering. This corresponds to wetter conditions and heavy monsoonal rainfall in the study area (Central India). The more intense development of anthropogenic carbonate in the soil of the sediment source area corresponds to higher CaO/MgO ratios in sediment, which points to warm climate with alternating wet and dry periods (Veena et al. 2014; Wang et al. 1990; Wang 1992).

The CWI and CaO/MgO ratio with the depth (cm) of the NBL core are compared for the past 100 years (Fig. 6.6). The CWI and CaO/MgO ratio started declining after ~1918 till ~1933 coinciding with the one calamitous drought event in ~1918 and a moderate drought event in ~1920 in many parts of India. The further decline in the ratio of the CWI and CaO/MgO after ~1920 till ~1933 points to a gradual reduction of rainfall (dry period) in Central India. The further decline in this ratio from ~1934 to ~1975 indicates the prevalence of low rainfall in the catchment of the NBL. The moderate drought event of ~1965 and the severe drought event of ~1972 in India (De et al. 2005) also corroborate our findings of low rainfall conditions from ~1934 to ~1975. The CWI, CaO/MgO ratio further shows a declining trend after ~1984 indicating the reduction in the rainfall till ~1991. The severe drought event in India during ~1987 also supports the present finding. The CWI and CaO/MgO ratios show increasing trends after ~1992 indicating moderate to high rainfall in Central India till ~2009 (De et al. 2005; Fig. 6.6).

Diatom Analysis

The significant shift of diatoms from benthic to planktonic assemblage has been attributed to climate warming (Chen et al. 2014). Lake sediments from stratification during summer and climate warming periods and thus more stratification would

point to increased length and strength of warm/dry periods (Wang 2012). The small size and fast-growing planktonic diatoms in the sediment cores indicate longer and stronger thermal stratification (Smol et al. 2005; Rühland et al. 2010; Chen et al. 2014). The NBL falls in the tropical climatic region. Thus, the temperature variation in the region has not been significant since the last century. However, the diatom species may respond to fluctuations in the precipitation (rainfall) and dry periods (droughts) existing in the region. The changing patterns of planktonic to benthic diatom assemblage (P/B) are recorded in the NBL core from ~1906 to ~2012 (Fig. 6.7). The planktonic diatom A. granulata is dominate throughout the NBL core along with the appearance of another planktonic diatom taxa D. stelligera after ~2004. However, the comparative decline in abundance of A. granulata was associated with the increase in the concentration of benthic diatoms such as R. musculus, R. gibberula and G. undulatum. The concentration of A. granulata remained higher since ~ 1906 and more or less constant till ~ 1961 . A major shift in speciation was seen at ~1920, ~1933, ~1966 and ~ 1983 till ~2005 with the preponderance of the benthic species *R. musculus* coeval with a decline in planktonic forms. The abrupt disappearance of R. gibberula was observed from ~1983 to ~ 2005 . The nutrient input in response to climatic conditions and anthropogenic activities has played a vital role in the diatom shift of the NBL. The aridity/low rainfall mainly affects the water chemistry and inflicts salinity (Winder et al. 2009). D. stelligera indicates changing water levels and deforestation, while A. granulata exists in varying trophic status (Costa-Bödeker et al. 2012). R. musculus is a mesohalobus and alkalibiontic species found in the swamp, swampy lakes, springs and oozing areas (You et al. 2009). The major period of the profusion of R. musculus the NBL core was during ~1919-1921, ~1933-1940. in ~1956–1972 and ~ 1978–2004, respectively. Thus, the NBL water was mainly mesotrophic, Meso euhyaline and alkalibiontic. The longer dry/less rainfall period that prevailed in the NBL watershed could have possibly developed swampy conditions in the lake during these years. The existence of a low rainfall/dry period also corroborates several drought events recorded in India, for example, in \sim 1918, ~1920, ~1965, ~1972 and ~1987 (De et al. 2005; Fig. 6.7). A. granulata was predominant during ~1906–1914, ~1920–1922, ~1941–1943, ~1948–1956, ~1972–1976 and ~ 1973–1982. The increased concentration of A. granulata during these periods in the NBL mainly points to the accelerated soil erosion and flux, persistent wet period and increased nutrient levels. It also clearly signifies that the NBL was highly eutrophic with high phosphorus and nitrogen values. A decline in the A. granulata population is linked with an increase in the population of R. gibberula and G. undulatum also coincides with dry/low rainfall periods (De et al. 2005; Fig. 6.7). The major dominance of R. musculus was observed on the top of the core during ~1983–2006. The prevalence of the longer dry/low rainfall periods could have again led to swampy conditions in the NBL with the mesotrophic waters. R. musculus and A. granulata both decreased drastically at the top of the core during ~2007-2012, while other small benthic and planktonic forms became predominant during this period (Fig. 6.7). D. stelligera was the common abundant form observed during this period. Diatom assemblages dominated by D. stelligera indicate a thermally stable environment and alkaline conditions (Cardozo et al. 2014). The abundance of *D. stelligera* also indicates a decline in the nutrient concentration due to enhanced stratification in response to the warming trend in the region (Stone et al. 2010). Thus, the abundance of planktonic diatom species, *D. stelligera* during this period suggests low nutrient, mesotrophic, alkaline lake waters with comparatively dry/less rainfall period indicating changing water level and deforestation in the catchment of the NBL. Thus, differences in aquatic habitat, duration and strength of dry and wet periods could have resulted in the different diatom responses in the NBL.

Conclusions

Nutrients such as phosphorous are mostly derived from the sediment and soils from the watershed of the NBL. The concentration of geochemical elements like K, Si, Fe, Mn, Zn and Na are also mainly derived from the sediments and soils in the watershed of the NBL. From ~1906 to ~1956, P was mainly derived through the excessive use of synthetic fertilizers in the agricultural land of the catchment area of the NBL rather than soil particles mainly after the construction of the rockfill dam, i.e. ~1917. The hypolimnetic oxygen of the NBL has declined for the past 80 years indicating increased eutrophication in the lake till the present. The decline in the deposition of the geochemical elements till ~1919 was coeval with the calamitous and moderate drought events that occurred in major parts of India during 1918 and 1920. Similarly, the exceptional flood in India in ~1933 coincides with the initial rise in the concentration of the geochemical elements of the NBL. The gradual rise in the accumulation of the majority of the geochemical elements till ~1956 could be attributed to improved precipitation in the catchment of the NBL. The maximum fall in the concentration of a geochemical element in ~1966 again coincides with the other moderate drought event in India in ~1965. The central Indian region in general and the catchment area of the NBL, in particular, had suffered a major drought period from ~ 1987 to ~ 1991 . The highest level of deposition of the geochemical elements in the NBL in ~ 1998 possibly could be attributed to the occurrence of maximum rainfall or flood event over Central India. The post ~1998 period showed a gradual reduction in rainfall till ~2004 and the low rainfall conditions existed up to ~2009. The CWI record of the NBL shows that the accumulation of the geochemical elements was mainly controlled by the changing climatic conditions, namely wet and dry periods in the catchment area along with the enhanced soil erosion caused by anthropogenic activities. The changes in the aquatic conditions are mainly caused by varying duration and strength of dry and wet periods over the central Indian region and enhanced anthropogenic activities such as deforestation, use of synthetic fertilizers, etc., in the catchment area and could have resulted in the diverse diatom responses in the NBL.

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References

- Achyuthan H, Kar A, Eastoe C (2007) Late quaternary environmental changes and evolution of the Tal Chhapar salt lakes, Rajasthan. J Paleolimnol 38:493–507
- Anderson NJ, Rippey B (1994) Monitoring lake recovery from point source eutrophication: the use diatom-inferred epilimentic total phosphorus and sediment chemistry freshwater biology. Hydrobiologia 32:625–639
- Anderson NJ, Foy RH, Engstrom DR, Rippey B, Alamgir F (2012) Climate forcing of diatom productivity in low land, eutrophic lake: White Lough revisited. Freshw Biol 57:2030–2043
- Batterbee RW, Charles DF, Dixit SS, Renberg I (1999) Diatom as indicators of surface water acidity. In: Stoermer EF, Smol JP (eds). Sciences Cambridge University Press, pp 85–127
- Batterbee RW, Jones VJ, Flower RJ, Cameron NG, Bennion H, Carvalho L, Juggins S (2001) Diatoms. In: Smol JP, Birks HJB, Last WM (eds) Tracking environmental change using Lake sediments: terrestrial, algal, and siliceous indicators, vol 3. Kluwer Academic Publishers, Dordrecht, pp 155–202
- Bennion H, Wunsam S, Schmidt R (1995) The variation of diatom-phosphorus transfer functions: an example of Mondsee, Austria. Freshw Biol 34:271–283
- Cardozo AZY, Gomes DF, Silva E, Da M, Duque SRE, Rangel JOC, Sifeddine A, Turcq B, Albuquerque ALS (2014) Holocene Paleolimnological reconstruction of high altitude Colombian tropical lake. Palaeogeogr Palaeoclimatol Palaeoecol:1–10. https://doi.org/10.1016/J. palaeo.2014.03.013
- Chen C, Zhao L, Zhu C, Wang J, Jiang J, Yang S (2014) Response of diatom community in Lugu Lake (Yunnan–Guizhou plateau China) to climate change over the past century. J Paleolimnol 51(3):357–373. https://doi.org/10.1007/s10933-013-9760-4
- Church J, White N (2006) A 20th-century acceleration in global sea-level rise. Geophys Res Lett. https://doi.org/10.1029/2005GL024826
- Cohen AS (2003) Paleolimnology. Oxford University Press, 500p
- Colin C, Kissel C, Blamart D, Turpin I (1998) Magnetic properties of sediments in the Bay of Bengal and the Andaman Sea: impact of rapid North Atlantic Ocean climatic events on the strength of the Indian Monsoon. Earth Planet Sci Lett 160:623–635
- Costa-Bödeker S, Bennion H, Jesus TA, Albuquerque ALS, Figueira RCL, Bicudo DC (2012) Paleolimnologically inferred eutrophication of a shallow, tropical, urban reservoir in Southeast Brazil. J Paleolimnol 48:751–766
- De US, Dube RK, Prakasa Rao GS (2005) Extreme weather events over India in the last 100 years. Indian Geophy Union 9:173–187
- Dean W (2002) A 1500-year record of climatic and environmental change in Elk Lake, Clearwater County, Minnesota II: geochemistry, mineralogy, and stable isotopes. J Paleolimnol 27:301– 319

DRM (2000) District Resource Map of Bhandara and Gondia Districts. Geological Survey of India

- Engstrom DR, Wright HE (1984) Chemical stratigraphy of lake sediments as a record of environmental change. In: Lund H, Jm WC (eds) Lake sediments- environmental history. Leicester University Press, pp 11–67
- Engstrom DR, Swain EB, Kingston JC (1985) A paleolimnological record of human disturbance from Harvey's Lake, Vermont: geochemistry, pigments, and diatoms. Freshw Biol 15:261–288

- Fitzpatrick FA, Garrison PJ, Fitzgerald SA, Elder JF (2003) Nutrient, trace-element, and ecological history of Musky Bay, Lac Courte Oreilles, Wisconsin, as inferred from sediment cores. US Geologic Survey Water-Resource Investigation Report 02-4225: 141p
- Garrison PJ (2008) Paleoecological study of Grindstone Lake, Sawyerl County. Wisconsin Department of Natural Resources, Bureau of Integrated Science Services 1–16
- Garrison PJ, Laliberte GD (2007) Paleoecological study of Big Round Lake, Polk County. Wisconsin Department of Natural Resources, Bureau of Integrated Science Services 1–17
- Garrison PJ, Laliberte G (2010) Paleoecological Study of lake Chetac, Sawyer Country. Wisconsin Department of Natural Resources, Bureau of Integrated Science Services 1–17
- Gondia District Gazetteer (2013) Government of Maharashtra, India
- Grimm E (1991) Tilia. Version 2.0. Illinois State Museum, Illinois
- Humane SS, Humane SK, Juare S (2016) ²¹⁰Pb dating and trace metal accumulation study of sediment cores from Navegaon Bandh and Bodhalkasa Lakes, Gondia District, Maharashtra, India. Environ Earth Sci 75(7):1–26
- IPCC (2007) Climate change 2007: the physical science basis. In: Solomon S, Qin D, Manning M, Chen Z, Marquis M, Averyt KB, Tignor M, Miller HL (eds) Contribution of a working group to the fourth assessment report on the intergovernmental panel on climate change. Cambridge University Press, 996p
- John J (2012) Diatoms in the Swan River estuary, Western Australia: taxonomy and ecology. Koeltz Scientific Books, 456p
- Jones BF, Bowser CJ (1978) The mineralogy and related chemistry of lake sediments. In: Lerman A (ed) Lakes: chemistry, geology, physics. Springer, New York, pp 179–235
- Juggins S (2007) C2 version 1.5.0: a program for plotting and visualizing stratigraphic data. University of Newcastle
- Karthick B, Hamilton PB, Kociolek JP (2013) An illustrated guide to common diatoms of Peninsular India. Gubbi labs, 206p
- Kotlia BS, Sanwal J, Phartiyal B, Joshi LM, Trivedi A, Sharma C (2010) Late quaternary climatic changes in the eastern Kumaun Himalaya India as deduced from multi-proxy studies. Quat Int 213:44–55
- Liu J, Zhangwen L, Huanjun Z, Han BP (2012) Hydrodynamic change recorded by diatoms in sediments of Liuxihe Reservoir, southern China. J Paleolimnol 47:17–27
- Liu B, Williams DM, Tan L (2017) Three new species of Ulneria (Bacillariophyta) from the Wuling Mountains Area, China. Phytotaxa 306(4):241–258. https://doi.org/10.11646/phytotaxa.306.4.1
- McFadden MA, Patterson WP, Mullins HT, Anderson WT (2005) Multi-proxy approach to longand short-term Holocene climate-change: evidence from eastern Lake Ontario. J Paleolimnol 33:371–391
- Metzeltin D, Lange-Bertalot H (2007) Tropical diatoms of South America, 2. In: Lange-Bertalot H (ed) Iconographia diatomologica, annotated diatom micrographs, vol 15. Koeltz Scientific Books, Sttutgart, 736p
- Metzeltin D, Lange-Bertalot H, Garcia-Rodriguez F (2005) Diatoms of Uruguay. Iconographia Diatomologica 15:1–736
- Meyers PA, Teranes JL (2001) Sediment organic matter. In: Last WM, Smol JP (eds) Tracking environmental changes using lake sediment vol. 2: physical and geochemical methods, pp 239–270
- Mullins HT, Patterson WP, Teece MA, Burnett AW (2011) Holocene climate and environmental change in Central New York (USA). J Paleolimnol 45:243–256
- Rühland KM, Paterson AM, Hargan K, Jenkin A, Clark BJ, Smol JP (2010) Reorganization of algal communities in the Lake of the Woods (Ontario, Canada) in response to turn of – the-century damming and recent warming. Limnol Oceanogr 55:2433–2451
- Schroeder L, Martin SC, Kerns GJ, McLean CE (2016) Diatom assemblages in a reservoir sediment core track land-use changes in the watershed. J Paleolimnol 55(1). https://doi.org/10.1007/ s10933-015-9860-4

- Singhvi AK, Kale VS (2008) Paleoclimate studies in India: last ice age to the present, IGBP-WCRP-SCOPE report series. Indian National Science Academy, New Delhi, p 4
- Smol JP (2008) Pollution of lakes and Rivers: a Paleoenvironmental perspective, 2nd edn. Blackwell Publishing, Oxford, 383p
- Smol JP, Wolfe AP, Birks HJB, Douglash MSV (2005) Climate-driven regime shifts in the biological communities of arctic lakes. Proc Natl Acad Sci U S A 102:4397–4402
- Stone J, Westover K, Cohen A (2010) Late Pleistocene paleohydrography and diatom paleoecology of the central basin of Lake Malawi, Africa. Palaeogeogr Paleoclimatol Paleoecol 303:51–70
- Sun Q, Wang S, Zhou J, Chen Z, Shen J, Xie X, Wu F, Chen P (2009) Sediment geochemistry of lake Daihai, north-Central China: implications for catchment weathering and climate change during Holocene. J Paleolimnol 43:75–87
- Veena MP, Achyuthan H, Eastoe C, Farooqui A (2014) A multi-proxy reconstruction of monsoon variability in the late Holocene, South India. Quat Int 325:63–73
- Wang SM (1992) Lake records of the Holocene climatic change in China. In: Shi YF (ed) The Holocene climatic optimum and associated environment in China. Science Press, Beijing (in Chinese), pp 146–152
- Wang Q (2012) Environmental evolution of Lugu Lake, Yunnan and response to Southwest monsoon climate since LGM. Nanjing Institute of Geography and Limnology, CAS, University of Chinese Academy of Sciences, Nanjing China, PhD thesis, 128p
- Wang SM, Tu YS, Wu RJ, Freng M (1990) The Daihai Lake: environment evolution and climate change. University of Science and Technology of China Press, Hefei, pp 1–191. (in Chinese)
- Winder M, Reuter JE, Schladow SG (2009) Lake warming favours small-sized planktonic diatom species. Proc R Soc Britain Biol Sci 276:427–435
- You Q, Liu Y, Wang Y, Wang Q (2009) Taxonomy and distribution of diatoms in the genera *Epithemia* and *Rhopalodia* from the Xinjiang Uygur Autonomous Region, China. Nova Hedwigia 89(3–14):397–430

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[iii]

Application of Carbon Based Nanomaterials: A Review

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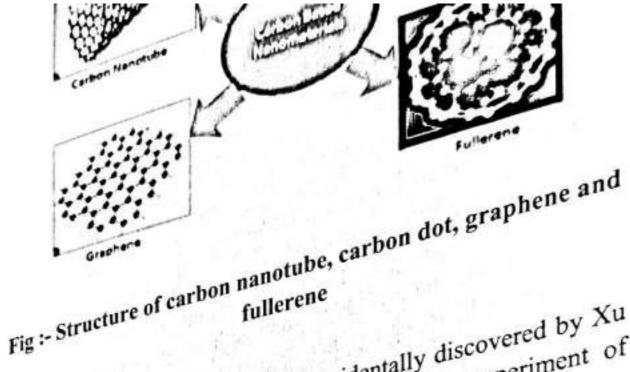
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Abstract:- Recent years nanotechnology is a flourishing area in research work and received prodigious interest due to applications in various fields. Nanotechnology is the branch of science and technology and deals with the fabrication of nano-size substances, characterization and their applications. Nanotechnology is a developing field that brings materials into the nanoscale level ie. Nanomaterials and they have shown to have a wide range of applications. However, a marked and rapid growth of interest has been shown by the scientific and engineering communities in the carbon-based nanomaterials. They are challenging due to their superior behaviors and interesting applications over other materials. Nanocarbon included carbon dot, carbon nanotube, and grapheme. Carbon dots (CDs) by their unique structure and fascinating properties, they have various application such as solar cells, drug delivery, biological sensing, and photo catalysis. Carbon nanotubes (CNTs) are cylindrical molecules that consist of rolled-up sheets of single- layer carbon atoms. They can be singlewalled (SWCNT) and multi-walled (MWCNT) structure. They have been applicable for absorbents, electronics, biosensing, and chemical sensing. Grapheme has applications in the energy, construction, health, and electronics sectors. Carbon- based nanomaterials have gained tremendous attention in the scientific community for their potentials application in all fields in current scenario.

Keywords:- Nanotechnology, carbon-based nanomaterials, Carbon dots, Carbon nanotubes, Grapheme.

1. Introduction

The carbons have atomic mass number of twelve and atomic number of six and which is present in p-block in periodic table, This carbon is the fourth most abundant element in the universe. It has been reported that nearly 18% of total body mass of a healthy human being consist of carbon element. The chemical literatures suggest that more than one million compounds of carbon exist in nature and chemists are adding many new compounds every year to the existing bag of carbon compounds. It is a major constituent of all organic compounds found in living systems such as carbohydrates, proteins, vitamins, nucleic acid and fats. In nature, the carbon is known to exist in many allotropic forms such as charcoal, diamond, graphite, amorphous carbon and many more. [1]Among these various allotropes, some allotropes of carbon like carbon dots (CDs), carbon nanotubes (CNTs), graphene etc. have one dimension in nanoscale range. Due to the confinement to nanoscale size, each member of the CNMs family behaves in a different way and shows different properties as compared to their bulk counterpart. Hence, they became popular as a family known as carbon based nanomaterials (CNMs)[2]. Carbon-based nanomaterials have gained tremendous attention in the scientific community for their potentials in biological applications including drug delivery, biosensing, imaging and other application optoelectronics and energy-related applications. The unique properties of engineered carbon-based nanomaterials have attracted great interest to large-scale industrial production[3]. Structure of carbon based nanomaterials like carbon nanotube, carbon dot, graphene and fullerene shown in fig-1.



Carbon dosts(CDs) were first accidentally discovered by Xu and co-workers in 2004, during the purification experiment of single-walled carbon nanotubes. Carbon dots (CDs) are known as

the rising star of carbon-based nanomaterials and, by virtue of their unique structure and fascinating properties and can be used in several applications in various fields. The CDs synthesis techniques are straightforward and inexpensive. CDs are prepared from a large number of organic molecules that can be readily available in nature. CDs are also prepared from vegetables fruit, juice, grass, plant leaves, coffee, and vegetable waste[4]

2.1 Application of Carbon dot

A wide variety of biological and chemical sensors have been 2.1.1 Sensing developed using CDs based on their excellent fluorescent properties. CDs have sensors with better performance because of the other hand, the arrangement of concentric graphene cylinders with an interlayer space of 0.34 nm and a diameter typically of the order of 10–20 nm leads to the formation of MWCNTs[7].

3.1 Application of Carbon nanotube

3.1.1 Electrical properties

The electrical properties of carbon nanotubes arise from such confinement of the electrons. MWCNTs are a good electrical conductor and the property can be enhanced through suitable modification as a composite material. However, the outer wall alone has conductive properties, but the inner walls MWCNTs are normally not active for conductivity. The band gap energy, changes with degree of change in crystalline nature of layers, chirality, and thickness of tube are effect electronic properties of carbon nanotubes[8].

1.3.2 Field emission properties

Both MWCNT and SWCNT are excellent field emitters. The small diameter of carbon nanotube is highly favorable for field emission. The carbon nanotubes based field emitters are used in various applications including flat panel displays, lamps, x-ray sources and microwave amplifiers due to its unique properties[9].

1.3.3 Energy Storage

Carbon nanotubes have unique characteristics desired for material used as electrodes in batteries and super capacitors. The high surface area, good electrical conductivity, reversible capacity and their linear geometry makes them as a potential material for energy storage devices. Carbon nanotubes have also been used in a variety of fuel cell devices[10].

1.3.4 Biomedical

The research on carbon nanotubes application in biomedical field is just underway, but has significant potential as it is a



biocompatible material for human and animal body. The possibility of carbon nanotubes to be functionalized or chemically modified leads to biomedical applications such as vascular stents, neuron growth, demonstrated that a single strand of DNA and regeneration[11].

4. Graphene

Graphene, a one-atom thick planar sheet of sp2 bonded carbon atoms packed in a honeycomb lattice, is considered to be the mother of all graphitic materials like fullerenes, carbon nanotubes, and graphite.Graphene has emerged as a revolutionary material since its isolation in 2004 by Novoselov and co-workers. Graphene formed by chemical activation possesses high electron transfer promoting ability, excellent catalytic behavior, large surface area it has been widely used in novel chemical sensors on glassy carbon electrodes (GCEs). Graphene possesses several exceptional properties such as high electrical conductivity, high tensile strength, high thermal conductivity and chemical inertness. There are two different types of methods to produce graphene which are exfoliation methods and direct growth of graphene layer which can be known as Topdown and Bottom-up methods[12].

4.1 Application of Graphene

4.1.1 Electrical properties

Graphene has potential applications in nanoelectronics, super capacitors, solar cells, batteries, flexible displays, hydrogen storage, sensors, and has been explored for versatile applications ranging from electronic devices to electrode materials. It exhibits outstanding electronic properties, permitting electricity to flow rapidly through the materials. In fact, it has been shown that electrons in graphene behave as massless particles similar to photons, zipping across a graphene layer without scattering. This outstanding electronic property is crucial for many device applications and it is expected that graphene could eventually replace silicon (Si) as the substance for computer chips, offering the prospect of ultrafast computers/quantum computers operating at terahertz speeds[13].

4.1.2 Actuators

The extraordinary mechanical, optical, and electrical properties of graphene have been exploited by many scientists to develop actuators. Park et al. designed a bilayer paper composed of adjacent graphene oxide and multi-walled carbon nanotube layers and demonstrated a macroscopic graphene-based actuators. The actuation motion was induced through asymmetric charging and discharging. A bimorph microactuator has been developed based on graphene-on- organic hybrid film. The graphene-on-organic film actuator generates a flapping and bending motion that can be controlled by varying the frequency and duration of the applied potential[14].

4.1.3 Supercapacitors

Recently, grapheme-based electrode material has been used for supercapacitor applications Subsequent development of grapheme-based nanocomposites using conducting polymers is an important step of improvisation in the area of nanoscience and nanotechnology. This kind of graphene-based polymer nanocomposites can be used as electrode material in supercapacitors. The main conductive polymer materials that have been investigated for the supercapacitor electrode are polyaniline (PANI), polypyrrole (PPY), polythiophene (PTH), and their derivatives [15].

6. Conclusion

This review article perfectly presents an introduction on carbon nanomaterials such aslike carbon dots (CDs), carbon nanotubes (CNTs), graphene, and fullerene.Carbon dots (CDs) are known as the rising star of carbon-based nanomaterials and, by



virtue of their unique structure and fascinating properties and can be several applications in various fields such as sensing, bioimaging and optoelectrical .The discovery of CNTs represents a major breakthrough in nanotechnology development which has different application such as electrical properties, field emission spectroscopy, optical properties, energy storage and biomedical application.Graphene formed by chemical activation possesses high electron transfer promoting ability, excellent catalytic behavior, large surface area it has been various application. Carbon-based nanomaterials have gained tremendous attention in the scientific community for their potentials application in all fields in current scenario.

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References

- "CRC Handbook of Chemistry and Physics," CRC Handb. Chem. Phys., 2014, doi: 10.1201/b17118.
- [2] S. Muraru and M. Ionita, "Towards performant design of carbon-based nanomotors for hydrogen separation through molecular dynamics simulations," Int. J. Mol. Sci., vol. 21, no. 24, pp. 1–12, 2020, doi: 10.3390/ijms21249588.

[3] J. Xu et al., "A review of functionalized carbon nanotubes and graphene for heavy metal adsorption from water. Preparation, application, and mechanism," Chemosphere, vol. 195, pp. 351-364, 2018, doi: 10.1016/j. chemosphere. 2017.12.061.

- [4] W. Wei, C. Xu, J. Ren, B. Xu, and X. Qu, "Sensing metal ions with ion selectivity of a crown ether and fluorescence resonance energy transfer between carbon dots and graphene," Chem. Commun., vol. 48, no. 9, pp. 1284–1286, 2012, doi: 10.1039/c2cc16481g.
- [5] M. Zheng et al., "Integrating oxaliplatin with highly luminescent carbon dots: An unprecedented theranostic agent for personalized medicine," Adv. Mater., vol. 26, no. 21, pp. 3554–3560, 2014, doi: 10.1002/adma.201306192.
- [6] L. Cao et al., "Carbon dots for multiphoton bioimaging," J. Am. Chem. Soc., vol. 129, no. 37, pp. 11318–11319, 2007, doi: 10.1021/ja073527l.
- [7] Y. Chen, M. J. Conway, and J. D. Fitzgerald, "Carbon nanotubes formed in graphite after mechanical grinding and thermal annealing," Appl. Phys. A Mater. Sci. Process., vol. 76, no. 4, pp. 633–636, 2003, doi: 10.1007/s00339-002-1986-3.
- [8] A. Rochefort, P. Avouris, F. Lesage, and D. R. Salahub, "Electrical and mechanical properties of distorted carbon nanotubes," Phys. Rev. B - Condens. Matter Mater. Phys., vol. 60, no. 19, pp. 13824–13830, 1999, doi: 10.1103/ PhysRevB.60.13824.
- [9] N. Dwivedi et al., "The rise of carbon materials for field emission," J. Mater. Chem. C, vol. 9, no. 8, pp. 2620–2659, 2021, doi: 10.1039/d0tc05873d.
- [10] B. Gao et al., "Enhanced saturation lithium composition in ball-milled single-walled carbon nanotubes," Chem. Phys. Lett., vol. 327, no. 1–2, pp. 69–75, 2000, doi: 10.1016/ S0009-2614(00)00851-4.



लेखक परिचय

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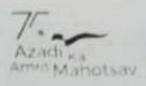
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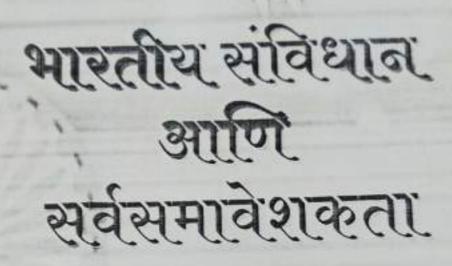
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EDUCATION IN CONSTITUTION OF INDIA

Prof. Parsharam Maroti Thakare

Yashwantrao Chavan College, Lakhandur Dist-Bhandara

Education is important to cultivate ethos and values of Indian Democracy in citizens. The Indian constitution has provisions to ensure that the state provides education to all citizens. The Indian Constitution in its original enactment defined education as a state subject. In the 42nd constitutional amendment act, five topics were moved from State list to Concurrent list, including education. Now education is available to both parliament and state assemblies to legislate upon. Under the constitution of India Central government has been specifically vested with several educational responsibilities.

India is signatory to number of international covenants i.e. MDGs , SDGs,SAARC charter for children which id binding on its commitment for making education a reality for all children.

Articles which are related to Education are -

Article 14, 15, 21A, 28, 29, 30, 45, 46, 51A (k), 337, 350, 351 .

Some major constitutional provisions on education in India are as follows:

 Right to Education - 86th Constitutional Amendment Act 2002 of constitution of India made important changes in Fundamental

Rights, Directive Principles of state policy, Fundamental Duties in education.

It provides Right to Education for age of 6 to 14 years and early childhood care until the age of six. It has inserted Article 21(A) - Right to education as fundamental right and replaces Article 45 – Early childhood education and amended Article 51A.

Article 45 – "The state shall endeavour to provide within a period of ten years from the commencement of this Constitution, for free and compulsory Education for all children until they complete the age of fourteen years"

It is clearly directed in Art 45 that provisions of Universal, free and compulsory education becomes joint responsibility of centre and the states.

58

Article 21A (Right to Education) - " to provide free and compulsory education of all children in the age group of six to fourteen years as a Fundamental Right in such a manner as the State may, by law, determine "

Government of India passed Right of children to free and compulsory education(RTE) Act ,2009 Came into force in April 2010. Eighty years after constitution was amended to make education a fundamental right. Act mandates that even private educational institution have to reserve 25 percent seats for children from weaker sections.

RTE made implementing body National commission for protection of child rights (NCPCR).

Article 51A $(k) - 11^{th}$ fundamental duty was added by 42nd CAA 1976- duty of parents for providing education to his child ." Provide opportunities for education to his child or ward between the age of six and fourteen years"

 Religious Institution - In Constitution Minorities are given rights to establish Educational Institutions.

Article 28 (1) - "No Religious instruction shall be provided in any educational institution wholly maintained out of state fund."

Article 28 (2)- Nothing in clause (1) shall apply to an educational institution which is administered by the state but has been established under any endowment or trust which requires that religious instructions shall be imparted to such institution.

Article 28 (3) – No person attending any educational institution by the state or receiving aid out of state funds, shall be required to take part in any religious instruction that maybe imported in such institutions or to attend any religious worship that may be conducted in such institutions. Distinguishes educational institutions into 4 types - 1) Wholly maintained by state. 2) Administered by the state but established under any endowment or trust. 3) Recognized by state. 4) Receiving aid from state.

It gives freedom from attending religious instructions .In India minorities whether based on religion or languages are given full right to establish educational institution.

 Minorities - Article 29 and 30 guarantee cultural and educational rights to religious and linguistic minority groups in India, to enable them to preserve their distinct culture, language, or script. Article 29(2)- No citizen shall be denied admission into any educational institution maintained by the State or receiving aid out of State funds on grounds only of religion, race, caste, language or any of them.

It provides Article 14 (Right to equality) to all but Article 15 (Prohibition of Discrimination) clearly signifies that distinction can be made on basis of any position . caste, class, or creed.

Nothing in article 29 prevent state from making any special provision for advancement of any socially or economically backward classes of citizens or for weaker sections of scheduled caste and scheduled tribe . It grants protection to both religious minorities and linguistic minorities.

Article 30 - Right of minorities to establish and administer educational institutions.

All minorities, whether based on religion or language, shall have the right to (1)establish and administer educational institutions of their choice.

They independently choose its governing body, staff, eligible student, fee structure.

In making any law providing for the compulsory acquisition of any property of an educational institution established and administered by a minority, referred to in clause (1) the State shall ensure that the amount fixed by or determined under such law for the acquisition of such property is such as would not restrict or abrogate the right guaranteed under that clause.

The State shall not, in granting aid to educational institutions, discriminate (2)against any educational institution on the ground that it is under the management of a minority, whether based on religion or language.

Article 30 is also called the "Charter of Educational Rights"

4. Weaker Section-There are so many provisions made in our constitutions for the upliftment of weaker sections of our society like, Article 14, 15, 46, 338, 339, 340, Important articles are 15 and 46 as it provides special provision related to education of Women, Scheduled caste and Scheduled tribe.

Article 15-The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them.



Women- Art 15(3)) Nothing in this article shall prevent the State from making any special provision for women .

It empowers state to create special provisions for women including Education Weaker Section- Article 46- Promotion of educational and economic interests of Scheduled Castes, Scheduled Tribes and other weaker sections.

- Union Territory Article 239 states Administration of Education in Union territorics. Education is responsibility of central government (administered by president by creation special department) in UTs.
- Language Secondary Education Commission (1952-53) for secondary school stage and Kothari Commission (1964-66) for higher education made provisions related to use of mother tongue in education.

Article 350 A- Facilities for instruction in mother-tongue at primary stage.—It shall be the endeavor of every State and of every local authority within the State to provide adequate facilities for instruction in the mother-tongue at the primary stage of education to children belonging to linguistic minority groups; and the President may issue such directions to any State as he considers necessary or proper for securing the provision of such facilities. In constitution it is clearly given that study of ones own language is fundamental right of the citizens. Constitution of India also made provisions for promotion and spread of Hindi as National language in Article 351. Hindi is largely used language in India . Central ministry of home affairs has a directorate of Hindi . It is considered as a medium of instruction and should be known to citizens of India as it is beneficial for communicating throughout country. Therefore, Indian Education system should consider it as responsibility to teach hindi at different levels .

- 7. Article 337 states provision about education for Anglo Indian community.
- The seventh schedule of the Indian Constitution contains legislative power under three lists viz. The Union list, State list, and concurrent list.

The union list contains 97 subjects where the following entries are related to education – Entry 13 - Educational and cultural relations with foreign countries.

Entry 62 - Institutions known at the commencement of the constitution as Library, museum, memorial.

Entry 63 - Institutions of National Importance.

int, in the little of the

Entry 64 - Instituions of scientific and technical education financed by the government of india wholly or in part and declared by law to be institutions of national importance

Entry 65 - Union agencies and institutions for professional , technical , vocational like IITs and IIMs.

training, research and scientific or technical assistance. Entry 66 - Coordination and determination of standards in the institutions higher

education or research and scientific and technical institutions.

The State list contain 66 subjects education related entry is-

Entry 12 - Libraries, museum, institutions financed by state other than those declared under law made by parliament of india to be of the national importance.

The Concurrent list - It comprises of 47 entries, among then related to education are -

Entry 20 - Economic and social planning

Entry 25 - Education subject to provisions of entry 63, 64, 65, 66 of union list

Entry 34 - Newspaper, books, and printing presses. Reservation in Education.

iber of other provisions directly or indirectly related to education are given in different eles and clauses which makes education as one of the most important subject in constitution

ndia.

Recent Advances of NANOTECHNOLOGY in Chemical Sciences Voulme-1

Dr. W.B. Gurnule Dr. Priti Mishra Dr. Krishna Kumar Verma Dr. Anita Baghel



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Nanofillers-Bio Source Rubber Nanocomposites

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Abstract:

Elastomers are unusual types of polymeric materials with some distinct properties like elasticity, flexibility, and hardness. Elastomeric materials such as Natural rubber, Synthetic rubber and other polymeric materials like thermoplastic elastomers are known to everyone. Rubber compounding involves the different properties and applications of rubber and additives, such as filler, accelerators, activators and curing agents in proper proportions to get a regular mixture that will have desirable properties to encounter processing at cheapest cost and get good results. Nanofillers are generally used in rubber compounding to enhance the properties of rubber. Over the past few years rubber nanocomposites seemed to discussed by scientist that believing the number of different nanofillers such as carbon based reinforcing, hybrid nanofillers and bio- sourced nanofillers. The hybrid nanofillers coordination favors effective dispersion without nanoparticles structures, leading destroying to improves percolation threshold and better properties of the ternary nanocomposites. The bio-sourced nanofillers are based on plant fibers that reduce the compatibility with the rubber matrix. The miner size of the filler improves the interaction between the filler and the rubber, and accordingly mechanical, thermal and environmental properties of nanofillers/rubber composites have been improved.

[35]

Keywords: nanofillers, nanocomposites, bio sourced nanofillers, hybrid nanofillers

1. Introduction

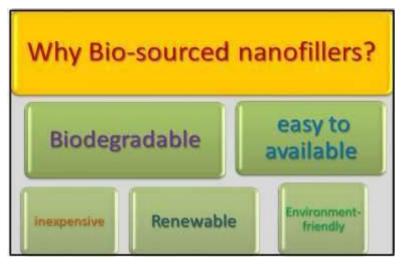
The innovation of renewable, degradable and sustainable bio based composites is the best solution to handle environmental problems like climate change, pollution and steady consumption of petroleum resources associated with material development [1]. Nanocomposites have wide interfacial area available for stress transfer compared to conventional microcomposites, due to their nanoscale size. Therefore, nanocomposites show innovative and reinforced properties compared to pure polymers or their conventional composites. These include improved mechanical, thermal, barrier, and flame retardancy, electrical and environmental properties [2]. Generally, properties of pure rubber are fails to fulfill the practical applications and hence addition of filler is very essential for enhancing the properties as well as introduction of new properties into rubber. Hence in recent years researchers around the world working on the development of rubber nanocomposites instead of rubber composites [3].

Currently, carbon black (CB) and silane-modified silica are the most commonly used reinforcing fillers in rubber composites because of their strong reinforcing effects. Other additives such as crosslinking agents, activators, antioxidants, heat stabilizers, dyes, pigments, plasticizers, oils, etc [4]. However, the production of CB is very energy consuming and is not sustainable. Also CB is petroleum in nature is the another disadvantage. Furthermore, for better reinforcement higher loading is needed, which may be reduce the processability of rubber components [5].

Bio based fibers extracted from some of the popular natural fiber plants and used as fillers for green composite preparation [6]. Recently, agricultural wastes and co-products have been majorly used to develop bio composites because of their inexpensiveness,

[36]

availability, and excellent performances [7]. Nowadays, rubber composites with hybrid nanofillers are also a hot topic for researchers. Because synthesized hybrid fillers show great synergistic reinforcement towards polymer compared to individual filler [8].



2. Carbon based nanofillers

There are various studies manifesting improvement in properties of polymers and their composites by adding carbon based nanofillers like carbon nanotubes, carbon Nano fibers, and nanographites [9]. Size and shape of nanofillers are major factors in polymeric composites reinforced with nanoparticles [10]. Moreover, the formation of free surface and interphase boundary between the polymer and filler results high aspect ratio and can contribute the improved interaction due to the presence of nanofillers in polymer matrix [11]. Carbon nanotubes (CNTs) and carbon nanofibers (CNFs) are the examples of those nanofillers with high aspect ratios [12]. Previous studies found that CB, CNTs, and GE had a great impact on the mechanical properties, electrical and thermal conductivity, and fatigue properties of rubber composites, due to the different topological structure of

[37]

fillers [13]. Also the CB, CNTs, and GE all evidenced contribution on the gas barrier properties of rubber composites [14].

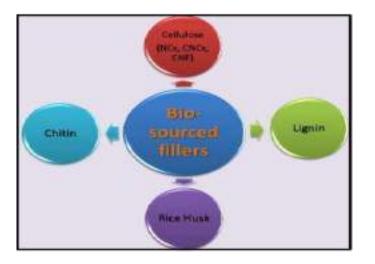
3. Hybrid nanofillers

The word "hybrid" is derived from the Greek–Latin word, which means mixing of more than one materials or composition. Many areas of research associated with chemistry, physics, materials science and biomedical penetrated the concept of "hybrid".The development of hybrid organic–inorganic nanocomposites consisting of polymer matrix and a layered silicate has been studied [15]. Graphene oxide and halloysite nanotube as hybrid nanofillers shows much better reinforcement efficiency towards the mechanical properties of NBR than individual GO and HNT [16]. Also GO and nanoclay hybrid filler [17], silica hybrid nanofillers [18], SiO2 and ZnO hybrid Nanofiller [19] and some bio-based hybrid nanofillers are used as an reinforcing fillers to enhance the properties of rubber polymer.

4. Bio-sourced Nanofillers

Bio-sourced materials include all ranges of plant fibers, biomasses, and agricultural wastes such as rice husk, sugar beet, starch, sawdust, corn stalk, etc. Presently, natural fibers (NF) are the most widely investigated and accepted bio-source constituent for the preparation of bio composites. In order to reduce environmental pollution and global warming, there is increasing interest to replace CB and other inorganic mineral-based fillers in rubber materials with more sustainable bio-sourced fillers as an alternative. Biobased fillers including cellulose nanocrystals (CNC) or cellulose nanofibers (CNF), lignin, starch, eggshell, rice husk, soy protein, etc. have been studied as reinforcements in rubber composites [20]

[38]



4.1 Cellulose nanocrystals/nanofibers

Cellulose nanoparticles extracted from different sources and in different forms have been used in nanocomposites in combination with different polymer matrices. With time, research work on cellulose filled polymer composites has been studied significantly where cellulose has been used in various forms such as nanocrystals, microcrystals, nanofibrils, and whiskers. Cellulose nanocrystals (CNC) and cellulose nanofibers (CNF) are the most researched nanocellulose species as a filler for rubber biocomposites [21].

The main advantages of these CNCs over other nano-fillers are their renewability, abundance, low density, availability of reactive groups, low energy consumption during processing, etc. To boost tensile strength and produce better dispersion in the NR matrix, zinc-modified CNCs can be employed. Whereas oxidised NR latex compatible with CNC to attain enhanced tensile qualities, and maleated NR latex employed to get better surface compatibility with CNC [22].

[39]

4.2 Lignin

There has been huge focus on incorporating lignin as ecofriendly filler in various polymer nanocomposites production. Lignin can be extracted from lignocellulosic biomass in various ways, including soda pulping and Kraft processing. For lignin incorporation in NR latex, the approach of coagulation and roll milling has resulted in improved dispersibility and tensile mechanical properties. Plant cells are joined by lignin and hemicellulose, resulting in a composite with outstanding strength and elasticity [23].

4.3 Chitin

Chitin (Poly- $[1 \rightarrow 4]$ - β -N-acetyl-D-glucosamine), is a natural amino polysaccharide having abundant availability in earth crust as a marine biomass with good biodegradability, hydrophilicity and biocompatibility. Chitin is a long chain biopolymer that can be extracted from many sources like marine animals, microorganisms, and insects. Chitin nanoparticles like nanofibers and nanocrystals are chitin's 1D nanomaterials shows high specific surface area, crystallinity and modulus [24].

Additions of the chitin in rubbers, the resulting composites are possessed to have good strength in mechanical properties. Chitosan is one of the important biomaterials used for food and nutrition, waste water treatment, biomedical, textile, CO2 adsorption and drug delivery. Generally the chitosan can be produced by the deacetylation of chitin.

5. Application of bio-sourced nanocomposites

Performance and sustainability of the products are key factors in the development of bio composites for industrial use. As a result, there is an expanding trend in research that emphasizes the overall performance of natural fiber composites. The use of biobased composites in industrial applications can be found in the

[40]

food packaging industry as well as in the automobile, building, cosmetics, aerospace, electrical, and electronics industries. The advantages of bio-based composites are their superior corrosion resistance, high strength to density ratio, and outstanding mechanical properties. Nevertheless, fiber reinforced composites have anisotropic behaviour, and the rate of loading as well as the environment may have an impact on their mechanical characteristics. The blockage of hydrophilic groups on CNC surfaces, which can lower water absorption and transport, is one application- specific advantage of surfactant addition. The hydrophilic character of negatively charged CNCs can work against this objective because reduced water vapour permeability (WVP) has been found to stop bacterial growth in packaging materials. Comparing biobased rubber composites to commercial NR compounds that contain CB and silica, we found that the crosslinking rate was higher and the apparent activation energy was lower. A partial substitution of CB with waste-derived materials was discovered to be able to decrease the power consumption during rubber processing while maintaining sufficient mechanical performance. It was discovered that adding various types of protein from bio sources with NR, it reduced the bulk viscosity and improved thermo-oxidative stability [25].

6. Conclusion

The use of sustainable and renewable biomass-based fillers, particularly agro-waste waste resources, in rubber composite applications is gaining popularity in line with global sustainable development. This chapter gave a thorough analysis of how fillers made from renewable and bioresources could be improved for use in rubber composite applications. Biofillers have a significant potential to replace or supplement the current petroleum- derived carbon black or the unwantedly high density mineral fillers in rubber composites with the proper processing, purification, and occasionally surface modifications. Developing high-performance

[41]

rubber biocomposites for practical applications continues to be the biofillers thermal stability inhibited by and their incompatibility with hydrophobic polymers and hydrophilic biofillers, respectively. To use biofillers in commercial rubber products, research is required on both hybrid filler systems and rubber composites based on biofiller. While ongoing research and development on various biofiller-reinforced rubber composites to support sustainable development, a streamlined and efficient green processing technology with high-quality products is required to shift the rubber industry's future towards a more sustainable development.

7. References

- Chang, B. P., Mohanty, A. K., & Misra, M. (2020). Studies on durability of sustainable biobased composites: a review. RSC advances, 10(31), 17955-17999.
- 2. Bokobza, L. (2018). Natural rubber nanocomposites: A review. Nanomaterials, 9(1), 12.
- 3. Thomas, S., & Stephen, R. (Eds.). (2010). Rubber nanocomposites: preparation, properties, and applications. John Wiley & Sons.
- 4. Dong, B., Liu, C., & Wu, Y. P. (2014). Fracture and fatigue of silica/carbon black/natural rubber composites. Polymer Testing, 38, 40-45.
- Dominic, M., Joseph, R., Begum, P. S., Kanoth, B. P., Chandra, J., & Thomas, S. (2020). Green tire technology: Effect of rice husk derived nanocellulose (RHNC) in replacing carbon black (CB) in natural rubber (NR) compounding. Carbohydrate polymers, 230, 115620.
- Adeosun, S. O., Lawal, G. I., Balogun, S. A., & Akpan, E. I. (2012). Review of green polymer nanocomposites. Journal of

[42]

Minerals and Materials Characterization and Engineering, 11(04), 385.

- Shaik, S. A., Schuster, J., Shaik, Y. P., & Kazmi, M. (2022). Manufacturing of biocomposites for domestic applications using bio-based filler materials. Journal of Composites Science, 6(3), 78.
- Sanusi, O. M., Benelfellah, A., & Hocine, N. A. (2020). Clays and carbon nanotubes as hybrid nanofillers in thermoplastic-based nanocomposites–A review. Applied Clay Science, 185, 105408.
- 9. Yibowei, M. E., Adekoya, J. G., Adediran, A. A., & Adekomaya, O. (2021). Carbon- based nano-filler in polymeric composites for supercapacitor electrode materials: a review. Environmental Science and Pollution Research, 28, 26269-26279.
- Sahakaro, K. (2017). Mechanism of reinforcement using nanofillers in rubber nanocomposites. In Progress in rubber nanocomposites (pp. 81-113). Woodhead Publishing.
- Yaragalla, S., Mishra, R. K., Thomas, S., Kalarikkal, N., & Maria, H. J. (Eds.). (2019). Carbon-based nanofillers and their rubber nanocomposites: fundamentals and applications. Elsevier.
- Bakošová, D., & Bakošová, A. (2022). Testing of rubber composites reinforced with carbon nanotubes. Polymers, 14(15), 3039.
- Jayalakshmy, M. S., & Mishra, R. K. (2019). Applications of carbon-based nanofiller- incorporated rubber composites in the fields of tire engineering, flexible electronics and EMI shielding. In Carbon-Based Nanofillers and Their Rubber Nanocomposites (pp. 441-472). Elsevier.

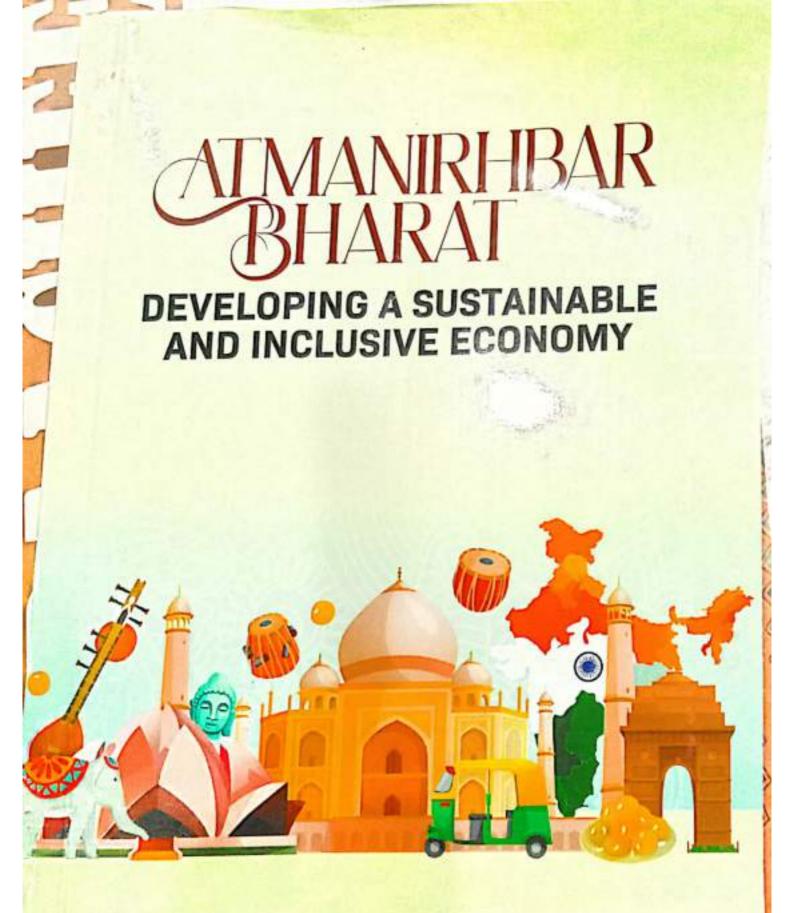
[43]

- Wen, S., Zhang, R., Xu, Z., Zheng, L., & Liu, L. (2020). Effect of the topology of carbon-based nanofillers on the filler networks and gas barrier properties of rubber composites. Materials, 13(23), 5416.
- 15. Abdul Salim, Z. A. S., Hassan, A., & Ismail, H. (2018). A review on hybrid fillers in rubber composites. Polymer-Plastics Technology and Engineering, 57(6), 523-539.
- Hu, X., Zhao, H., Li, T., He, X., Wang, X., Pellerin, C., & Zhang, R. (2020). Acrylonitrile–butadiene rubber reinforced by graphene oxide/halloysite nanotubes hybrid nanofillers through mechanical blending method. Plastics, Rubber and Composites, 49(4), 141-149.
- Keloth Paduvilan, J., Velayudhan, P., Amanulla, A., Joseph Maria, H., Saiter-Fourcin, A., & Thomas, S. (2021). Assessment of graphene oxide and nanoclay based hybrid filler in chlorobutyl-natural rubber blend for advanced gas barrier applications. Nanomaterials, 1 1 (5), 1098.
- Tangudom, P., Thongsang, S., & Sombatsompop, N. (2014). Cure and mechanical properties and abrasive wear behavior of natural rubber, styrene–butadiene rubber and their blends reinforced with silica hybrid fillers. Materials & Design, 53, 856-864.
- Mou, W., Li, J., Fu, X., Huang, C., Chen, L., & Liu, Y. (2022). SiO2 and ZnO hybrid nanofillers modified natural rubber latex: Excellent mechanical and antibacterial properties. Polymer Engineering & Science, 62(10), 3110-3120.
- Mokhothu, T. H., John, M. J., & John, M. J. (2016). Biobased fillers for environmentally friendly composites. Handbook of Composites from Renewable Materials; Vijay, KT, Manju, KT, Michael, RK, Eds, 243-270.

[44]

- Low, D. Y. S., Supramaniam, J., Soottitantawat, A., Charinpanitkul, T., Tanthapanichakoon, W., Tan, K. W., & Tang, S. Y. (2021). Recent developments in nanocellulosereinforced rubber matrix composites: A review. Polymers, 13(4), 550.
- Singh, S., Dhakar, G. L., Kapgate, B. P., Maji, P. K., Verma, C., Chhajed, M., ... & Das,C. (2020). Synthesis and chemical modification of crystalline nanocellulose to reinforce natural rubber composites. Polymers for Advanced Technologies, 31(12), 3059-3069.
- Kazemi, H., Mighri, F., & Rodrigue, D. (2022). A Review of Rubber Biocomposites Reinforced with Lignocellulosic Fillers. Journal of Composites Science, 6(7), 183.
- Thomas, S. K., Parameswaranpillai, J., Krishnasamy, S., Begum, P. S., Nandi, D., Siengchin, S., ... & Sienkiewicz, N. (2021). A comprehensive review on cellulose, chitin, and starch as fillers in natural rubber biocomposites. Carbohydrate Polymer Technologies and Applications, 2, 100095.
- Chang, B. P., Gupta, A., Muthuraj, R., & Mekonnen, T. H. (2021). Bioresourced fillers for rubber composite sustainability: Current development and future opportunities. Green Chemistry, 23(15), 5337-5378.

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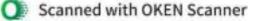
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CHAPTER 9

INTERNET OF THINGS: A NEW ERA WITHIN INDUSTRY FIELD

Dr. Rita R. Raut

Yashwaantrao Chawhan Arts, Commerce And Science College Lakhandur, Dist-Bhandara. Assistant Professor

ABSTRACT:

tablets are connected with peoples by internet. Except that we also increase the demand for hardware, software, coding, programming connect with that devices which are working on sensor point like alarm. guizer, fridge, electric bills, motorcycle, car and many things we use regularly in our life. What if all of these things could talk to each other or act in harmony with each other?We can say for this Internet of Things. It is playing a vital role in a huge area of Industry development. This can language. So, in such a situation, employment will be available but the right skill is required for the young generation who can get opportunity. Hence, the structure of Internet of Things is very expanding through Internet is the Network of many computers. Computers, smart phones, modern technology and it will help in reforming human behavioral. Definitely it will becontributed in Indian Economy.

Introduction

The Internet of Things consists of device connectivity, the appearance of combination of software, hardware, data and services. One important With the help of internet connectivity we attached to many things like industrial motors, wearables like watch, vehicles, shoes, heart monitoring implants, biochip transponders, automobiles, food measuring etc. There is a nuge opposition to take education with coding, programing language with computer-based skill but need to maintain updating. Things that we feature of loT is sensor power which is always used in IoT Applications. a huge opportunity to who having skill of computer in industry sector do easily in today's daily life like bank transactions, movie theater do easily in travel by GPS to any desired means Things physical objects, software-hardware attachment.

object. We can control all objects with the help of internet through our mobile.Through this network one device can send information to another place have become possible due to internet. Every transaction can made easily by internet.We can call this as Internet of Computers.Everything around us is going to be interconnected beyond our imagination. This is called Internet of Things IoT is going to become an integral part of our life in future. Internet of Things means that things which are available around us in electronic form.For example:computer, mobile, watch, CCTV, car, Refrigerator, Washing Machine, A.C., Oven, Kitchen Apparatus, Water pump. T.V., Door Bell, Music System, Lights Fans etc's, Internet enabled electronic devices are easily available in the market. Various modern devices with internet facility are easily available in market.All these are going to have different sensors, software and electronic circuits to connect all the electronic devices with each other. With the help of sensor and electronic facility, the fridge can communicate with another device. This study is focus on how the effect of internet of things can reach to the human behaviors. devices

Keywords- Internet, Human Behaviors, Human Creativity, Applications, Employment

addressing the young people about availability of new corner of working point of their hidden skills. Hence the object in this study is taken for Objectives of the Study: The study is very useful to young generation as skill in network world.

- To determine the result of implementation of "Internet of Things".
- To analysis the effect of such creativity on human behavioral. ci
 - To know the functions of "Internet of Things". ŝ
- To search the limit of human capacity Vs "Internet of Things". 4

the IT sector has provided employment in the economic development of agriculture, industrial etc. The internet has made it easy from small tasks to Area of Internet: Currently, the IT sector in India is booming.Meanwhile, the country by achieving a large development. IT sector provide many Many sectors are attached with IT sector and a huge area of economy is occupied with such different sectors like medical, education, cultural, large tasks.Budgeting, reporting, all types of account preparation, presentation, messaging, transportation, travel, accommodation all the facilities provided by the IT sector made the work of the office faster and casiest applications for people which are suitable to operate their work.

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physical world and information world.

دب or services platforms including different network. applications and networks. They can coordinate with another devices heterogeneous Heterogeneityconstructed on different The devices III the internet of hardware things platforms. are

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- +activity such as sleeping, walking, the process of connecting devices Dynamic changes- A device's position is suddenly dynamic.Physical from location and motion
- ş objects will be more effective. This recounts to semantics of data, as magnitude larger than the devices connected to the current internet. that communicate with one another will be at least in an order of Enormous scale- The number of devices that need to be managed and well as resourceful data handling. The management of created data and their construal for application
- 9 Safety-We need to stay safe in this world. IoT must be planned with safety of our physical devices also.Safeguarding the endpoints, the security in mind. It can include the safety of our personal data and the networks and the data affecting across all of it means making a safety paradigm in Internet of Things.
- -1 Connectivity-Connectivity enables data needs to be connected when it wants to generate, transfer or receive is no longer in use, the connection can be detached whereas the device data. The intermittent connectivity is desirable in IoT as when device compatibility provides the common capability to utilize and create compatibility. Approachability is found on network a network accessibility while and
- 00 connected to IoT should be unique. The renovation and translation of Naming and Addressing- Thenames and addresses addresses resourcefully. from a network to the another should take place of devices

Scope of IoT automatically ask the regular shop for soft drinks. Without going to the as needed by the person in that room. If the bottle of soft drink in the everyone control it.Likea A.C. room can automatically set the temperature special things that is a device which can control things anywhere and can hospital, the doctor can prescribe the medicine to patient on mobile fridge is low, the fridge will send a message a Think that can touch to the sky by providing a way like to your mobile 01



Modernization of the predicting the weather thetechnology of the water pump as needed by predicting the weather tark through of the water pump as will not have to come to us. Let's know some examples Modernization of farm equipment will automatically turn on and off the of internet of things industry.

speed, temperature, fuel etc.Being able to easily communicate with the IoT in Automobile Industry- Nowadays, internet is available in the outside world with control.Dashboard can give answer for how 10 dashboardof all cars.Henceforth the car can track its own mileage. reach at any place, do we have to wait for thatetc.A Dashboard can do deliver any kind of information to car owner or dashboard driver like all kinds of work of smart phones. like Dashboard can automatically voice of driver, road traffic, climate, storms etc. _

IoT in Houses

All the devices in the house will be connected to a control monitor and songs by recording your favorites channels and songs. The world-famous will know and control temperature, humidity, smoke, pollution in the house. If an unknown person enters this 'Smart Homes', an alarm will sound immediately and the notification will be received on the home owner's mobile phone.TV and music system will help you play the same Philips company, which manufactures electrical appliances and lighting is looking in this mirror based on 'loT' it will communicate with you and information about today's date, wind, temperature, changing changing the light accordingly. 'Smart Mirror' is one such type. While environment. give

- patient to treat an ailment. Because the doctor will know condition of IoT in Healthcare- It will no longer require hospitalization of a the patient by attaching the devices with various senses to the patient temperature, blood pressure and patient movements records will be automatically sent to the doctor.On this the doctor will prescribe the medicine online and if needed, the ambulance will be sent a message breathing rate. and it will go to the given address.It can be treated immediately body at the patient home. ECG, Heart Rate, ci
- the information of how much goods have been sold and how much is be connected by IoT.Then the second production process starts from IoT in Industry- A worker can manage and operate the machine material processing to finished goods processing, all components will effectively even without being present at the work site. From raw left. That is, the supply will be as much as the demand. m

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20 of the goods, remaining space in the godown, coordination of trucks IoT in Communication- The complete information about the delivery and manpower, means of transport, parking, etc. will already be available on the mobile of the goods supplier.

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- 50 for athletics that has installed sensors on the smart shirt, thereby IoT in Sports- Ralph Lauren is the first American clothing company connecting the athlete's heart rate, breathing rate, blood pressure, calorie burn, all information with an iPhone or Apple improve the athlete's habit. watch to
- 6 1oT in Car, Agriculture, retailer, management, dust in relation to the car, it can be said that if a car is coming in the opposite direction, the car driver will be informed about it and he will special scheme has been implemented to get return on investment become determining the quantity of fertilizers have become convenient. from it.From that, soil moisture, nutrients, proper use of water and alert.Government has added technology for agriculture.A poultry, smart

Limitations of IoT

data sector.But these same applications have some drawbacks such as lack of Various applications of IoT have created a distinct niche in the industry personal security.Lack of security can be seen due to theft, problems in privacy.It always needs approval.Difficulties arise when communicating necessary.More cloud creates a problem. has to be carried with power battery and electric connection where data about the environment.As usual network connectivity issues occur.It usage.Your information cannot be kept secret unless there is

Suggestions

not on its demerits. The matter of security is very important but many As above given limitation, we have to need focus on the advantages of IoT things can connect to us at anywhere whenever we want to use it for so be ready to capture its area. While moving towards the future, it is very controlling a system.So, think about that. It provides a new employment. technology overpower humans, it should be used to a certain extent. Important to keep in mind its disadvantages and move forward.Don't let

Conclusions-

employment will be seen in it. There will be a huge demand in the industry In the future, a different form will be seen in the industry.A new ray of

for the youth who have knowledge or artificial intelligent and loT in software, computer skills etc.For that, students need to think about commercial matters rather than giving 100 % behind their degree or higher and computer skills, they can adfinitely set up their careers.It needs to be updated.		Dr. Kamlesh Lakhani, Dr. Hemant Kumar Gianey, Joseph Kofi Wireko, Kamal Kant Hiran, "Internet of Things-Principles, Paradigms, and Applications of IoT", BpB Publications, New Delhi, ISBN 978-93-89423-365, Pg.No.652.	Jose Jeeva, "Internet of Things", Khanna Publishing House, 14 2018), New Delhi, ISBN No. 978-93-86173-59-1, pg.no.299-375.	DhotreIresh A., "Intrenet of Things", Anna University, Technical Publications, Pune, ISBN: 978-93-90041-06-0, Subject Code:CS8081, June 2020, Pg.No.1-34	Jain Satish, Singh Shashi,"Internet of Things and its Applications: Made Simple (English Edition), BPB Publication, 1st Edition-1 January 2020, ISBN No. 978- 9389845761.	Indian Institute of Banking and Finance, "Digital Banking", Taxman Publications (p.) Ltd. New Delhi,2019.	Udyojak- Internet of Things, Diwali Special Journal, M/s. Printwell International Pvt.Ltd.MCED, Aurangabad, 2022, Vol. XXXII, Issue X. Pg.No.55.	https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT	https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf	https://mrcet.com/downloads/digital_notes/EEE/IoT%20&%20Applications%20Digit al%20Notes.pdfvvvvvvvvvv		- 98 -
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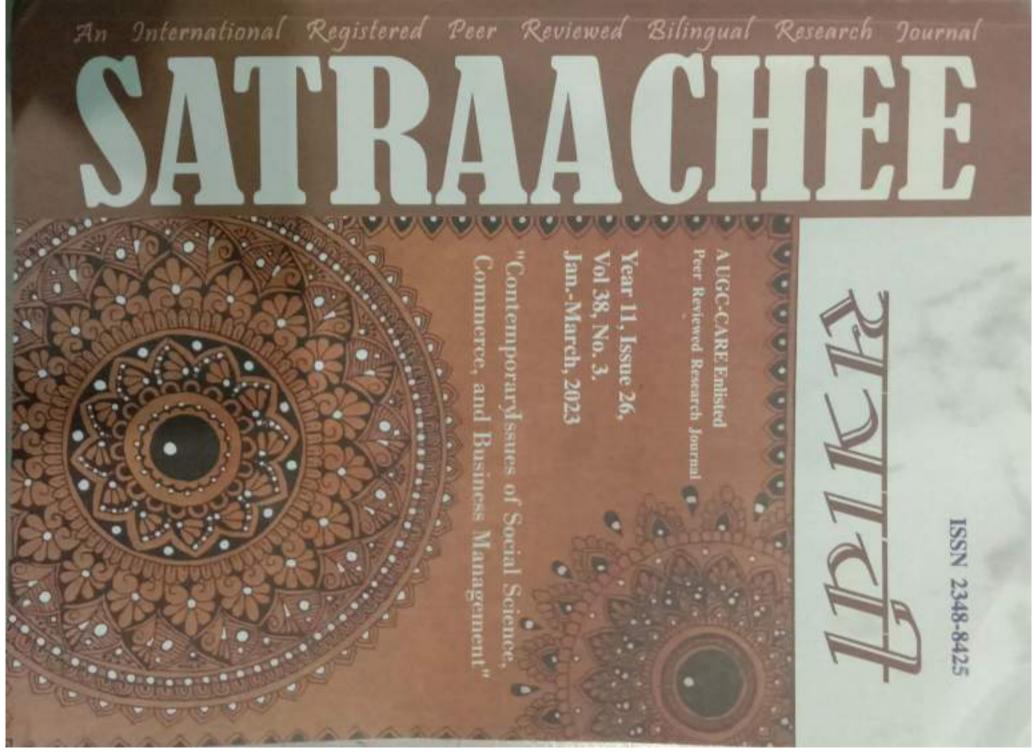
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Apps, 7,4%. Duted topped 12 million.So, in services, IT sector primarily taking employment is above 12 million.So, in services, IT sector primarily taking place as provider of employment.Social media also taking place for Shopping APP 2022, the contribution of IT Sector in Indian GDP is contribution. In FY 2022, the contribution of IT Sector in Indian GDP is 7.4%. Direct Employment in IT services is above 5 million and indirect people liked to do unternet is the need of all. PhonePe, PayTM, Google increased and today internet is Government Apps. F. Comment, Google Pay, U.L. Apps etc's are become easy to handy due to IT sector. people liked to do their work easily from home, the importance of internet Apps, E-Commerce Banking Apps, Government joining people at single platform. UPI. Pav.

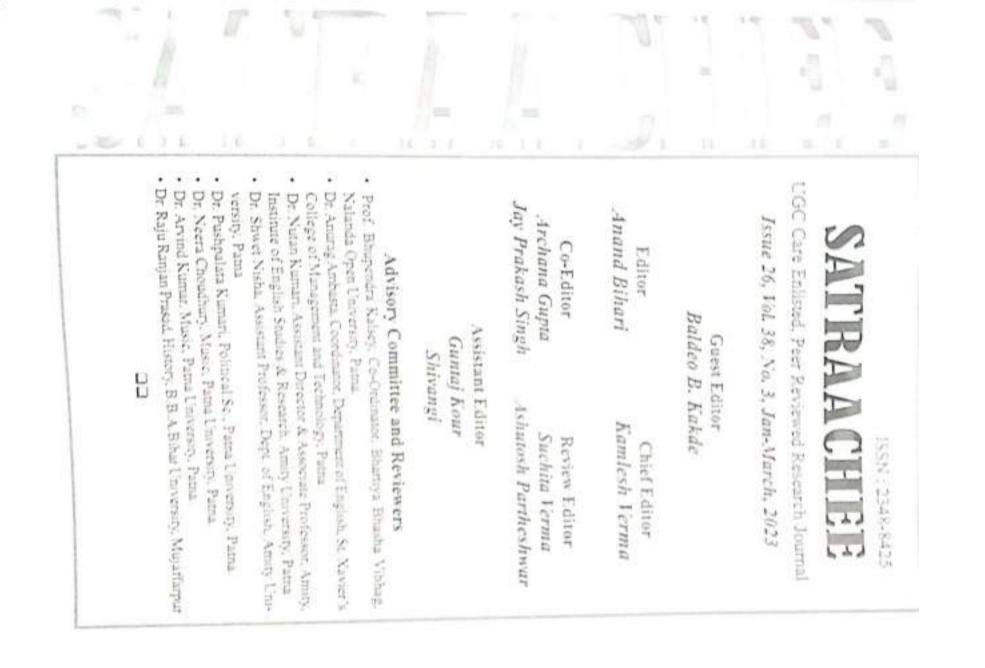
form of Fan,T.V., Fridge etc. Peoples are ready for accepting this new his mobile. Many peoples are having such devices at their home in the distance by using mobile. He can control temperature and speed through handle everything everywhere by network connectivity. Now we see in advertisement that Mahanayak Amitabh Bachchan played a role in advertisement of wifi inverter A.C. He can operate A.C. from a long format has become more online. Various tasks related to the entire office through special App for Auditing, income tax, budget, meetings report, file maintenance etc. can done by IT sector. People can communicate, can listen songs, can call to any person, can operate business on mobile, can completing their office work from home. It shows how convenient the creating various apps through the Internet, the education of various arts could reach the masses.Now people are so used to internet that they don't feel comfortable working offline.It seems that the work of online official internet has been made by the IT sector. Even in the field of education, by making it platform for their work. People have understood the importance of internet since corona and most of the employees of companies are still thousands of people where experienced internet facility depends on nature of work. From that period, people engaged with internet facility by Human Behavioral in digital platforms: Incorona pandemics, more than concept. They can operate device from outside area.1

Characteristics of IoT- Commonly some characteristics of IoT are found out.

- Interconnectivity- With the help of internet of things, every type of communication global information and connect with infrastructures. can thing -
- things. There will be a change can occur in between technology of semantic consistency among physical things and their related virtual Things related services- Internet of Things can provide application about services within its criteria such as privacy protection and ci







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SERVICE SECTOR : A MEDICINE FOR STRONGEST INDIAN ECONOMY

O Dr. Rita R. Raut*

Abstract :

The service sector has taken the lead in many places in India. Agriculture and industsectors are developing at a large rate while services are being developed. Generally service work is transferred from one person to another in an invisible form. Services are also in intangible, invisible and visible form. The development of industry sector, agriculture secur, education sector, trade sector and various sectors mainly depends on service sector. The progress of other service organizations depends on the availability and readiness of the service. So, in the current situation the service areas are expanding day by day and continuously. It mainly pushed and boosted capital development, employment Generation. proper utilization of human resources, increase in technology, customer satisfaction. economic and industrial development etc. It also helps in day-to-day life cycle. In 2021-22 total expenditure on medical fare is only 2.1% of GDP as compare to Japan or other countries. The highly contribution of Travel and Tourism industry in India by 178 billion dollars # Indian GDP. The total contribution of service sector in Indian GDP is 60%. In India, de expansion of the service sector has given a major boost to job creation. It has helped a lot if solving the problem of unemployment in the country. Services are also expanding due a current globalization.

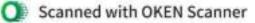
Keywords : Service, Indian Economy, Start Up, Digital Platforms, Employment

Introduction

Services are not visible like goods. Service is the main part of any humanity and with the help of service factor, we maintain connectivity in society. In the modern era, the importance of marketing has increased and the role of the service sector is important of it. Along with goods, the demand for services has increased. But services cannot be measured like goods. Some services are not visible like medical services, entertainment service travelling services etc. Service Sector is played an important role in developing economic







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of India. Service sector is wide area. It includes various contents like trade, hotel, transport, storage, communication, financing, business services, personal services etc. There is need of service of schools, hospitals, administrative and accountings for development of Indian Economy. Increase in service sector of India is a unique example of traditional model of development of Indian Economy. But it providing less employment.

Agriculture and production department still contain high employment. Start-up concept provide many new employments with grateful services. It proposes digital platforms to societies which give new inspiration to young generation. Service sector increases its importance after Corona Period. It is third source of earning in Indian Economy. Service sector includes all contents which are taken by people using time and knowledge for improvement in productivity, uses, capacity, possibility, durable etc. The object of this study is to provide awareness about employment providing sector i.e., service sector which is giving positive approach in young generation.

Objectives of Study :

India has tremendous structures nearby creativity in ability development content. India Government has started the "Digital India" notion overall India. Within this concept, many peoples were coming under service factor and the purpose of India Government providing the digital platform is self - employment.

On this basis, in this study the purpose is taken according to the need of employment at present date. Some Objectives are here-

- 1. To provide awareness within society about service sector in India.
- 2. To maintain Sustainable Development through service area.
- To provide knowledge about role of service sector in employment.
- To study the startup features about service sector

Research Methodology :

In this study, some data is taken from secondary sources like books, newspapers, periodicals, articles, websites etc. some data is primary type was usual by online survey. As well as it primarily be contingent upon exploratory in countryside. The study is based on quantitative and qualitative methods.

Review of Literature :

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The aspect of FDI i.e., foreign direct investment in India service sector(a study of post liberalization) are analyzed by most of the scholars and researchers that are Dr. Arjun Singh Sirari and Mr. Narendra Singh Bohra.2011 examined the role of FDI in service sector.

Indian Economy and service sector: When the importance of online increased during the Corona period, online services were increased according to the needs of households. When the importance of online increased during the Corona period, online services were increased according to the needs of households. And the benefit of this is the increase in the number of unicorns that offer large-scale online services.Out of which a large number of employments were generated. It shows that the demand for service sector is more. More than 6 lakh jobs created by unicorns in India. It includes Ola, Big Basket, Paytm and so on.

The economy is depending upon three criteria which are agriculture, industrial and

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service. Out of these the third sector is very helpful for creating employment and to be service.Out of these the third sector is very nerry fields like medical, tourism, leisure's Indian economy by giving contribution in many fields like medical, tourism, leisure's Indian economy by giving contribution and at current price is 53.89% of total Indian ian economy by giving contribution in the price is 53.89% of total $India_{3}G_{2}$ In 2020-21, the gross value added at current price is contributes 20 total $India_{3}G_{2}$

In 2020-21, the gross value added at endurum sector contributes 20.19% in Gau Industry Sector contribute% as well as ugenal Product. As usual the agriculture form mostly contributed sector in Indian Economy.

The following table shows the sector wise GAV in India and their shares.

Sr.No.	Sectors	GAV Rupees in Crore.	Shares in %
1	Public Administration, Defense and other services	2,761,996	15.42
2	Financial Real Estate and prof. services	3,950,786	22.05
3	Trades, hotels, transport, communication and services related to broadcasting	2,941,477	16.42
Total G	AV at basic prices	9,654,259	53.89%

Table No.1.1 GAV in Indian Economy (2020-21)

Source : Ministry of Statistics and Programme Implementation 2020-21

From above table, there is 53.89% in shares of Indian Economy. Financial Real Est and prof. services contribute 22.05% in it. Agriculture sector contributes 20.19% in GA same as Industry Sector contributes 25.92% in GAV.

The contribution of service sector in Indian GDP is increased for continuously accerde to many peoples. Foreigners are taking interest in Indian Service Facilities because India has a big group of skilled worker, low charges and high education. Practically, the quality which is liked by people in other country. So, on this basis, many other country are started out sourcing in business services and in ITsector services. Due to this services facilities have been providing a boosting power to Indian Economy and the result is show in GDP growth.

FDI and Service Sector :

FDI increases job opportunities in country and help to create skill-based thing. It is boosts Indian export system and encourage to international organization for entering domestic market. In March 2021, FDI in insurance sector is increases from 49% to 2 FDI helps in reforming economy of many countries and it is very essential factor for growthe economic globalization. FDI means investing in a company in another country.RBI com FDI under FEMA.FDI inflow of foreign currency into India leads to creation of a infrastructure in India, increase in productivity and in turn increase in employment service sector accounts for the largest share of foreign investment inflows to India Infirst half of 2021-22, foreign direct investment of USD 16.73 billion has flowed into services sector "The Economic Content of USD 16.73 billion has flowed into services sector."The Economic Survey report shows a significant increase in foreigner investment in financial, business, outsourcing, research and development, court technology testing and analysis of the second development. technology testing and analysis and education sub-sectors.Currently ENCUBE announced a new R&D Center of Excellence at Palava.

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Inale in Service Sector :

Services are the backbone of the global economy, accounting for more than two-thirds /dobal GDP and attracting three-quarters of FDI. Globally, new job creation takes place analarge scale. Service trade has become very important. First sea trade was seen only then estrance trade increased Service is mainly seen in it. Now the importance of IT sector is screases day by day. Specially in communication technology, services are popular by peoples. It brings new service pattern in society. That's why some companies are conomically developed. It includes legal, engineering, professional services, computer grices, telecommunication etc. GATTS provides special rules for service market which sip to determine the status of transaction whether it is residents or non-residents. Basically the "the mode of supply" is known for the service provide on the basis of transactions serveen supplier and customer at territorial place which contracts about the trade services. India has a lion's share in exporting services globally. In 2020, India has taken place in First Ten's list in service exporter. In 2020, services are covered at 4.1% contribution in commercial services as compared to 2019 which was 3.4%. The Net export growth rate in 2021-22 is 22.8%.

In the year 2021-22, the IT sector will provide 5 million jobs in India and account for 51% of services exports. IT sector provide more than 290 M&As by focusing digital platforms. Industry and digital revenue contribute five times more than service sector in Indian economy by various new skills in employees.

Start-Up and Digital platforms :

Currently, start-ups have taken over the services marketing. The start-up helped the youth to find employment. Many service professionals have gained a foothold in the market. Many service professionals have gained a foothold in the market. Among the various tcosystems in India, startups are becoming important. Among the various ecosystems in India, startups are becoming important. The services sector has captured the market share in the Indian economy. The services sector has captured the market share in the Indian teonomy. Service base business growing fastest in India because it contributes in GDP growth, employment, trade, and in investment also. There is also major contribution of E-Commerce in pie. By Morgan Stanley study says in 2020 that the business of E-Commerce market has been increases from \$ 102 billion to \$ 119 billion. Many start-ups in India hining advantages because of service based businesses. There are some reasons for successful ^{a start-up} project like low capital cost, faster to launch, lower business risk, flexibility and daptability etc. There is some successful service-based startups in India are Zomato, Practo, Rentomojo etc.Zomata is working for search a particular restaurant by online and provide theses for taking decision within 1 million options in 23 countries. This service is launched ¹⁷ 2008 by providing service to 3,31,200 restaurants in 19 countries. Practo is known for balls health tech company with more than 1 lakhs doctors and more than 20 million patients ¹⁰⁷⁰¹⁰ the worlds. Rentomojo is providing online rental facility for furniture.

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Service Sector and Sustainable Development : Sustainable development is achieved by managing the natural processes of things. Business of services in it is certainly a pollution-free matter. Big factories have to be set up

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for the production of goods and this leads to destruction of the structure of nature Service marketing plays its role after the for the production of goods and this teles rvice marketing plays its role after the goods businesses can avoid these side effects. Service marketing medical as well as religious businesses can avoid these side criceda, hoteling, medical as well as religious and son manufactured. Services include travel, hoteling, medical as well as religious and son culture. It receives a large amount of foreign investment. Service sector is based on oils mode also. Hence it similar to digital economy. Service can reach everywhere by fin online to offline way.so, each and every person can get the benefits of any products at a place. ITU's contributed in 17 SDGs goals. It also taking place in service area, Service Area provide a huge number of services which are paperless also. So, day by day to importance of service sector is increases though various platforms which are helpful growth in digital economy.

Conclusion

The service sector plays an important role in developing Indian Economy as wells digital economy. It helpful in creating digital jobs, pollution free environment, increase FDI. It also helpful in maintaining sustainability. IT sector and Banking Sector are provide best services to peoples by many securing applications. Due to service sector, from uth to rural area all type of peoples can involve and make themselves economically stren One thing is it difficult in requirement of skill which are not properly gathered. Vision people need to be change for implementation of the sector.

References :

- 1. https://statisticstimes.com/economy/country/india-gdp-sectorwise.php
- 2. https://www.ijeronline.com/documents/volumes/Vol2issue2/ijer20110202(2).pdf
- 3. https://mospi.gov.in/download-reports
- 4. https://www.oecd.org/trade/topics/services-trade/
- 5. Udojak Magazine Diwali 2022 Seva Kshetra pg.no.35, 47.
- 6. Mohanty R.P., Lakhe R.R., "TQM in service sector Understanding The Service System Jaico Publishing House, Mumbai 2011, pg.no.879 &1054.
- 7. Nayyar Gaurav, "The Service Sector in India's Development", Cambridge University Pro-2012, pg.no.302.
- Thakur Gurudev Singh, "Service Marketing-Service Sector Global Dominance", pg. no.6.
- 9. https://www.investindia.gov.in/sector/it-bpm
- 10. Bodhankar Sudhir and Parakhi Megha, "Sevakshetravyavsthapan", Sainath Publication Nagpur, pg. no.1-54.
- 11. https://startuptalky.com/service-based-start ups-successful-india/
- https://www.forbes.com/sites/bobeccles/2019/11/03/the-importance-of-the-services to-the-sustainable-development-goals/?sh=66421b3878ff
- 13. https://www.unesco.org/en/education-sustainable-development 14. https://www.mospi.gov.in/national-sample-survey-nss

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SERVICE SECTOR : A MEDICINE FOR STRONGEST INDIAN ECONOMY

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Dr. Rita R. Raut*

Abstract :

solving the problem of unemployment in the country. Services are also expanding due to current globalization expansion of the service sector has given a major boost to job creation. It has helped a lot in Indian GDP. The total contribution of service sector in Indian GDP is 60%. In India, the The highly contribution of Travel and Tourism industry in India by 178 billion dollars to total expenditure on medical fare is only 2.1% of GDP as compare to Japan or other countries. proper utilization of human resources, increase in technology, customer satisfaction, economic and industrial development etc. It also helps in day-to-day life cycle. In 2021-22 continuously. It mainly pushed and boosted capital development, employment Generation, service.So, in the current situation the service areas are expanding day by day and progress of other service organizations depends on the availability and readiness of the education sector, trade sector and various sectors mainly depends on service sector. The intangible, invisible and visible form. The development of industry sector, agriculture sector, work is transferred from one person to another in an invisible form. Services are also in sectors are developing at a large rate while services are being developed. Generally service The service sector has taken the lead in many places in India. Agriculture and industry

Keywords : Service, Indian Economy, Start Up, Digital Platforms, Employment

Introduction

travelling services etc. Service Sector is played an important role in developing economy like goods. Some services are not visible like medical services, entertainment service, it. Along with goods, the demand for services has increased. But services cannot be measured importance of marketing has increased and the role of the service sector is important in the help of service factor, we maintain connectivity in society. In the modern era, the Services are not visible like goods. Service is the main part of any humanity and with

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Recent Trends in the Basic Science

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PREFACE

The present book focuses on the development of theories and applications, and also promotes interdisciplinary endeavour among Basic Science.

The present volume is based on contributions made by various authors on the topics of their interest about "Recent Trends in the Basic Science" and introduces the subject along with the following topics: FIRST PRINCIPLES CALCULATIONS ON THE OPTICAL PROPERTIES OF AAA STACKED TRILAYER SILICENE,

GRADED RESPONSE ACTION PLAN (GRAP), DESIGN AND DEVELOPMENT OF COLPITTS OSCILLATOR USING NMOS TRANSISTOR IN THE FORM OF NANO TECHNOLOGY AND SOME AUDIO FREQUENCY RANGE, TIME SERIES ANALYSIS OF ATMOSPHERIC TEMPERATURE USING ARIMA MODEL, BLACK HOLES AND ITS DYNAMICAL CHARACTERISTICS, AN INNOVATIVE CIRCUIT TO DESIGN A LOW POWER CONSUMPTIONS HIGH SPEED CLASS -A AMPLIFIER, NITROGEN CONTAINING POTENT HETEROCYCLES: AN OVERVIEW, AIR QUALITY AND UNDERSTANDING THEIR ROLE IN ADVERSE HEALTH AND ENVIRONMENTS, A NEW REVERSIBLE 10*10 GATE AND ITS APPLICATION, ANALYSIS OF INDUSTRIAL PROSPECTS AND AVENUES EMPLOYING INTERACTIONS OF BIOPOLYMERS AND IONIC LIQUIDS, AN APPROACH ON NETWORK SECURITY WITH CRYPTOGRAPHY, A PRACTICAL APPROACH TOWARDS DETECTION OF FACE MASKS IN PUBLIC SECTOR.

So, the purpose of this book is to gather into one volume many of the topics.

We must place on record our sincere gratitude to the authors for their endless efforts in order to help the reader to build a high-quality book chapter.

We must place on record our sincere gratitude to the authors not only for their effort in preparing the papers for the present form, but also their patience in waiting to see their work in print. Finally, we are also thankful to our publishers for taking all the efforts in bringing out this volume in short span time.

Editor

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Chapter 8

Recent rents

AIR QUALITY AND UNDERSTANDING THEIR ROLE IN ADVERSE HEALTH AND ENVIRONMENTS

PRANAY B. WASNIK¹ AND SUMIT D. ROKADE¹

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Abstract

Pollution is introduction of harmful substance or product into the environment. Air pollution is one of the biggest trends for the environment and effect everyone human being, plants, animals and aquatic ecosystem. Air pollution effect on global climate change due to increases of Co2 and other greenhouse gasses. Polluted air in atmosphere such as Sulphur dioxide and nitrogen oxide particles in the air can create acid rain. Recently in India as due to rapid growth of industrialization, over population, vehicle emission and urbanisation, Air quality index (AQI) of most of the major cities has been rapidly increases and it becomes going to most hazardous situations. There are many pollutants that are major factors of disease in humans, Air pollution is one of them that causes major public issues such causing respiratory and cardiovascular diseases, asthma, bronchiolitis, cardiovascular events, central nervous system dysfunctions, cutaneous disease, reproductive, and lung cancer. Recent studies we have provided estimates of this environmental effect and effect on human health through correlations of air quality.

Keywords: Air pollution, environment, greenhouse gasses, climate change, air quality index, respiratory diseases.

Introduction

Now a day's human activities have an adverse effect on the environment by the air we breathe, polluting the water we drink and the soil in which plants grow. At the present day's air pollution is a major public issue. So, question is arising that, what means air pollution? Air is contamination of many chemical, biological and physical agents which contaminate or pollute the air are called air pollution. It is the world largest environmental health risk which is leading to the millions of death risk. In our earth atmosphere is consist of many particles and gasses such as Nitrogen 78 percent, Oxygen 21 percent, Argon 0.93 percent, Carbon dioxide - 0.04 percent (appro) and amounts of neon, helium, methane, krypton and hydrogen, as well as water vapour. Most of these gasses are not visible for our naked eye. an atmospheric gas, these gasses are polluted when they emitted by cars, power plants, industrial boilers, refineries, and other sources chemically react in the presence of sunlight. Toxious gases, which are include carbon dioxide, carbon monoxide, nitrogen oxides (NOx), and sulfur oxides (SOx), are components of motor vehicle emissions and by-products of industrial processes. It is now generally recognized that exposure to outdoor air pollution pays to a broad array of acute and chronic health effects, ranging from minor physiological effects to death from respiratory and cardiovascular syndrome. It is also recognized that the effects on human health are large and widespread [1]. Air pollution are from the combination of both unfavourable weather and high emissions. Air quality executes to protect public health through emission controls. The resulting developments in air quality may be controlled by changes in weather statistics, i.e., changes in climate [2] Air pollution hazards are normally enumerated for ambient household air pollution, particulate matter pollution and to a smaller extent tropospheric ozone. The main sources of ambient particulate matter pollution in India are residential and commercial biomass burning, industrial emissions, agricultural stubble burning,

waste burning windblown mineral dust, coal burning for energy generation, construction activities, brick kilns, transport vehicles, and diesel generators [3]. There are two types of air pollution one is the outdoor air pollution and other is indoor air pollution but according to The World Health Organization (WHO) reports on six major air pollutants, namely particle pollution, ground-level ozone, carbon monoxide, sulphur oxides, nitrogen oxides, and lead. Air pollution can have a disastrous effect on all components of the environment, including groundwater, soil, and air [4]. Vehicle emissions, fuel oils and natural gas to heat homes, by-products of manufacturing and power generation, particularly coalfuel power plants, and fumes from chemical production are the primary sources of human-made air pollution. Nature releases hazardous substances into the air, such as smoke from wildfires, which are often caused by people; ash and gases from volcanic eruptions; and gases, like methane, which are emitted from decomposing organic matter in soils.

Traffic-Related Air Pollution (TRAP) from motor vehicle emissions, may be the most recognizable form of air pollution. It contains most of the elements of human-made air pollution: ground-level ozone, various forms of carbon, nitrogen oxides, sulphur oxides, volatile organic compounds, polycyclic aromatic hydrocarbons, and fine particulate Matter. Toxious gasses, which include carbon dioxide, carbon monoxide, nitrogen oxides (NOx), and sulphur oxides (SOx), are components of motor vehicle emissions and by products of industrial processes. Particulate matter (PM) is composed of chemicals such as sulphates, nitrates, carbon, or mineral dusts. Vehicle and industrial emissions from fossil fuel combustion, cigarette smoke, and burning organic matter, such as wildfires, all contain PM. A subset of PM, fine particulate matter (PM 2.5) is 30 times thinner than a human hair. It can be inhaled deeply into lung tissue and contribute to serious health problems. PM 2.5 accounts for most health effects due to air pollution in the U.S. Volatile organic compounds (VOC) vaporize at or near room temperature—hence, the designation volatile. They are called organic because they contain carbon. VOCs are given off by paints, cleaning supplies, pesticides, some furnishings, and even craft materials like glue. Gasoline and natural gas are major sources of VOCs, which are released during combustion.

Impact on Human Health

In phrases of health hazards, every unusual suspended material withinside the air, which causes problems in regular function of the human organs, is described as air toxicants. According to available data, the primary toxic results of exposure to air pollutants are especially at the respiratory, cardiovascular, ophthalmologic, dermatologic, neuropsychiatric, hematologic, immunologic, and reproductive systems. However, the molecular and cell toxicity can also result in loads of cancers withinside the long term [5]. Even small quantity of air toxicants is proven to be risky for susceptible groups including youngsters and elderly human beings in addition to sufferers suffering from respiratory and cardiovascular diseases [6].

Respiratory disorders

Although the bronchopulmonary tract has more than one protective mechanisms, together with mucosal cilia and air-blood barrier, air pollution are able to build up in or pass via lung tissues depending on the dimensions and chemical nature of pollutants[7]. Negative health effects of air pollutants have been shown on multiple respiratory diseases, including respiratory infections asthma, chronic obstructive pulmonary disease, lung cancer, even in combination with stroke and heart diseases We briefly outline these direct negative effects of air pollutants on major respiratory diseases as below.

Respiratory infections

Air pollution enhances the severity of respiratory infections, especially in youngsters. Especially, outdoor pollutants in big cities is related to a excessive burden of numerous acute respiratory infections, which collectively are accountable for almost a third of all deaths in youngsters below five years old [8]. However, indoor pollution contributes to excessive rates of chronic bronchitis of non-smoker cooking mothers in hilly areas of Nepal [9], suggesting that indoor pollutants is possibly greater related to breathing infections in growing international locations and rural areas. The destructive effect of air pollution may be highlighted mainly in people with pre-current lung infections or other lung diseases, due to the fact they may be possibly at more risk, and additionally in youngsters, probably due to the fact youngsters have a relatively large lung floor region and greater outside bodily sports with a more threat to show to air pollutants.

Asthma and COPD

Ambient air pollution will increase the chance of respiratory mortality, however evidence for influences on lung function and obstructive lung disease is less well established. Recent research and reviews have reported suggestive proof linking outdoor air pollution and lung function and chronic obstructive pulmonary ailment (COPD) [10]. Emergency visits for asthma are mostly related to the exacerbation effect of environmental exposure. Both major outdoor and indoor pollutants, including O3, CO, NO2, SO2, PM10, PM2.5, dust mite, pollen, pet dander, and smoke, contribute to more severe allergic responses. Specifically, allergic immunoglobulin E (IgE) responses to pollen or ovalbumin can be triggered by diesel exhaust particles (DEP) exposure[11] and airway responsiveness in asthmatic patients with house dust mite challenge can be potentiated by short-term exposure to nitrogen oxides. Similarly, long-term exposure to indoor air pollution from second-hand cigarette smoke and biomass fuel is able to induce chronic inflammation that contributes to COPD, while exposure to PMs is linked

to the acute exacerbation-related hospitalization of COPD patients. Overall, more epidemiological associations have been reported to link the exposure to air pollutants with the development of asthmatic and chronic inflammation [12].

Lung cancers

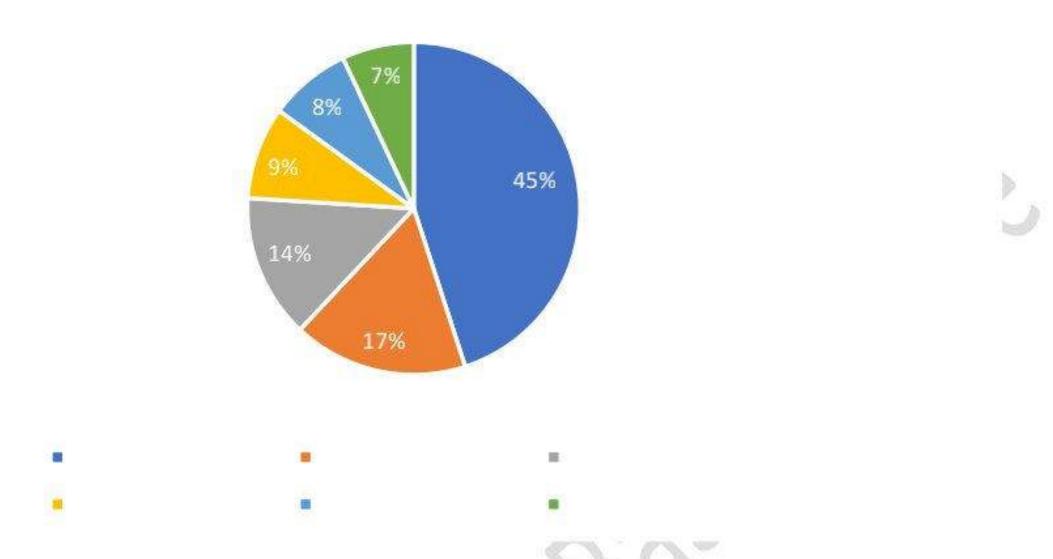
Epidemiological studies have clearly demonstrated that air pollution is associated with lung cancer incidence and mortality[13]. Lung cancer is the primary killer of all cancer death globally, lung cancer in non-smokers if taken into consideration as a separate entity, might be ranked the 7th maximum lethal most cancers, inflicting an estimation of 200,000 lung cancer deaths globally. Despite robust epidemiological evidence linking air pollutants with lung cancers, even in non-smoking subjects, there are limited studies elucidating the molecular mechanism of carcinogenesis in air pollutants-associated lung cancer[14]. The most important purpose for the gradual developing frame of proof in this discipline is because of the more than one demanding situation confronted in air pollutants research. To elucidate the gene/molecular interplay in air pollutants associated lung most cancers, it's far crucial to understand each the bodily and environmental factors of air pollutants.

Air Quality Index Levels of Health Concern	Numeric al Values	Effect
Good	0 to 50	Air quality is considered satisfactory and air pollution possess little or no risk
Moderate	51 to 100	Air quality is acceptable however for some pollutant there may be a moderate health concern for very small number of people who are unusually sensitive to air pollution
Unhealthy for Sensitive groups	101 to 150	Member of sensitive groups may experience health effect. The general public is not likely to be affected
Unhealthy	151 to 200	Everyone may begin to experience health effects: Member of sensitive groups may experience more serious health effect
Very Unhealthy	201 to 300	Health warning of emergency conditions. The entire population is more likely to be affected
Hazardous	301 to 500	Health alert: Everyone may experience more serious health effects

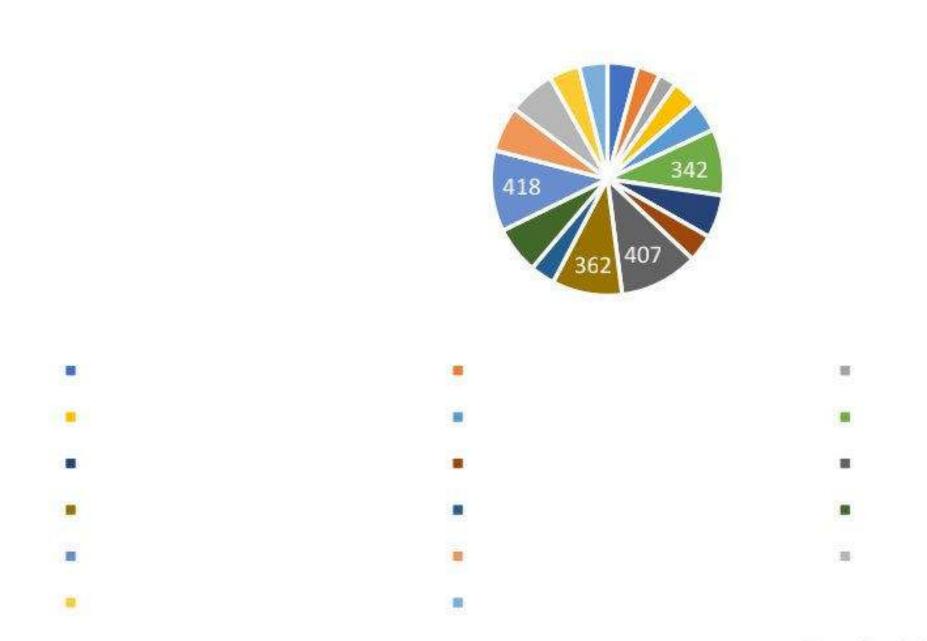
Fig Air quality index ©source by Understanding the air pollution respiratory health association. https://www.google.com/search?q=effects+of+air+quality+on+environment&rlz)

Every adult male will breathe on average 15 m³ (approx. 15kg) of air in every day. Yet those invisible gases, from ground level ozone to particulates, often cause enormous health problems when they enter our more sensitive systems, such as the lungs or eyes. In fact, air pollution is directly responsible for the death of over 7 million people each year, and approximately 90% of the world's population is exposed to air pollution at some point. Carbon monoxide (CO) has a significant effect on hospitalizations for asthma among children ages 1–18, while none of the pollutants considered has a clear impact on hospitalizations for infants. Multiple cardiovascular effects have been observed after exposure to air pollutants Changes occurred in blood cells after long-term exposure may affect cardiac functionality also Neurological effects have been observed in adults and children[15] after Approximately 5 million children in the United States have asthma. It is the leading specific reason for school absence and the most frequent cause of paediatric emergency room use and hospital admission [16] . In developing countries, the women of the household seem to transmit the highest risk for disease development due to their longer duration exposure to the indoor air pollution[15]

Effect on environment



There are many environmental issues in India. Water pollution, air pollution, and pollution of the natural territory. The major causes of the environmental embarrassment are industrialization, modern urbanization, over-population growth and deforestation etc. Environmental pollution refers to the degradation of quality and quantity of natural resources. [17] Changes in climate affect air quality by disturbing ventilation rates (wind speed, mixing depth, convection, anterior tracks), dry deposition, snow hunting, chemical production and loss rates, natural emissions, and related concentrations [18] Maximum of the e-waste in India is recycled in unauthorized workshops that execute operations such as irreplaceable metals recovery and the removal of repairable parts in whatever ways are fastest and easiest, irrespective of environmental considerations. A number of investigations have suggested that the natural environment (soil, air, water, plants, etc.) is contaminated by contact to the toxic substances released at these workshop sites [19] To quantify the impacts of climate and air pollution trends on Indian agricultural production, we constructed a dataset of rice and wheat yields, surface air temperature, precipitation, and aerosol and ozone precursor emissions for major Indian wheat- and rice-producing states from 1980 to 2010[20] Acid rain is rainwater containing harmful amounts of sulphuric and nitric acids. These acids are formed primarily by sulphur and nitrogen oxides and released into the atmosphere when fossil fuels are burned Toxic pollutants in the air, or deposited on soils or surface waters, can impact wildlife in a number of ways. Like humans, animals can experience health problems if they are exposed to sufficient concentrations of air toxics over time[21].



At the world-wide level, the speedy growth in motor vehicle activity has serious energy security and climate change effects. Transport already consumes nearly half of the world oil. Energy consumption and carbon dioxide emissions due to transport raised by about a third in just one decade since the 1990 [22]

Conclusion

This paper presents an assessment of available information on vulnerability and ambient air pollution using the risk framework. Individuals and population groups can be differentially vulnerable to the health effects of air pollution due to differences in biological characteristics, time spent on daily activities, and/or social-economic conditions. These inspect of air pollution provide solid evidence that air pollution is significantly associated with mortality and morbidity, provide clues to possible mechanisms and interactions with infections, and confirm that reducing air pollution can improve public health

Reference

J. J. West et al., "what We Breathe Impacts Our Health: Improving Understanding of the Link [1] between Air Pollution and Health," in Environmental Science and Technology, May 2016, vol. 50, no. 10, pp. 4895-4904. doi: 10.1021/acs.est.5b03827.

[2] D. J. Jacob and D. A. Winner, "Effect of climate change on air quality," Atmos Environ, vol. 43, no. 1, pp. 51–63, Jan. 2009, doi: 10.1016/j.atmosenv.2008.09.051.

A. Pandey et al., "Health and economic impact of air pollution in the states of India: the Global [3] Burden of Disease Study 2019," Lancet Planet Health, vol. 5, no. 1, pp. e25-e38, Jan. 2021, doi: 10.1016/S2542-5196(20)30298-9.

[4] I. Manisalidis, E. Stavropoulou, A. Stavropoulos, and E. Bezirtzoglou, "Environmental and Health Impacts of Air Pollution: A Review," Frontiers in Public Health, vol. 8. Frontiers Media S.A., Feb. 20, 2020. doi: 10.3389/fpubh.2020.00014.

O. Raaschou-Nielsen et al., "Particulate matter air pollution components and risk for lung [5] cancer," Environ Int, vol. 87, pp. 66–73, Feb. 2016, doi: 10.1016/j.envint.2015.11.007.

A. Makri and N. I. Stilianakis, "Vulnerability to air pollution health effects," Int J Hyg Environ [6] Health, vol. 211, no. 3–4, pp. 326–336, Jul. 2008, doi: 10.1016/j.ijheh.2007.06.005.

[7] G. D'amato, L. Cecchi, D.' Amato, and G. Liccardi, "Urban Air Pollution and Climate Change as Environmental Risk Factors of Respiratory Allergy: An Update," 2010.

A. J. Chauhan and S. L. Johnston, "Air pollution and infection in respiratory illness," British [8] Medical Bulletin, vol. 68. pp. 95–112, 2003. doi: 10.1093/bmb/ldg022.

M. Raj Pandey, "Prevalence of chronic bronchitis in a rural community of the Hill Region of [9] Nepal." [Online]. Available: http://thorax.bmj.com/

T. Götschi, J. Heinrich, J. Sunyer, and N. Künzli, "Long-term effects of ambient air pollution on [10]lung function: A review," Epidemiology, vol. 19, no. 5. Lippincott Williams and Wilkins, pp. 690-701, 2008. doi: 10.1097/EDE.0b013e318181650f.

[11] D. Diaz-Sanchez, A. Tsien, J. Fleming, and A. Saxon, "Combined Diesel Exhaust Particulate and Ragweed Allergen Challenge Markedly Enhances Human In Vivo Nasal Ragweed-Specific IgE and Skews Production to a T Cytokine Helper Cell 2-Type Pattern'." [Online]. Available: http://journals.aai.org/jimmunol/article-pdf/158/5/2406/1077170/2406.pdf

K. R. Smith, "National burden of disease in India from indoor air pollution," 1997. [Online]. [12] Available: www.pnas.org

[13] J. Cao et al., "Association between long-term exposure to outdoor air pollution and mortality in China: A cohort study," J Hazard Mater, vol. 186, no. 2-3, pp. 1594-1600, Feb. 2011, doi: 10.1016/j.jhazmat.2010.12.036.

G. B. Hamra et al., "Outdoor Particulate Matter Exposure and Lung Cancer: A Systematic [14] Review and Meta-Analysis," Environ Health Perspect, vol. 122, no. 9, pp. 906-911, Sep. 2014, doi: 10.1289/ehp/1408092.

[15] I. Manisalidis, E. Stavropoulou, A. Stavropoulos, and E. Bezirtzoglou, "Environmental and Health Impacts of Air Pollution: A Review," Front Public Health, vol. 8, no. February, pp. 1-13, 2020, doi: 10.3389/fpubh.2020.00014.

[16] M. J. Neidell, "Air pollution, health, and socio-economic status: the effect of outdoor air quality on childhood asthma," J Health Econ, vol. 23, no. 6, pp. 1209–1236, Nov. 2004, doi: 10.1016/J.JHEALECO.2004.05.002.

R. Chopra, "Environmental Degradation in India: Causes and Consequences," International [17] Journal of Applied Environmental Sciences, vol. 11, no. 6, pp. 1593–1601, 2016.

D. J. Jacob and D. A. Winner, "Effect of climate change on air quality," Atmos Environ, vol. 43, [18] no. 1, pp. 51–63, 2009, doi: 10.1016/j.atmosenv.2008.09.051.

[19] A. K. Awasthi, X. Zeng, and J. Li, "Environmental pollution of electronic waste recycling in India:
 A critical review," *Environmental Pollution*, vol. 211, pp. 259–270, 2016, doi: 10.1016/j.envpol.2015.11.027.

[20] J. Burney and V. Ramanathan, "Recent climate and air pollution impacts on indian agriculture," *Proc Natl Acad Sci U S A*, vol. 111, no. 46, pp. 16319–16324, 2014, doi: 10.1073/pnas.1317275111.

[21] D. L. Patrick, "Health and Environmental Effects of Air Pollution," *Health & Environmental Effects of Air Pollution Health*, pp. 1–3, 2016.

[22] M. G. Badami, "Transport and urban air pollution in India," *Environ Manage*, vol. 36, no. 2, pp. 195–204, 2005, doi: 10.1007/s00267-004-0106-x.

Recent rection

Recent Trends in the Basic Science

About the Edited Book: This edited book "Recent Trends in the Basic Science" is based on the papers presented at the 2nd International Conference on Multidisciplinary Academic Research and Innovation (ICMARI 2023) jointly organized by Amiruddaula Islamia Degree College, Lucknow and Aryabhat Institute of Academics and Research, Lucknow during Jan. 28-29, 2023. The aim of this conference was to bring together the young as well as experienced researchers on one platform to discuss the recent findings in the aforesaid areas. After peer reviewing process, relevant research papers were finally included in this book as chapters.

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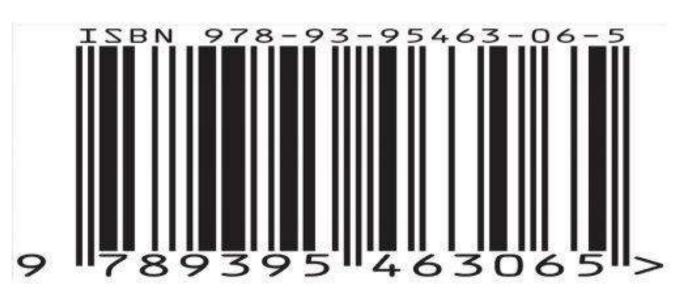
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Environmental, Industrialization, Management, Economics, Agriculture, **Rural and Urban Development towards** Sustainable Potential

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Role of Solar Energy for Sustainable Development

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Abstract Sustainable development is that which beat the need of present without compromising the ability of so Abstract Sustainable development is that which beat the help of such a development we reduced the pollution and as generation to meet their own needs. With the help of such a development we reduced the pollution and as generation to meet their own needs. With the help of electricity generated with the help of coal and named according environments. In the World most of electricity generated with the help of coal and named according environments and environmental according to the second seco eco-friendly environments. In the World most of cluttion which effect on human and environmental met and the second second and the second seco Those resources are limited and create more all portant is very essential need to find out clean, enumerated and produces greenhouse gas emission so now days it is very essential need to find out clean, enumerated and produces greenhouse gas emission. So lar energy is one of them. Solar energy is very more and produces greenhouse gas emission so not day there energy is one of them. Solar energy is very promised and pollution free energy resources. Solar energy is one of energy it is pollution free and environment as friendly and pollution free energy resources to be source of energy it is pollution free and eco-friendly and pollution of electricity. Solar energy how solar panel work and there mechanism, also discusses for generation of electricity, sonar energy, how solar panel work and there mechanism, also discussing apper written about, what is solar energy, how solar panel work and there mechanism, also discussing appendix of solar energy for sustainable development.

Key words: - Sustainable development, environmental, eco-friendly, greenhouse gas emission, solar men

Introduction

Sustainable development is the way of organizing society so that it can exist in the long term. There are manly three pillar of sustainability first one is economic then environmental and social. Such a development is future centric. Example of sustainable development is renewable energy resources it is very useful energy that is collected from natural resources.it is most effective in the long term. Examples renewable resources are sunlight, wind, rain, tides, waves, biomass plants, solar cooker, and geothermal heat. Such a renewable energy creates 5 times more effective than fossil fuels, such a energy generating energy that produces no greenhouse gas emission from fossil fuels and reduces some types of air pollutions and creating economic development and jobs in installation, manufacturing and lots more. Energy is an essential need for the existence and growth of human communities. Consequently, the need for energy has increased gradually as human civilization has progressed.(Maka & Alabid, 2022) The increasing environmental disturb is about the contribution of coal-fired power generation to air emissions, mainly due to the poor quality of Indian coal with an average ash content of 40% or more. Studies have shown that power sector contributes about 40% of the total carbon emissions (Mallah & Bansal, 2010) Progress in energy use and emissions is expected to be principally noticeable in some sectors. The sectorial contributors to progress in energy consumption are expected to be power grown (35%), industry (15%), transport (126 buildings (6%) in developing countries, former power generation (11%) and transport #0.1 OECD countries (Kaygusuz, 2012) Aamen environmental pollution as well as global were or climate change that caused by the resume conventional energy can be counted as to an significant issue in the world which all at the main reasons to find a suitable alternate and source(Mekhilef, Faramarzi, Saidur, & Suim 34 One of the most important factors of 1048 14 energy production system are Greenhout a emissions from power plants around as un which are considered to be one of the and so leading to climate change.(Karakosa, 1986 Marinakis, & Psarras, 2013). Most of the and predict that if atmospheric concernant greenhouse gases continue to increase = 70 trends in fossil fuel consumption suggest up the earth's temperature may increase in an century by another 2°C and perhaps by 4 4ºC.(Dincer, 2000) Eighty-five per cell world's commercial primary energy is sufficient fossil fuels. Conventional (renewable) nuclear and new renewables provide the depicted. In the last few years, recenable technologies in India have been promoted projects, essen projects/programmes supported by go demonstration R&D. subsidies and fiscal incentives(Naidu, 1980)



Recent Advances of NANO'TECHNOLOGY in Chemical Sciences Volume-1

W. B. Gurnule Priti Mishra Krishna Kumar Verma. Dr. Anita Baghel Dr.



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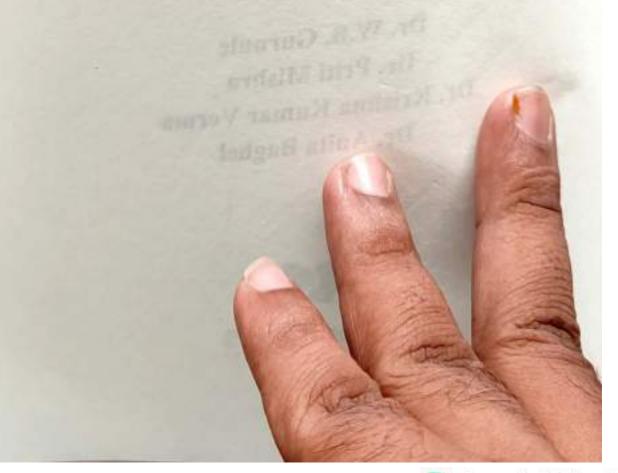


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Graphene; The Miracale Nanocarbon Material

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ABSTRACT

Graphene is an amazing material yet it was only discovered in 2004.graphene is a single thin layer of graphite, it is a soft flashy material used in pencil lead. Atom are arranged in a hexagonal arrangement, it is just a one atom thick and first 2-Dimmensional material ever discovered .it is one of the thinnest materials and it was hundred times stronger than an equivalent weight of steel, it is an flexible as rubber and could stretch to 12% of its length. It is the hardest material even than diamond. Graphene takes on some miraculous properties such as high electrical, optical, and thermal properties, but the two-dimensional atomic sheet structure of graphene assists more diverse electronic characteristics. This material carries electricity more quickly, more precisely and more efficiently than any other known materials.it much better than silicon. due Graphene to its high electron mobility, mechanical/thermal stability, high surface area volume and capacitance, has been utilized in various applications. Graphene acts as a material for the future application of water purification, super capacitors, gas sensor and as a composite in antibacterial activity, solar cells and coatings. This paper discus about various characteristics and properties of graphene and discus their multifunctional applicability.

Key words:- Graphene, graphite, 2- Dimensional material, electronic characteristics, high surface to volume ratio

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Recent Advances of NANOTECHNOLOGY in Chemical Sciences Voulme-2

Dr. Priti Mishra Dr. Krishna Kumar Verma Dr. Anita Baghel Dr. W.B Gurnule



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Layered Double Hydroxide-Multi functional Nanomaterials to remove Heavy metals.

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Abstract

Layered double hydroxide are multipurpose and growing class of two dimensional inorganic layered Nanomaterials, also known as hydrotalcite like compounds are well known for their strange character including modifiable composition, simple synthesis procedures, stability, large surface area, and formation of various nanocomposites that conferred LDH's significant adsorptive capability towards elimination of heavy metals (pollutant) from environment. The High-valence heavy metals with high ecotoxicity are generally found in water in the form of anions, and this increases heavy metal pollution intensity and treatment difficulty. Sorption by layered double hydroxides Nanomaterials (LDHs) and precipitation in alkaline media are two of the main remediation techniques for remove these heavy metals. This chapter focused on different technique use for synthesis of layered double hydroxide, Various LDH Nanomaterials to removal of heavy metals ion from environment, we discussing the adsorption mechanism of LDHs on heavy metal anions, as well as the current state of research and future directions for microscopic interaction mechanisms.

Keywords:- Hydrotalcite, Nanomaterials, Heavy metals, Adsorption.

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Introduction:- Water is one of the utmost fundamental natural sources in the world, that is important for the survival of all residing beings and the progress of humans. Along with the increase of rate of industrialization and urbanization, the consumption of water is increasing quickly and water shortage crisis has grow up to be an significant restriction for financial improvement. Meanwhile, water pollution, in particular heavy metals pollution inside water, has appear as a universal environmental crisis. Heavy metals will be on the rampage into water in particular in the mining, electroplating, metallurgy, chemical flowers, agriculture and household wastewater etc. Heavy metals such as Hg, Zn, Cu, Pb, and so on. May want to pretense a too much hazard to human's health due to the fact they may be combined biologically within the food chain. As an example, heavy metals must to cause damage to the kidneys, mental and vital frightened functions, lungs, and other organs (Azimi et al., 2017). in addition, heavy metals also can make use of harmful results on the surroundings and other ecological receptors, as they can't be degraded by means of microorganisms once they're launched into the environment, on the converse, they may meet on all sides of thru the food chain. Heavy metals are absolutely poisonous, the majority of that are to be carcinogenic (Sall et al., 2020). So, the elimination of heavy metals from water is of incredible importance and has drawn most attention. So far, many technology had been evolved to preparation this problem, such as chemical precipitation, ion exchange, adsorption, membrane filtration, electrochemical remedy and so on (Shrestha et al., 2021). Adsorption is one of the most significantly used techniques since of its low cost and easy process. In current years, Layered double hydroxide nanomaterials have also proven their advantage in removal of off hazardous materials from the environment due to their huge/tunable porosity, pore capacity, and numerous pore structure and so forth(Rojas, 2014). These days, nanomaterials have also furnished a promising approach to

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eliminating heavy metals from wastewater. Since long time, Nanomaterials have received practically a few attention. many nanomaterials were exploited in many fields, together with electron gadgets, health care, strength, and so on(Yang *et al.*, 2019). The past decades have also witnessed the growing applications of nanomaterials in the environmental safety area. In standard, nanomaterials are substances whose outside size are within the nanoscale (commonly 1–100 nm) or the ones who have a nanoscale inner structure. Under the nanoscale, nanomaterials normally show a few unique properties, which includes a surface effect, small size effect, quantum effect, and macro quantum tunnel effect(Murty *et al.*, 2013).

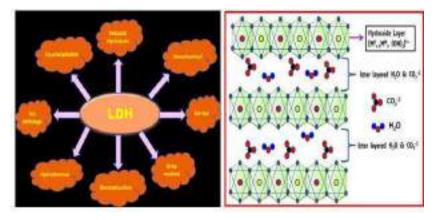
These characteristics giving to their reactivity and adsorption capacity and reactivity, each of which might be favorable for the elimination of heavy metal ions. Up to now, high-quality research on nanomaterials have been done to analyze their application on heavy water process and that they have exhibited fantastic ability as a promising opportunity to adsorbing heavy metals from wastewater (Wang, 2012).

Layered double hydroxides is hydrotalcite like materials are a group of layered material with a common formula of $[(M^{II})_{1-x} (M^{III})_x (OH)_2]^{x+} (A^{m-}_{x/m}) \cdot nH_2O]$ and a structural arrangement as shown in following figure. The layer contain divalent (M^{II}) and trivalent (MIII) metal ions and the interlayer area is occupied with charge-balancing anions. Divalent metal ions are often Ca²⁺, Mg²⁺, Fe²⁺, Co²⁺, Mn²⁺, Ni²⁺, Cu²⁺, or Zn²⁺. Trivalent metal ions are usually Al³⁺, Fe³⁺, Co³⁺, and Ni³⁺. The anions, such as CO₃²⁻,NO₃-, and Cl⁻, in the interlayer galleries can be readily replaced (Forano *et al.*, 2006).

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Synthesis of Layered double hydroxide:-

Co-precipitation method



In co-precipitation method, LDHs are prepared by the adding up of two solutions, one containing metal salts of M^{2+} and M^{3+} ; and one more containing base, such as NaOH, Na₂CO₃, NH₄OH and so on. In this method, firstly metal hydroxides are produced and further addition of base results in the change of metal hydroxides into LDH during precipitation mechanism. In co-precipitation method, pH is an important factor as it remarkable affects the structural and chemical properties of the LDH phases. throughout the addition, the pH of the solution mixture is kept at constant in the range of 8–10 in order to reach high chemical homogeneity in LDH. The constant pH is maintained by the concurrent addition of a base solution to the reaction mixture. The final solution mixture is allowed for aging for a long period of time to get a material of very well crystallized structure. The obtained solid precipitate is collected by filtration, washed thoroughly with deionized water and dried for the night (Theiss et al., 2016).

Sonochemical method

In this method, LDHs are prepared by co-precipitation technique followed by sonochemical treatment. In first step, two solutions containing M^{2+} and M^{3+} metal salts are mixed gradually

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with another solution containing base. throughout the mixing, the pH of the solution mixture is maintained at constant in the range of 8–10 depending on the character of the metal ions. later than completion of addition, the resultant solution is exposed to ultrasound irradiation at a fixed time and temperature. The solid precipitate is filtered, washed carefully with deionized water and dried out in oven overnight. This method helps in increasing the crystallinity of LDH phases.

The observable fact of sonochemical method is based on the acoustic cavitations. When the solution mixture is exposed to ultrasonic irradiation, speedy movement of the fluid leads to cavitations in which microbubbles are formed and collapsed. This oscillating microbubbles construct unique hot spot arises due to the compressional heating from breaking up of bubble and thus produces remarkable environment within the bubble with particularly high temperature, pressure and cooling rates (Pahalagedara *et al.*, 2014).

Urea method

In this synthesis, Urea is added to an aqueous solution of chosen M^{2+} and M^{3+} metal salts and heated under reflux condition for few hours. The precipitate obtained is collected by filtration, washed thoroughly with deionized water and dried up overnight. The rate of urea hydrolysis can be possible to increase upto 200 times by increasing the reaction temperature to 100 °C.

The urea molecules undergo decomposition to produce ammonium carbonate, which finally causes in the precipitation into LDH with CO3²⁻ as interlayer anion. The urea method provides high degree of crystallinity and a narrow particle size distribution (Hibino & Ohya, 2009).

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Sol-gel method:-

In sol-gel synthesis of MgAl LDHs. In this method, ethoxide solution of M^{2+} metal is added to another solution containing acetylacetonate/ tri-sec-butoxide of M^{3+} metal and heated under refluxed condition. The pH of the suspension is maintained at 10 by adding base like, NH4OH and allowed to stir constantly until the gel like precipitate of LDH is formed. The as obtained gel like product is filtered, washed appropriately by deionized water and dried up overnight. The LDHs synthesized using sol-gel method is thermally very stable, but not as much of crystalline than those synthesized via the co-precipitation method (Prinetto *et al.*, 2000).

Hydrothermal method:-

In this method, two solutions containing M^{2+} and M^{3+} metal salts are added drop wise to an another solution containing base under strong stirring at room temperature. Then, the suspension is transferred into a Teflon-lined autoclave and heated at higher temperature for several hours depending upon the metal ions. The pH of the supernatant ranges 8–10. The solid precipitate is collected by centrifugation washed thoroughly with deionized water and ethanol and dried overnight. The hydrothermal method is useful for synthesis of highly crystalline LDHs (Forano *et al.*, 2006).

Ion exchange method

The ion exchange method is depend on the exchange of anions in interlayer space with other anionic species. In typical method, the precursor LDH is suspended in an aqueous solution containing the anionic species to be exchanged. The suspension is then allowed to stir for several hours at room temperature. The precipitate is then collected by filtration, washed several times with deionized water and dried overnight (Forano *et al.*, 2013).

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Reconstruction method

This method involves the reconstruction of the layered structure of brucite-like LDH by hydrating the calcined LDH. The reconstruction method is based on one of the unique properties of LDHs i.e. memory effect. In first step, the LDHs are calcined at a particular temperature to obtain mixed oxides and then subjected to rehydration in aqueous solution with the anion to be intercalated. The solid precipitate is collected by filtration, washed several times with deionized water and dried overnight. The structural improvement however, depends upon some experimental condition such as, calcination temperature, duration and rate of heating. The reconstruction method is useful mainly in the preparation of large organic anions intercalated LDH (Mascolo & Mascolo, 2015).

Induced hydrolysis method

In this method, metal oxides are added drop wise to an acidic solution having M^{3+} metal salts. The metal oxides are dissolved progressively in the acidic solution and precipitated into LDH provided the pH is buffered by the oxide suspension. The obtained solid precipitate is filtered, washed thoroughly with deionized water and dried overnight. The method of induced hydrolysis can also be used for synthesis of LDH with di-divalent, di-tetravalent and tri-trivalent systems(Guo *et al.*, 2010).

Different LDH Materials to Remove Heavy Metals:-

Different mechanisms have been suggested for removal of heavy metals by LDH materials from waste water like ion exchange, chemical bonding physical adsorption in which electrostatic attraction, van der Waals force, hydrogen bonding and π - π interaction, etc.

Liangguo yan et al. synthesized chitosan-Mg-Al-LDH based Nanomaterials using an emulsion- crossing method. The chitosan was immobilized in side the gallery of LDH materials to form CS-

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LDH by using epichlorohydrine. The CS-LDH show high specific surface area and having many functional group. The adsorption kinetics ,isotherms and mechanisms the CS-LDH show more adsorption capacity of Pb2+ and Cd2+ as compare to chitosan and LDH Mg-Al-LDH this effect was due to precipitation, surface complexation and isomorphic substitution. Liangguo yan et al Again doing similar type of work in which modification of Mg-Al-LDH by L-cysteine using facile co-precipitation method to remove Cu2+ , Pb2+and Cd 2+ in water solution . Due to the presence of Carboxyl, thio and amido group the materials show good adsorption performance in water sample(Lyu *et al.*, 2019).

Shan et al. synthesized Mg-Al-CO₃ and magnetic Fe3O₄/Mg-Al-CO₃ LDHs. While studied the mechanisms of Cd²⁺ adsorption on surface of materials they found that sorption was due to precipitation as CdCO₃, Substitution of Cd²⁺ by Mg²⁺ inside the gallery of LDH layers and interaction between Cd²⁺ and deprotonated hydroxyl groups with generation of outer-sphere complexes (Shan *et al.*, 2015).

Removal of Cr^{6+} from water was studied by Deng et al. synthesized a magnetic CoFe2O4/MgAl-LDH materials.They found that adsorption of Cr^{6+} onto above materials by three different ways (1) Adsorption into the LDH pore of heavy metals. (2) by electrostatic attraction between positively charge LDH surface. (3) Exchange of NO₃⁻ present in the interlayer LDH materials with anions containing Chromium in the +6 state (Deng *et al.*, 2015).

Mostafa et al. studied the removal of Pb^{2+} from water by synthesized CoMo-LDH. They observed that the black parts of Pb^{2+} adsorbed on LDH surface supported by scanning electron microscopy. They also suggested that adsorption of Pb^{2+} on LDH materials via coordination between the negative oxygen atom of nitrate anions and the Mo6+ of the brucite layers(Mostafa *et al.*, 2016).

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Zubair et al try to improve adsorption properties of LDHs materials by combining with graphene oxide (GO), carbon nanotubes (CNTs), carbon quantum dots (CQDs) by using this idea magnetite-graphene-LDH (MGL) synthesized by Wu and coworker for removal of arsenate. They found that arsenate adsorption capacity for the MGL nanomaterials higher than LDH materials due to the presence of iron oxide and graphene results in increase the surface area of modified nanomaterials with more active sites for sorption of arsenate (Al-harthi, 2017).

Conclusions:

For the removal of heavy metals we are fortunate to have nanotechnology as biggest ongoing technique in this area. The most beautiful feature of Nanomaterials is size of materials decreases, surface area increases results in increasing adsorption capacity of nanomaterials to remove heavy metals. LDH is one of the most promising nanomaterials use as sorbent. LHD have specific feature like high surface area , high porosity ,layered structure, exchangeable cation inside the layer could be exchange by cationic and anionic pollutant. Also electrostatic attraction, π - π interactions, van der waals forces , hydrogen bonding take part in the sorption of heavy metals. But LDH materials having some limitation like weak attraction with heavy metals low sorption capacity and low reusability. To overcome these problems following approaches proposed and perform .

- Surface modification and functionalization of LDH materials.
- Synthesis of hybrid LDH materials like CNT/LDH, GO/LDH and QDs/LDH etc.
- Fabrication of polymer/LDH nanocomposites by using bioplymer as chitosan.

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References:-

- Al-harthi, M. A. (2017). adsorbents for water remediation. Applied Clay Science, 143(April), 279–292. https://doi.org/ 10.1016/ j.clay.2017.04.002
- Azimi, A., Azari, A., Rezakazemi, M., & Ansarpour, M. (2017). Removal of Heavy Metals from Industrial Wastewaters: A Review. ChemBioEng Reviews, 4(1), 37–59. https://doi.org/ 10.1002/cben.201600010
- Deng, L., Shi, Z., & Peng, X. (2015). Adsorption of Cr(vi) onto a magnetic CoFe2O4/MgAl- LDH composite and mechanism study. RSC Advances, 5(61), 49791–49801. https:// doi.org/ 10. 1039/c5ra06178d
- Forano, C., Costantino, U., Prévot, V., & Gueho, C. T. (2013). Layered double hydroxides (LDH). Developments in Clay Science, 5(September 2005), 745–782. https://doi.org/10. 1016/ B978-0-08-098258-8.00025-0
- Forano, C., Hibino, T., Leroux, F., & Taviot-Guého, C. (2006). Chapter 13.1 Layered Double Hydroxides. Developments in Clay Science, 1(C), 1021–1095. https://doi.org/10 . 1016/S1572-4352(05)01039-1
- Guo, X., Zhang, F., Evans, D. G., & Duan, X. (2010). Layered double hydroxide films: Synthesis, properties and applications. Chemical Communications, 46(29), 5197–5210. https://doi.org/10.1039/c0cc00313a
- Hibino, T., & Ohya, H. (2009). Synthesis of crystalline layered double hydroxides: Precipitation by using urea hydrolysis and subsequent hydrothermal reactions in aqueous solutions.
- Applied Clay Science, 45(3), 123–132. https://doi.org/ 10. 1016/j.clay.2009.04.013

[23]

- Lyu, F., Yu, H., Hou, T., Yan, L., Zhang, X., & Du, B. (2019). Efficient and fast removal of Pb 2+ and Cd 2+ from an aqueous solution using a chitosan/Mg-Al-layered double hydroxide nanocomposite. Journal of Colloid and Interface Science, 539, 184–193. https://doi.org/10. 1016/j.jcis. 2018. 12.049
- Mascolo, G., & Mascolo, M. C. (2015). On the synthesis of layered double hydroxides (LDHs) by reconstruction method based on the "memory effect." Microporous and Mesoporous Materials, 214, 246–248. https://doi. org/10.1016/j. micromeso.2015.03.024
- Mostafa, M. S., Bakr, A. S. A., El Naggar, A. M. A., & Sultan, E. S. A. (2016). Water decontamination via the removal of Pb (II) using a new generation of highly energetic surface nanomaterial: Co+2Mo+6 LDH. Journal of Colloid and Interface Science, 461, 261–272. https://doi.org/10. 1016/j.jcis. 2015. 08.060
- Murty, B. S., Shankar, P., Raj, B., Rath, B. B., & Murday, J. (2013). Textbook of Nanoscience and Nanotechnology. In Textbook of Nanoscience and Nanotechnology: Vol. d. https://doi.org/10.1007/978-3-642-28030-6
- Pahalagedara, M. N., Samaraweera, M., Dharmarathna, S., Kuo, C. H., Pahalagedara, L. R., Gascón, J. A., & Suib, S. L. (2014).
 Removal of azo dyes: Intercalation into sonochemically synthesized nial layered double hydroxide. Journal of Physical Chemistry C, 118(31), 17801–17809. https://doi.org/10.1021/jp505260a
- Prinetto, F., Ghiotti, G., Graffin, P., & Tichit, D. (2000). Synthesis and characterization of sol- gel Mg/Al and Ni/Al layered double hydroxides and comparison with co-precipitated samples. Microporous and Mesoporous Materials, 39(1–2), 229–247. https://doi.org/10.1016/S1387-1811(00)00197-9

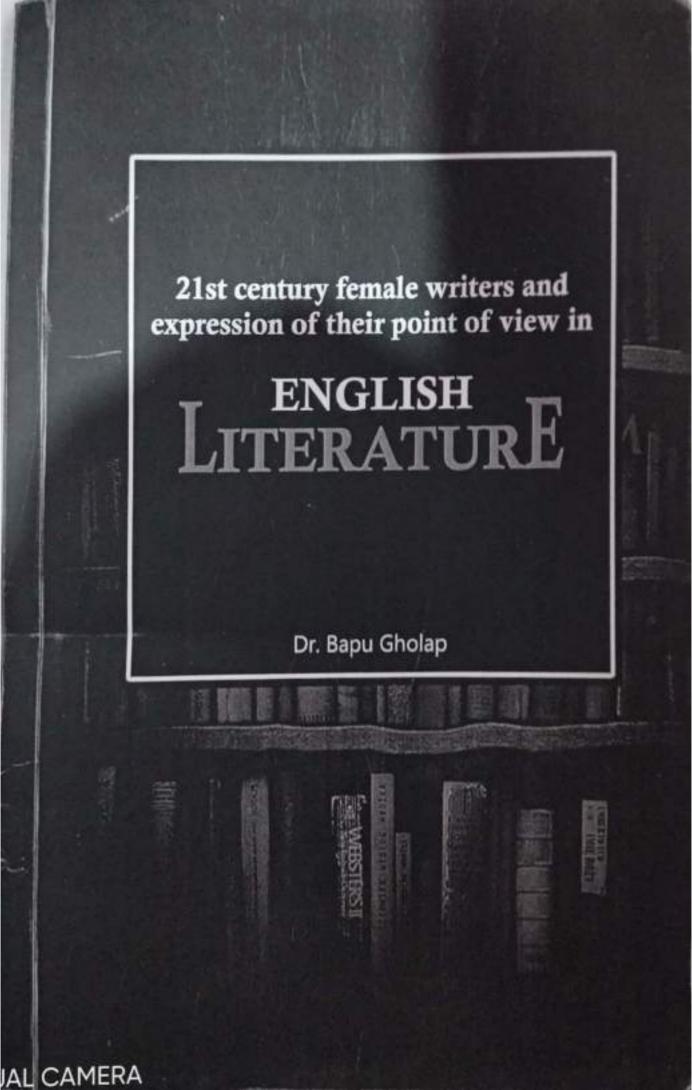
[24]

- Rojas, R. (2014). Copper, lead and cadmium removal by Ca Al layered double hydroxides.
- Applied Clay Science, 87, 254–259. https://doi.org/10. 1016/j. clay.2013.11.015
- Sall, M. L., Diaw, A. K. D., Gningue-Sall, D., Efremova Aaron, S., & Aaron, J. J. (2020). Toxic heavy metals: impact on the environment and human health, and treatment with conducting organic polymers, a review. Environmental Science and Pollution Research, 27(24), 29927–29942. https://doi.org/10.1007/s11356-020-09354-3
- Shan, R. ran, Yan, L. guo, Yang, K., Hao, Y. feng, & Du, B. (2015). Adsorption of Cd(II) by Mg-Al-CO3- and magnetic Fe3O4/Mg-Al-CO3-layered double hydroxides: Kinetic, isothermal, thermodynamic and mechanistic studies. Journal of Hazardous Materials, 299, 42–49. https://doi.org/10. 1016/j. jhazmat.2015.06.003
- Shrestha, R., Ban, S., Devkota, S., Sharma, S., Joshi, R., Tiwari, A. P., Kim, H. Y., & Joshi, M.
- K. (2021). Technological trends in heavy metals removal from industrial wastewater: A review. Journal of Environmental Chemical Engineering, 9(4), 105688. https://doi.org/10. 1016/j.jece.2021.105688
- Theiss, F. L., Ayoko, G. A., & Frost, R. L. (2016). Synthesis of layered double hydroxides containing Mg 2+, Zn 2+, Ca 2+ and A1 3+ layer cations by co-precipitation methods - A review. Applied Surface Science, 383, 200–213. https://doi.org/10.1016/j.apsusc.2016.04.150
- Wang, X. (2012). Nanomaterials as Sorbents to Remove Heavy Metal Ions in Wastewater Treatment. Journal of Environmental & Analytical Toxicology, 02(07). https://doi. org/10.4172/2161-0525.1000154

[25]

Yang, J., Hou, B., Wang, J., Tian, B., Bi, J., Wang, N., Li, X., & Huang, X. (2019). Nanomaterials for the removal of heavy metals from wastewater. Nanomaterials, 9(3). https://doi.org/ 10.339 0/ nano9030424

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Githa Hariharan's Point of View in Her Novels

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Abstract

Point of view is the way of story gets told. The author presents the characters, dialogue, actions, setting and events which constitute the narrative in a fiction. It is always great concern of the novelist to find out point of view in modern fiction. They have different aspect in the fiction having limitless subjects. Githa Hariharan is a prolific writer of 21" century in Indian writing. In her novels she convey the human psychology and the problems of the society in different ways. She puts forward the 21" century scenario and various concerns through her point of views in her novels.

Keywords: Patriarchy, Psychology, Feminine, Narrative, Indian GithaHariharan's novels are about how women deal with the given space in the Indian society. Her novels present patriarchal limitations for the women of different social classes and ages. The problems of marriage and battles of women in their relation with men and society and their intense passion for quest for identity are some of the other concern of her novels. These are classified as an extraordinary novel, about

women's lives by a woman writer. In some of her novels, she excavates the men psyche in an amazing ways which put forward her point of view about both female and male part of the society.

Githa Hariharan won the 1993 Common wealth prize for her first novel, 'The Thousand Faces of Night' (1992). Hariharan wrote this novel when she was on maternity leave. She was surrounded by women, especially old women. Hariharan took inspiration from their lives and used both real and imagined world to develop her point of view for her novels.

The celebrated Githa Hariharan's debut novel 'The Thousand Faces of Night' can be seen as the depiction of a single face of thousand lives. It is the face of thousands of Indian women who are caught in the old customs and traditions. The novel has the smell of our mother and grandmother's laps and their weak fingers will once again pacify our tired forehead as we go through this novel. The novel is woven around three generations of women - Devi, Sita and Mayamma. The novel brings forth the idea how despite generation, background and the education that an Indian woman attains, her fate is to fall back into the century old customs at least to a small extent. The Indian society demands at least a pretension from their women that they are obeying the centuries old routines. When Devi returns from her education at America, tradition and the old order of things are ready to reclaim her into an arranged marriage. As she gets exhausted with her self-important husband Mahesh, she learns the vital duty of any Indian wife pretend to be a good wife. She further learns to love entertaining husband's family and friends, pretending never sick or angry. Devi learns the vital duty from her old family retainer Mayamma, who got married when she was still a girl to a drunken husband and abused by mother-in-law, husband as well as her own

ment on hollowness of the contemporary education system and the limitations of prescribed texts.

The Ghosts of Vasu Master is narrated by a newly retired teacher. Having spend most of his life teaching at the private P.G.Boys' School, in the Indian town of Elipettai, Vasu Master moves a bit uneasily into retirement. His farewell present from his students was a notebook, and among the things he does is to begin to make notes-jotting down observations, memories and thoughts about teaching. He also continues to teach a bit, becoming a tutor. He doesn't have many students, however, and eventually he is only left with one, the most complicated and stubborn case, Mani. The boy is twelve when he comes to Vasu Master but it seemed the brain of a six or a seven-year-old. He doesn't speak, either, and has been through numerous schools and doctors, without anyone being able to draw him out or keep him under control.

Vasu Master has no great immediate success with Mani, but eventually finds at least one thing that seems to keep him entertained and interested with stories. Vasu Master himself wasn't brought up on proper stories, discovering in his childhood that the ones he was told weren't at all like the ones other children heard. Now, however, he can see their power and finds them useful for himself too. Vasu Master doesn't live only in the present: the past also haunts him, and part of what he is trying to do is to "make peace with memory". His wife, Mangala, died many years earlier, and she only gradually becomes a strong presence in the book. Scenes from his childhood and his past are recounted, all in trying to understand the present.

Hariharn's novel is very ambitious, as her acknowledgements suggest, as she thanks the authors of works that have influenced her. Everyone she credits from Ivan Illich and R.D. Laing to Susan Sontag and Oliver Sacks. She also mentions the influence of works such as the

dose of "magic realism".

A novel is about storytelling and storytellers, especially female, typically powerless ones. Hariharan takes the myth of Shahrzad and begins after it ended, with her sister Dunyazad returning to Shahrzad's palace to help her husband construct her tomb. Dunyazad and a scheming maidservant with a peculiarly hairy mole meet and share stories, including many of a hair-covered woman who was eventually ostracized by her community, revolving around the possibility that Shahrzad escaped and they can too, from the entrapments of the old 1001 Night story and the present concerns of their lives. 'When Dreams Travel', is a curious, meandering novel, beautifully written.

Githa Hariharan's last novel 'In Times of Siege' (2003), specifies her angst for fundamentalism and extremism. She boldly comments over the betrayal of the secularist vision that can shape the nation. The novel chillingly reflects the realities of contemporary India. Sometimes it seems exciting but it is often moving. It is stark contemporary narrative, which unfolds the story of ordinary life besieged, of men and women struggling to make sense of hatred, ignorance, love and loyalty individual's ideas and notion. It focuses our gaze at the increasing gulf among people who love peacefully co-existed for centuries together. It emphasizes the general apprehension about the future of India a pluralist society. Various characters surrogate to unveil their identity from unusual circumstances of their lives. While talking about the inspiration for 'In Times of Siege', Hariharanmentiones,

More than inspiration, I would have to talk about compulsion. Both in India and elsewhere, we are living in times that allow less space for debate and dissent. As for as specific incidents are concerned when I was midway through the novel. There was actually a case in India of two by rightwing watchdogs. This was not so much inspiration for me as a

strange parallel track being taken by both the reality around me, and the fiction I was writing. (Luan, via e-mail).

'In Times of Siege', covers the span of two months (late August - October, 2000) in the life of Shiv Murthy, a fiftytwo year old professor of History at Kasturba Gandhi Central University. It's an odd academic setting, with the students, an Open University, where Murthy is no longer teaches students; as his Department head likes to put it, he coordinates resources for his educational clients as a correspondence

Two events unsettle Murthy's settled life. He is the 'Local guardian' for Meena, a student at one of the other Delhi Universities whose mother had asked him to watch out for her while she was in Delhi. He has barely done anything for her since she arrived, but when she breaks her knee in an accident she calls on him and he takes her in until she can walk again. Murthy's wife is in America, where their daughter has just gotten a job, and so he's left pretty much to deal with Meena alone. The trouble explodes around some material he prepared for one of his B.A. History courses. Murthy wrote about Basava (Basavanna), the ttreasurer of a twelthcentury Hindu city, Kalyana. Basava has classless ideas that threatened the order of the day, undermining the caste system, though he was ultimately not able to overturn it. This version of history did not appeal to certain Hindu fundamentalists, and reading it in Murthy's lesson they raise a reek.

He has hurted the sentiments of a Hindu watchdog group, and things must be put right again. But Murthy isn't willing to give in so easily, and he refuses to apologize. The militant fundamentalist make a lot of fuss, the media takes as interest, people inside and outside academia choose sides. Hariharan nicely allows the dispute to unfold. This is a novel about politics and political correctness and academia, but her focus on Murthy, who often remains a bit on the edge of

events, and his day to day life prevents the book from bogging down in petty politics alone. Meena enthusiastically takes up Murthy's cause, and is of great help in enlisting help and organizing. The relationship between guardian and ward also becomes a more complicated one, also nicely handled by Hariharan. It all remains an episode, two months out of his life, but it brings with it change and some understanding. Murthy's is coming to terms with his own father's disappearance many years earlier that was a freedom fighter. The novel could have done with a bit more specificity and solidity; more fleshed out scenes, more explanation.

The lyrical luminous and sharply perceptive, the novel 'Fugitive Histories' is perhaps GithaHariharan's most mature work to date. While deft at the weaving of political events into private lives, Hariharan has often been accused of structuring a somewhat cerebral narrative, and some critics hold that she is better at the art of short story than at a longer narrative structure. Yet this work is clearly a deeply felt one, even though the reader may sometimes wish for a loosening up of the tightly held characterization that is the writer's trademark.

Practically in her life, Hariharan has been a social reformer and an idealist. All her novels are a great experiment of her point of view on various issues of the society. She is staunch follower of feminism. She believes that woman has her own individual identity, which has been suppressed in Indian society. Hariharan fought in Supreme Court and won the case of mother as natural guardian of a child. Almost all her novels have revealed the fact and the point of view that every woman has a self-identity, which ignores patriarchy. Works Cited

Novels As Primary Sources

Hariharan, Githa. The Thousand Faces of Night, Penguin India, 1992; The Women's press, UK 1996; Editions Zoe,

21st century female writers and ... 137 Geneva 1996; Van Gennep, Netherlands 1966; Ediciones del Bornce, Spain 2000.

- The Ghosts of Vasu Master, Viking, Penguin India, 1994.

- When Dreams Travel, Picador UK, Picador India, 1996, Empiria, Greece 2001.

 In Times of Siege, Viking, Penguin India 2003, Pantheon, New York, 2003, Vintag, New York, August 2004, II Saggiatore, Milan.

Secondary Sources

Bharat, Meenakshi. GithaHariharan 1957-in South Asian Novelist in English: an A-Z Guide, Saga Jain, Westport,

CT: Greenwood Press, 2003: xvi, 111-114. Gaines, Luan. An Interview with GithaHariharan via

e-mail for curledup.com.

India Today, Now.15, 1993: 111.

lyengar, K.R.S. Indian Writing in English, Bombay, 1973:

360.

Tejero-Antonio, Navarro. On fundamentalism and Nationality: An interview with GithaHariharan, Hyderabad, on April 19, 2003. South Asian Review, Vol. 25. No.2, 2004: 201-

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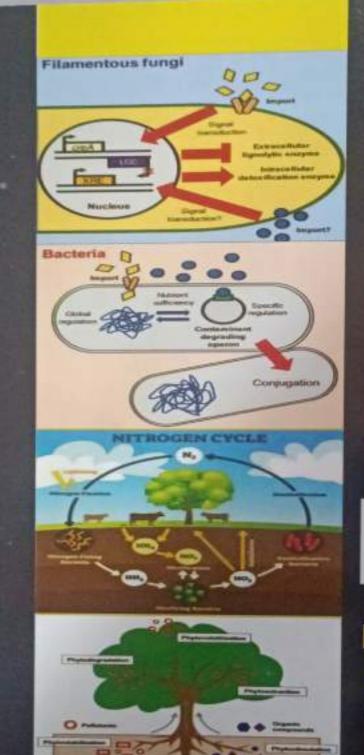
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(Volume - III)



DR. WASUDEO B. GURNULE



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<u>Chapter</u> 6

Environmental Impacts of Climate Change

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ABSTRACT

Convincing evidence that the Earth's climate is changing dramatically and alarmingly has built quickly in recent years, particularly during the last three decades. Global warming, on the other hand, is a fact backed up by a massive body of evidence from a variety of sources. Indeed, scientific efforts have switched away from proving the presence of global warming and toward determining its causes. Although the precise level of damage caused by global warming is difficult to estimate at this time, it can be argued with certainty that the negative impacts of global warming on the climate will far outweigh any potential advantages. The chances are highly high that human-made greenhouse gases, particularly carbon dioxide, are the principal cause of today's well-documented global warming and climate change. Climate change has a number of negative consequences for agriculture, water resources, forests and biodiversity, health, coastal management, and temperature rise. Climate change would add to the stress placed on natural and socioeconomic systems, which are already under immense strain as a result of rapid industrialization, urbanization, and economic expansion. This study discusses the impact of climate change and its many components.

KEYWORDS: Global warming, Climate change, Carbon dioxide, Methane, Sea level rise, Greenhouse gas.

INTRODUCTION

Human beings have had a long history of influencing the environment. However, human activities have only recently begun to have a worldwide impact since the beginning of the industrial revolution. As a result of scientific evidence about the increasing concentration of greenhouse gases in the atmosphere and the changing temperature of the Earth,

environmental issues have become the most pressing concern of humanity today. The amount and distribution of rainfall are changing globally as the temperature rises. Global warming and climate change have become a major global problem that transcends national and geographical boundaries. As a result of the continued overproduction of greenhouse gases, more and more heat is trapped in the earth's atmosphere, causing us to heat up. Global warming is the term for this situation.

The world's temperature continues to rise, which is extremely distressing. When sunlight reaches the Earth, global warming begins. About 30% of sunlight is reflected back into space by clouds, atmospheric particles, reflective ground surfaces, and ocean surfaces, while the rest is absorbed by seas, air, and land. As a result, the planet's surface and atmosphere heat up, making life possible. As the Earth warms, solar energy is radiated through thermal radiation and infrared rays, which travel directly into space and cool the planet. Some of the emitted radiation, however, is re-absorbed by carbon dioxide, water vapors, ozone, methane, and other gases in the atmosphere and radiated back to the Earth's surface. Because of their ability to trap heat, these gases are frequently referred to as greenhouse gases. It should be mentioned that this re-absorption process is beneficial since without greenhouse gases, the Earth's average surface temperature would be extremely cold. The problem began when people began to artificially increase the quantity of greenhouse gases in the atmosphere at an alarming rate over the last two centuries. The earth's temperature has risen by 0.7 degrees since industrialization, and if we do nothing soon, temperatures could rise by up to 5 degrees by 2100. This rise in temperature will have a significant and disastrous impact on the environment around us, causing more extreme weather occurrences and the extinction of many animal and plant species.

WHAT CAUSES CLIMATE CHANGE?

Climate change is triggered by a shift in the earth's energy balance, or how much of the sun's energy enters the planet and is released back into space. Human activities have sent massive amounts of greenhouse gases (GHG) into the atmosphere since the Industrial Revolution began over 200 years ago. Instead of allowing the sun's energy and heat to reflect back into space, these GHG behave as a greenhouse, trapping it. When GHG concentrations are too high, too much heat is trapped, and the earth's temperature rises above its usual range.

Carbon dioxide (CO₂) is the GHG that has caused the most warming to yet. The majority of CO₂ is produced by incomplete combustion of fossil fuels such as coal, oil, and gas, which are utilized in electricity generation, transportation, and industrial activities. Methane, nitrous oxide, black carbon, and other fluorinated gases are all important GHGs. Despite the fact that these gases are emitted in lower quantities than CO₂, they trap more heat in the atmosphere.

Global Warming Potential is a measurement of the ability to trap heat (GWP). (See table 1).

Greenhouse Gas	Lifetime (years)	GWP time Horizon 100 years
Methane	12.4	34
HFC-134a (hydro fluorocarbon)	13.4	1550
CFC-11 (chlorofluorocarbon)	45.0	5350
Nitrous oxide (N2O)	121.0	298
Carbon tetra fluoride (CF4)	50000	7350

 Table 1: GWP Values and Lifetimes

(Source: Myhreet al., 2013)

CO₂ has a GWP of 1 since it is the most prevalent and plentiful greenhouse gas, therefore all other GHG warming potentials are compared to it. Fluorinated gases, for example, have GWPs thousands of times bigger than CO₂, implying that they have a considerably greater impact on climate change pound-for-pound than CO₂.

Table 2: GWP Values and Sources

Name	% of U.S. GHG Emissions 2013	Sources	Lifetime in the Atmosphere	Global Warming Potential (GWP)
Carbon Dioxide (CO2)	82%	Electricity production, transportation, numerous industrial processes.	Approximately 50- 200 years. Poorly defined because CO2 is not destroyed over time; it moves among different parts of the ocean–atmosphere– land system.	1
Methane (CH4)	10%	Livestock manure, food decomposition; extraction, distribution and use of natural gas	12 years	25
Nitrous oxide (N2O) Black carbon	5% >1%	Vehicles, power plant emissions Diesel engines, wildfires	115 years Days to weeks	298 3,200

(soot, PM)		biomass in household cook stoves (developing countries)		
Fluorinated gases: PFCs, HFCs, NF3, SF6	>5%	No natural sources. These are synthetic pollutants found in coolants, aerosols, pesticides, solvents, fire extinguishers. Also used in the transmission electricity.	5	PFCs: 7,000– 12,000 HFCs: 12– 14,000 NF3: 17,2000 SF6: 22,800

GLOBAL WARMING

The term "global warming" or "climate change" refers to an increase in average worldwide temperatures caused by an increase in the greenhouse effect caused by increased greenhouse gas emissions. Forest fires, volcanic eruptions, methane release from thawing permafrost on the ocean floor and release of methane gas from cattle, wet lands and anthropogenic sources of exhausts from all types of combustion, industrial production of greenhouse gases, agricultural water lodging activities such as paddy cultivation, artificial wet lands, and deforestation are examples of natural events. As the earth warms, pre-existing weather patterns change quickly. There are various signs that changes with the warming earth, according to the National Oceanic and Atmospheric Administration (NOAA).

FACTORS INCREASES WITH GLOBAL WARMING

- Temperature of land
- Sea surface temperature
- Troposphere temperature
- Temperature over oceans
- Ocean heat content
- Sea level
- Humidity

FACTORS DECREASES WITH GLOBAL WARMING

- Glaciers
- Snow cover
- Sea ice

GREENHOUSE GASES

Greenhouse gases are the primary cause of climate change. Greenhouse gases are gases that trap heat energy; all greenhouse gases are positive radioactive forcing agents capable of

disrupting the energy balance in the atmosphere. Many greenhouse gases are emitted primarily as a result of human activities.

Sector	Activities	Gases
Energy	Forest fuel combustion Natural gas leakage Industrial activities Biomass burning	CO ₂ , CH ₄ , N ₂ O, O ₃
Forest	Harvesting Clearing Burning	CO ₂ , CH ₄ , N ₂ O
Agriculture	Paddy fields Animal husbandry (ruminants) Fertilizer usage	CO2, CH4, N2O
Waste	management Sanitary landfill Incineration Biomass decay	CO ₂ , CH ₄ , N ₂ O, O ₃ , CFCs
Industrial	Metal smelting & processing Cement production Petrochemical production Miscellaneous	CO ₂ , CH ₄ , N ₂ O, CFCs, SF ₆ , CF ₄ , C ₂ F ₆

Table 3: Major Sources of Greenhouse Gases

(Source: Kemp, 2004)

IMPACTS OF CLIMATE CHANGE ON ENVIRONMENT

Global warming and climate change



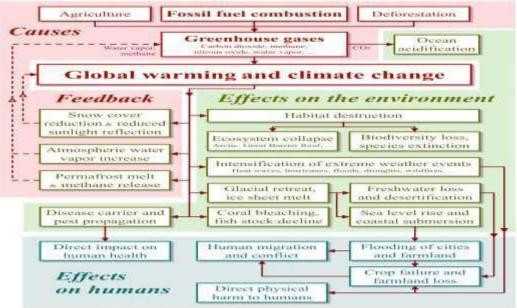


Fig. 1: Causes and Effect of Global Warming and Climate Change.

IMPACT ON AGRICULTURE

Climate change and its variability are causing widespread worry about their effects on agricultural production. While crops would respond positively to increase CO2 in the absence of climate change, the associated effects of high temperatures, altered precipitation patterns, and possibly increased frequency of extreme events such as drought and floods will most likely depress yields and increase production risks in many world regions, widening the gap between rich and poor countries.

Because of the dominance of agriculture in their economies, the scarcity of capital for adaptation measures, their warmer baseline climates, and their heightened exposure to extreme events, a consensus has emerged that developing countries are more vulnerable to climate change than developed countries. As a result, climate change might have a particularly negative impact in the developing world, where 800 million people are undernourished. A group of more than 40 'least-developed' countries, mostly in Sub-Saharan Africa, is of particular concern, with domestic per capita food production falling by 10% in the last 20 years.

Plants have evolved to maximize yields in specific temperature and humidity conditions. The rate at which a plant develops is influenced by the amount of CO2 and the temperature in the environment. The rate of development in plants alters when temperatures and CO2 concentrations rise, impacting the plants or crops growing time. Rice productivity is expected to decline by 10% for every 1% increase in growing season mean temperature between 30 and 400 degrees Celsius. The effect of a rise in the minimum temperature on rice grain output will be greater than the effect of a rise in the maximum temperature, which will be negligible.

Rabi crops are likely to lose more than Kharif crops. Wheat and other hypothermophilic crops such as cauliflower and cabbage are anticipated to be affected by global warming in Central India, whereas temperate crops such as cherry, apple, plum, and peach are likely to be harmed in Northern India. In Northern India, frost damage is likely to be less frequent. Global warming may threaten the viability of indigenous crops such as Basmati rice and litchi. Food trade imbalance due to favorable effects in Europe and North America and negative effects in tropical and subtropical nations such as India, Brazil, and Mexico.

IMPACT ON BIODIVERSITY

Increased land and ocean temperatures shifted the home ranges of numerous species pole ward or upward from their current location, with droughts and deserts speeding up the process. Species with a limited habitat requirement or that are stationary (coral reefs) or that have a limited climatic or geographic range (mountain top or island habitats) are more vulnerable to climate change. As atmospheric CO2 levels rise and opportunists (weeds) win the competition, this may also boost net primary productivity. Sea turtles, crocodiles, amphibians with permeable skin, and eggs are more prone to temperature-dependent sex determination. Many habitats, such as marshes, beaches, grasslands, and sea grass beds, are disappearing, and species that are already endangered face extinction. Climate changerelated reductions in Arctic and Antarctic ice affect marine mammals' seasonal distribution, migratory patterns, nutritional and reproductive status, as well as plankton distribution. This has an impact on the marine food chain, and the loss of a keystone species causes the entire food chain to collapse. Long-lived plants, such as perennial trees, display signs of climate change over time and gradually recover. Phenology, breeding seasons, behavioural changes, and migration patterns (in birds, for example) have all been documented.

IMPACT ON HEALTH

Heat and cold have direct physiological effects; high heat killed several people in Indian states in early 2015; continuous exposure can cause skin damage, eye disease, adverse effects on the immune system, and skin cancer; temperature raises blood pressure, viscosity, and pulse; thus, death from cardio vascular disease rises; and increased stress and malnutrition also have negative effects on health.

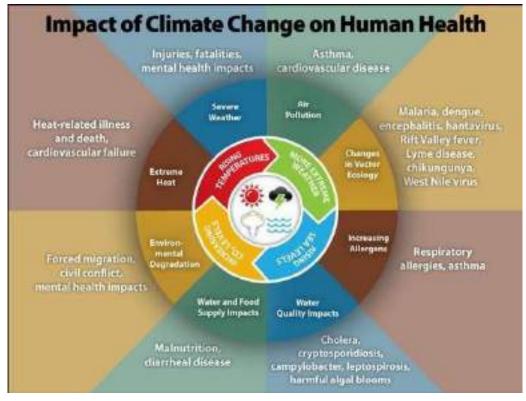


Fig. 2: Impact of Climate Change on Human Health

Flooding increases mosquito vector breeding sites, and damage in water pipes, septic tanks, sewers, drainage, and storm water causes leaks and pollution in portable water sources, resulting in epidemics of water-borne and vector-borne diseases.

Diarrhea, cholera, and dysentery are all waterborne diseases.

Falciparum malaria, vivax malaria, dengue fever, elephantiasis, yellow fever, and west Nile fever, rodent-borne infections plaque, Lyme disease, and tick-borne encephalitis, and hanata virus pulmonary syndrome are examples of vector-borne diseases.

CONCLUSION

Global warming and climate change have received some attention in the preceding analysis. Greenhouse gas emissions are thought to be the cause of global warming and climate change. CO2, CFCs, CH4, and N2O are four primary gases that contribute significantly to global warming and climate change. Natural and man-made activities both release these gases into the atmosphere. The long-term consequences of global warming and climate change on the environment may be seen in the late twentieth and early twenty-first centuries. Changes in sea level, global average temperature, ice cap melting, altering weather patterns, impact on agricultural productivity, heat wave intensity, and drought conditions are all frequent repercussions of global warming and climate change on our planet. It disrupts the lives, property, farmland, and ecosystem of millions of people. Future generations should focus on comprehending the phenomenon of climate change and its consequences.

REFERENCES

- 1. Langford, I. H., & Bentham, G. (1995). The Potential Effects of Climate Change on Winter Mortality in England and Wales. International Journal of Biometeorology, 38, 141-147.
- 2. McCarthy, J. J. et al. (2001). Report of the Intergovernmental Panel on Climate Change. New York, USA: Cambridge University Press.
- 3. McMichael, A. J., & Githeko, A. Human Health. In: Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment.
- 4. Patz, J. et al. (2000). The Potential Health Impacts of Climate Variability and Change for the United States: Executive Summary of the Report of the Health Sector of the US National Assessment. Environmental Health Perspectives, 108, 367-376.
- 5. Pounds, J.A., & R. Puschendorf (2004). Clouded Futures. Nature, 427, 8 January 2004.
- 6. Rens Kortmann (CE Delft), Edgar Peijnenborgh (RPS), Judith Harrewijn, Lindske van Hulst (SME Advies) (2007). Climate Change: Causes, Consequences, and Solutions, Scientific Background to the On-Line Platform Climate Quest.
- 7. Rooney, C. et al. (1998). Excess Mortality in England and Wales during the 1995 Heatwave. Journal of Epidemiology and Community Health, 52, 482-486.

- 8. Shindell, D. T. et al. (1998). Increased Polar Stratospheric Ozone Losses and Delayed Eventual Recovery Owing to Increasing Greenhouse Gas Concentrations. Nature, 392, 589-592.
- 9. Stern, N. (2006). The Economics of Climate Change—The Stern Review. Cambridge: Cambridge University Press
- 10. Sudip Mitra, Global Climate Change an Introduction. http://www.climate-leaders.org/wpcontent/uploads/global-climatechange-sudipmitra.pdf
- 11. UNFCCC (UN Framework Convention on Climate Change) (2007). Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries (p. 12). Bonn: UNFCCC.

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Gurnule published more than 200 research papers in National and International reviewed journals and presented more than 110 research papers in National and International conferences. He is a Reviewer of 41 International journals of Elsevier, John Wiley, Springer, Marcel Dekkar, Bentham, RSC publishers having an impact factor of more than 2.0.

He has received CRSI Best Teacher Awards-2011 for outstanding contribution in Polymer Materials Presented by Chemical Research Society of India, Bangalore at CRSI Symposium at Bhuwneshwar in 2011. He is also received Distinguish Scientist Award-2016 for their contribution to research work at Chennai by the Centre for Advanced Research, Chennai. He has also been received Aufbau International Outstanding Researcher Award-2016 by ACS publication Salem. He has also received the Best researcher award by the Vishwashanti society at MDI Singapore in 2017. His academic achievement includes best research paper presentation awards for 07 Research Papers in conferences. He has published more than 360 Science Articles in daily Newspapers for the people of society aiming to popularize science. He has successfully guided 26 students for a Ph.D. degree and 8 are currently registered for Ph.D. with him. He has successfully guided 21 M. Phil. Students for their dissertation work. He has successfully completed 03 Research Projects of a total amount of Rs. 46, 00,870/- of UGC. He is the author of 32 Books/11 Book Chapters, 07 of which are of International level published by Apple Academic Press Inc. Canada, Elsevier, and Springer. He is the Secretary of the Society for Promotion of Material Science, Nagpur. He is Secretary of West Zone of Association of Chemistry Teachers, Mumbai. He is a Life Member of more than 12 various academic societies. He is recently honored with the Best Researcher Award by Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur on 5th Sep. 2018.

Recently ISCAS prestigious Silver Medal Award was received in the 11th ISCAS National Conference at Nagpur, on 20th Dec. 2019.

He has delivered more than 60 Invited Talks at National and International Conferences. He has organized 07 National and 11 International Conference/Webinars for the researcher in India and abroad. He has visited countries like Malaysia, Singapore, Indonesia, Thailand, Nepal, Taiwan, Hong Kong, Bangladesh,

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